



# **APEC Industries**

## **Composite Polymeric Materials LLC**

*Engineering Solutions in various sectors*

# Manufacturing Facility



# About Us

**APEC Industries is a UAE based manufacturing company formed with the objective of providing world class Composite Polymeric Materials such as Geosynthetic Composites for Civil Engineering applications and Other Synthetic Composites for Building applications.** We provide innovative, cost effective and easy to apply solutions for a wide range of geotechnical, transportation, landfills, oil & gas, mining and recreational sectors.

**Our technical expertise helps in delivering outstanding project support and customer service.** We guarantee high quality of our products and related services. The company intends to lead the market in design and manufacture of innovative geosynthetics and continues to provide ground-breaking solutions.

**APEC Industries offer Composite materials and systems that gives practical engineering solutions** for drainage, reinforcement, separation, filtration, stabilization, waterproofing, salt barriers and root barriers.

# APEC'S Composite Products Range

<b>Drainage Composites</b>	<ul style="list-style-type: none"><li>• NETFLOW (HDPE Geonet Composite)</li><li>• NETLINER (HDPE Geonet Composite with one/both sides geomembrane)</li><li>• CUPFLOW (HDPE Cusped Sheet Composite)</li><li>• MATFLOW (3D Geomat PP Composite)</li><li>• MATLINER (3D Geomat PP Composite with one side geomembrane)</li></ul>
<b>Containment Composites</b>	<ul style="list-style-type: none"><li>• BENTOCLINE (Geosynthetic Clay Liner Composite)</li><li>• BENTOCLINE M (GCL Composite Laminated with geomembrane)</li><li>• EASYLINER HD (HDPE Composite Geomembrane)</li><li>• EASYLINER LD (LLDPE Composite Geomembrane)</li></ul>
<b>Reinforcement Composites</b>	<ul style="list-style-type: none"><li>• GRIDTEXTILE PP (PP Composite Geogrid)</li><li>• GRIDTEXTILE PET (Polyester Composite Geogrid)</li><li>• GRIDTEXTILE FG (Fiberglass Composite Geogrid)</li></ul>
<b>Erosion Control Mats</b>	<ul style="list-style-type: none"><li>• EROMAT (PA 3D Geomat Erosion control mat)</li><li>• EROGRID (PA 3D Geomat with PET Geogrid Erosion mat composite)</li><li>• CEMENTMAT (Geosynthetic Cementitious Composite mat)</li><li>• SANDSEAL (Geosynthetic Sand mat)</li></ul>
<b>Salt Barrier Composites</b>	<ul style="list-style-type: none"><li>• SALTSTOP (HDPE Geonet Composite)</li></ul>
<b>Root Barrier Composites</b>	<ul style="list-style-type: none"><li>• ROOTDIVERT HD (HDPE Composite Root barrier)</li><li>• ROOTDIVERT LD (LLDPE Composite Root barrier)</li></ul>

NETFLOW®

NETLINER®

CUPFLOW®

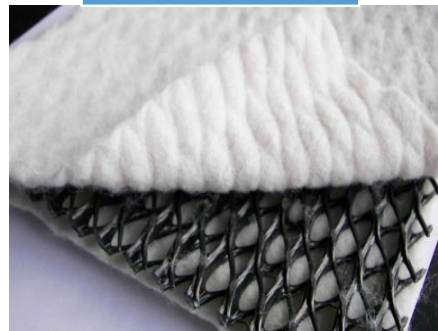
MATFLOW®

MATLINER®

# APEC Drainage Composites



NETFLOW®



HDPE Tri-planar  
Geonet Composite

NETLINER®



HDPE Tri-planar  
Geonet Composite

CUPFLOW®



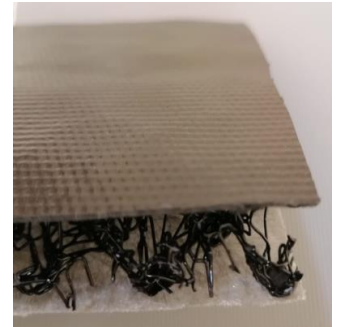
HDPE Cusped Sheet  
Composite

MATFLOW®



3D Geomat  
Composite

MATLINER®



3D Geomat  
Composite

**NETFLOW® geocomposite consists of a HDPE tri-planar/Biplanar Geonet core bonded with non-woven filter fabric on one or both sides.** NETFLOW® is available in various thicknesses and flow capacities.

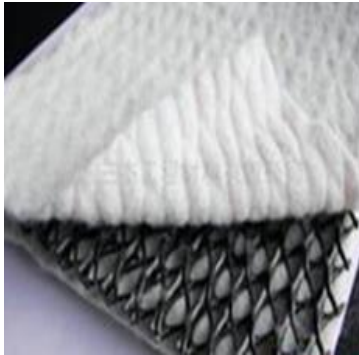
## Functions

Separation

Filtration

Drainage

Gas  
Venting



## Benefits of NETFLOW®

- NETFLOW® has high flow capacity, compared to gravel drain.
- Hydraulic pressures are reduced by removing water from soils.
- Compared to clogging with gravel drain, NETFLOW® is more effective.
- NETFLOW® has high impact and compressive strength.
- Huge saving in air space of landfills, compared to gravel drains.
- NETFLOW® reduces excavation and backfill.
- Durable, chemical & UV resistant and long-term performance.
- Factory manufactured with high quality assured.
- Filtration properties are suitable for most soil types.
- Highly durable to a wide range of leachate solutions.
- Ability to custom manufacture to specific project requirements.

## Applications

- Drainage under Roads and highways
- Leachate collection in landfills
- Leakage detection in landfills, evaporation ponds, heap leach pads etc.
- Gas venting from landfills
- Capping system in landfills
- Drainage under Sports field
- Other subsurface drainage applications

Main features	NETFLOW®	
Thickness at 2 kPa	4.0 – 8.0 mm	
In-plane water flow capacity, $\sigma = 20 \text{ kPa}$ , Soft/Rigid contact	Gradient ( $i = 1.0$ ) ~2.70 l/(m.s)	Gradient ( $i = 0.1$ ) ~0.70 l/(m.s)
Compressive strength (tri-planar geonet)	1917 kPa	
Roll width	2.0 and 4.0 m	
Roll length	25 , 50 and 100 m	
Roll Weight (min – max)	60 – 520 kg	

# NETLINER®

## Geodrain Composite with Geomembrane



**NETLINER® geocomposite consists of a HDPE Geonet core bonded with non-woven filter fabric on one side and impermeable membrane on the other side.** NETLINER® is available in various thicknesses and flow capacities.

### Functions

**Separation**

**Filtration**

**Drainage**

**Gas Venting**

**Containment**



### Benefits of NETLINER®

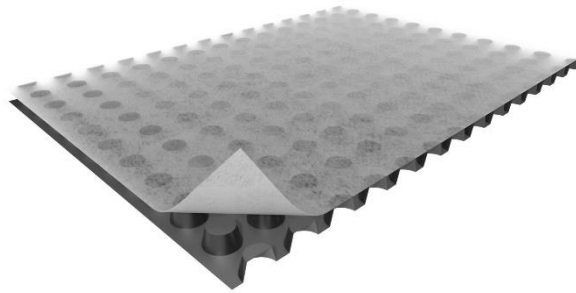
- NETLINER® has high flow capacity, compared to gravel drain.
- Hydraulic pressures are reduced by removing water from soils.
- NETLINER® has high impact and compressive strength.
- Huge saving in air space of landfills, compared to gravel drains.
- NETLINER® reduces excavation and backfill.
- NETLINER® is durable, chemical & UV resistant and long-term performance.
- Factory manufactured with high quality assured.
- Filtration properties are suitable for most soil types.
- Highly durable to a wide range of leachate solutions.
- Ability to custom manufacture to specific project requirements.

### Applications (Drainage along with Waterproofing)

- **Leachate collection in landfills**
- **Leakage detection in landfills,** evaporation ponds, heap leach pads etc.
- **Capping system in landfills**
- **Drainage under Roads and highways**
- **Gas venting from landfills**
- **Drainage under Sports field**
- **Other subsurface drainage applications**

Main features	NETLINER®	
Thickness at 2 kPa	4.0 – 7.0 mm	
In-plane water flow capacity, $\sigma = 20$ kPa, Soft/Rigid contact	Gradient ( $i = 1.0$ ) $\sim 1.60$ l/(m.s)	Gradient ( $i = 0.1$ ) $\sim 0.30$ l/(m.s)
Roll width	2.0 and 4.0 m	
Roll length	25 , 50 and 100 m	
Roll Weight (min – max)	70 – 540 kg	

**CUPFLOW® geocomposite consists of an impermeable cusped HDPE drainage core bonded with non-woven filter fabric on one side.** CUPFLOW® is available in various thicknesses, compressive strengths and flow capacities.



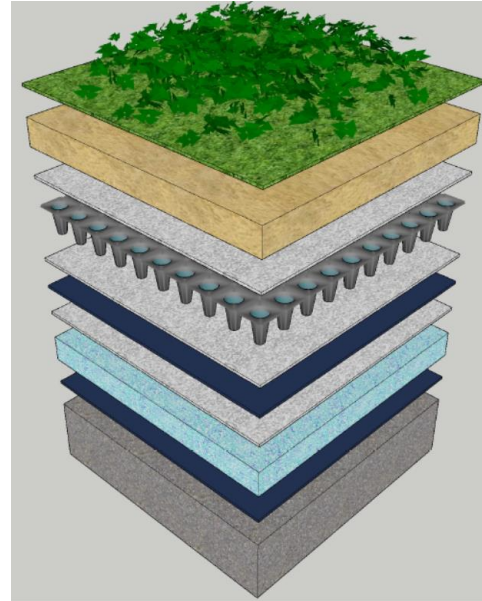
### Functions

**Separation**

**Filtration**

**Drainage**

**Water Reservoir**



### Applications

- Green roof drainage
- Road edge carriageway drains
- Relieve hydraulic pressure from buried structures and retaining walls
- Relief of uplift pressure beneath tanks, slabs and culverts
- Bridge abutments and wingwall drainage
- Drainage in Tunnel walls and floor
- Embankment drainage
- Landfill cap and slope drainage
- Gas venting from landfills
- Vertical cut-off trenches
- Drainage of contiguous and secant piled walls



Main features	CUPFLOW®	
Thickness at 2 kPa	5.0 – 25.0 mm	
In-plane water flow capacity, $\sigma = 20$ kPa, Soft/Rigid contact	Gradient ( $i = 1.0$ ) ~7.0 l/(m.s)	Gradient ( $i = 0.1$ ) ~2.00 l/(m.s)
Compressive Strength	200 – 1000 kPa	
Roll width	1.0, 2.0 and 4.0 m	
Roll length	25 , 50 and 100 m	
Roll Weight (min – max)	15 – 500 kg	

### Benefits of CUPFLOW®

- Thinner and less weight drainage layer compared to conventional drainage. Therefore, reduction in dead load on to soil or structures.
- Huge saving in air space of landfills, compared to gravel drains.
- CUPFLOW® provides water reservoir, which can be used by plants in dry seasons.
- Reduce excavation and backfill.
- CUPFLOW® has high flow capacity, durable, UV resistant & long-term performance.
- CUPFLOW® is easy and quick to install without specialized equipment.
- Reduction in traffic volume, compared to sand & gravel drains.
- Factory manufactured with high quality assured.
- Filtration properties are suitable for most soil types.
- Custom made to comply with interior & exterior drainage works.

**MATFLOW® is a 3D geocomposite consists of PP extruded W-shaped monofilaments core bonded with non-woven filter fabric on one or both sides.** MATFLOW® is available in various thicknesses, weights, compressive strengths and flow capacities.

**Functions**

- Separation
- Filtration
- Drainage



**Applications**

- Drainage behind Basement walls
- Relieve hydraulic pressure retaining walls
- Bridge abutments and wingwall drainage
- Drainage in Parking decks
- Highway edge drains
- Horizontal drainage below embankments
- Drainage in railway projects
- Vertical Cut-off trenches
- Relief of uplift pressure beneath tanks, slabs and culverts

Main features	MATFLOW®	
Thickness at 2 kPa	4.0 – 20.0 mm	
Mass per unit area	560 – 1260 g/m²	
In-plane water flow capacity, $\sigma = 20 \text{ kPa}$ , Soft/Rigid contact	Gradient (i = 1.0) ~6.30 l/(m.s)	Gradient (i = 0.1) ~1.50 l/(m.s)
Roll width	2.0 and 4.0 m	
Roll length	25 , 50 and 100 m	
Roll Weight (min – max)	30 – 510 kg	

**Benefits of MATFLOW®**

- MATFLOW® contains **95% of open voids** for high water discharge.
- Economical over conventional sand, gravel / aggregate drains.
- Weep holes are omitted from retaining walls.
- MATFLOW® ensures the long-term discharge of percolation water from underground structures.
- Geotextile eliminates clogging of the drainage core.
- Available wide roll widths, reducing the joints and installation time.
- MATFLOW® is durable, chemical & UV resistant and long-term performance.
- Will not degrade over time and will not pollute the subsoil
- Factory manufactured with high quality assured.
- Filtration properties are suitable for most soil types.
- Ability to custom manufacture to specific project requirements.

**MATLINER® is a 3D geocomposite consists of PP extruded W-shaped monofilaments core bonded with non-woven filter fabric on one and impermeable membrane on the other side.** MATLINER® is available in various thicknesses, unit weights and flow capacities.

### Functions

**Separation**

**Filtration**

**Drainage**

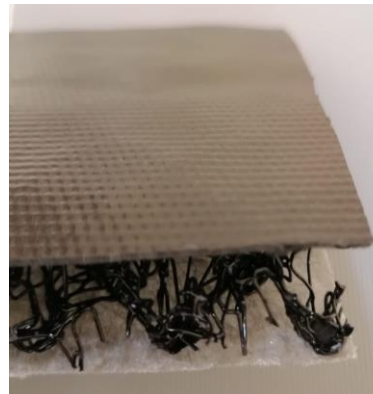
**Protection**

**Containment**

Main features	MATLINER®	
Thickness at 2 kPa	4.0 – 20.0 mm	
Mass per unit area	560 – 1260 g/m <sup>2</sup>	
In-plane water flow capacity, $\sigma = 20$ kPa, Soft/Rigid contact	Gradient (i = 1.0) ~5.20 l/(m.s)	Gradient (i = 0.03) ~0.70 l/(m.s)
Roll width	2.0 and 4.0 m	
Roll length	25 , 50 and 100 m	
Roll Weight (min – max)	30 – 510 kg	

### Applications of MATLINER® (Drainage along with Waterproofing)

- Behind Basement walls
- Drainage in Tunnel walls and floor
- Relieve hydraulic pressure from buried structures and retaining walls
- Bridge abutments and wingwalls
- Tunnel walls and floor
- Parking decks
- Highway edge drains
- Railway projects
- Relief of uplift pressure beneath tanks, slabs and culverts



### Benefits of MATLINER®

- MATLINER® along with the drainage facility it has an extra functions of protection and waterproofing. During the backfilling process, the drain mat acts as a protection layer to prevent construction equipment from damaging the waterproofing membrane bonded to it.
- MATLINER® also keeps sharp rocks or debris in the soil from puncturing the waterproofing membrane.
- Economical over conventional sand, gravel / aggregate drains.
- Weep holes are omitted from retaining walls.
- MATLINER® ensures the long-term discharge of percolation water from underground structures.
- Geotextile eliminates clogging of the drainage core.
- Available wide roll widths, reducing the joints and installation time.
- MATLINER® is durable, chemical & UV resistant and long-term performance.
- Will not degrade over time and will not pollute the subsoil.
- Factory manufactured with high quality assured.
- Filtration properties are suitable for most soil types.
- Ability to custom manufacture to specific project requirements.

BENTOCINE GCL®

EASYLINER HD®

EASYLINER LD®

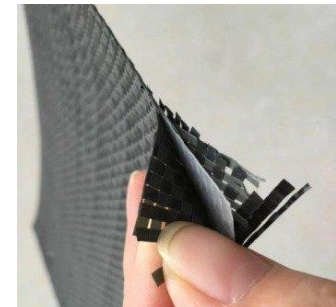
# APEC Containment Composites



EASYLINER HD®



BENTOCINE GCL®



EASYLINER LD®

# BENTOCLINE<sup>®</sup> -Hydraulic Barrier

- ✓ A composite material **designed for low hydraulic conductivity.**
  - » Typically, hydraulic conductivity (k) varies  $5 \times 10^{-11} \text{m/sec}$  to  $5 \times 10^{-13} \text{m/s}$
- ✓ Typically comprised of montmorillonite clay (sodium bentonite) sandwiched between two geotextiles and/or bonded to a geomembrane. When hydrated under confinement the bentonite swells to form a low permeability clay layer with **the equivalent hydraulic protection / waste containment of several feet of conventional compacted clay liners.**
- ✓ About 4mm to 7mm in thickness and roll width 5.05m and length up to 45m.



BENTOCLINE Roll



BENTOCLINE GCL



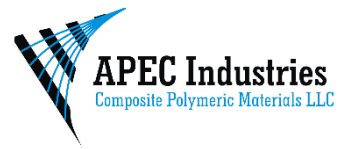
BENTOCLINE GM-GCL



Sodium Bentonite

# BENTOCLINE GCL®

Geosynthetic Clay Liner with Geomembrane Base



- **BENTOCLINE® consists of a uniform layer of sodium bentonite powder encapsulated with non-woven one side and woven on the other side which are needle punched together called BENTOCLINE® GCL. BENTOCLINE® GCL is laminated with LLDPE geomembrane on woven or Non-woven side BENTOCLINE® GM-GCL .**

## Functions

Containment

Separation

Waterproofing

## Applications

- Base lining of various landfills
- Landfill capping
- Mining remediation and reclamation
- Ponds / Canal lining
- Coal ash disposal facilities
- Storage & highway balancing reservoirs
- Fuel spillage containment
- Erosion control on slopes
- Environmental lining of roads
- Construction in contaminated land
- Groundwater protection
- Waterproofing of basements



**BENTOCLINE® GCL**



**BENTOCLINE® GM-GCL**



Main features	BENTOCLINE®
Thickness at 2 kPa	6.5 mm
Mass per unit area	4800 g/m <sup>2</sup>
Roll width	5.05 m
Roll length	45 m
Roll Weight (min – max)	1090 kg

## Benefits of BENTOCLINE®

- BENTOCLINE® with 0.5mm thick LLDPE membrane on the woven side is the best product in the market with NO FLOW allowed.
- Sodium bentonite powder, having high swelling capacity, adds the **self healing property to our BENTOCLINE® when hydrated.**
- In landfills, **eliminates ~1-2m thick CCL layer**, Increasing the air space, reducing excavation, backfilling and traffic volume.
- Our special needle-punch process increases the mechanical bond between top & bottom geotextiles. Increasing the internal shear resistance and the long-term creep resistance of BENTOCLINE®.
- Effective rehydration capacity of BENTOCLINE® makes it unique. Even small quantity of leachate fluids from the new disposal will be able to rehydrate it, due to high swelling nature of Na<sup>+</sup> bentonite and with the geomembrane in the base as liner.
- Wide roll widths reduce the overlaps & installation time.
- **Various grades of BENTOCLINE® is able to produce as per the client's requirement.**

**EASYLINER HD® geocomposite consists of HDPE geomembrane bonded with non-woven geotextile on one or both sides.** EASYLINER HD® is available in various thicknesses and puncture resistance.



### Functions

**Containment**

**Separation**

**Waterproofing**



### Benefits of EASYLINER HD®

- Wide width of geomembrane composite rolls reduce number of overlaps in site, which directly effects the time and cost of the project.
- **The bonding of geotextile to the membrane increased its puncture resistance, tear resistance, friction between soil and composite.**
- **Improved internal friction angle towards the surrounding layers.**
- EASYLINER HD® has good Chemical, biological, weathering and UV resistant.
- **Save the installation time and avoid the wrinkles**
- **Thermal Expansion coefficient around 40% lesser compared to geomembrane alone**

Main features	EASYLINER HD®
Thickness of Geomembrane	0.75 – 2.00 mm
Break Strength of Geomembrane	20 – 53 kN/m
Puncture Resistance of Geomembrane	240 - 640 N
Roll width	7.0 m
Roll length	50 and 100 m
Roll Weight	730 and 1600 kg

### Applications

- Liners in landfills, evaporation ponds, heap leach pads, ponds, canals, emergency spillways, railways and agriculture industry etc.
- Waterproof facing in various dams
- Contain and transport fluids in ocean
- Barrier to odours from landfills
- Floating reservoirs for seepage control
- Prevent infiltration of water in sensitive areas
- Barrier tubes as dams are formed
- Conduct water flow into preferred paths
- Beneath highways to prevent pollution from de-icing salts, to control expansive soils and to capture hazardous liquid spills
- Reduces differential settlements
- Beneath asphalt overlays as a waterproofing layer
- Contain seepage loss from existing above ground tanks
- Waterproofing membrane on roofs to grow green roof system.

# EASYLINER LD®

## LLDPE Geomembrane Composite



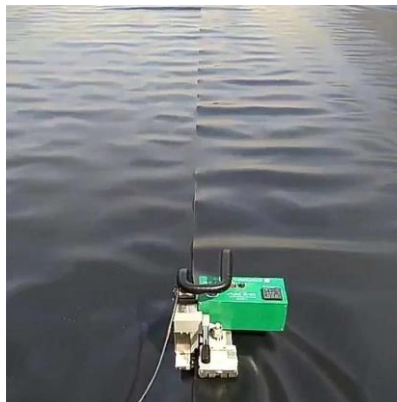
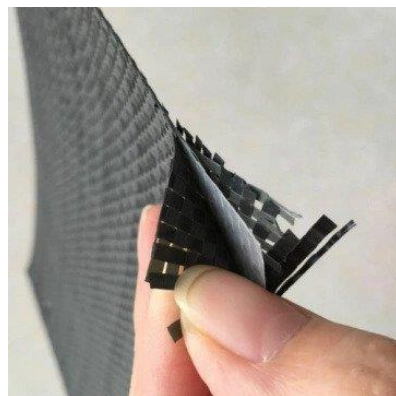
**EASYLINER LD® geocomposite consists of LLDPE geomembrane bonded with non-woven or woven geotextiles on both sides.** EASYLINER LD® is available in various thicknesses and puncture resistance.

### Functions

**Containment**

**Separation**

**Waterproofing**



### Benefits of EASYLINER LD®

- Wide width of geomembrane composite rolls reduce number of overlaps in site, which directly effects the time and cost of the project.
- The bonding of geotextile to the membrane increased its puncture resistance, tear resistance, friction between soil and composite.
- **LLDPE is more flexible than HDPE geomembranes.**
- EASYLINER LD® is good Chemical, biological, weathering and UV resistant.



### Applications

- Covers / capping for landfills, manure digesters in agriculture industry and power plant coal ash
- Waterproofing liners between rockface and tunnel wall inner concrete face, canals, ponds, reservoirs etc.,
- Daily covers in landfills or coal ash disposal facilities.
- Temporary covers on embankments and small waterproofing applications
- Contain and transport fluids in trucks
- Prevent infiltration of water in sensitive areas
- Conduct water flow into preferred paths

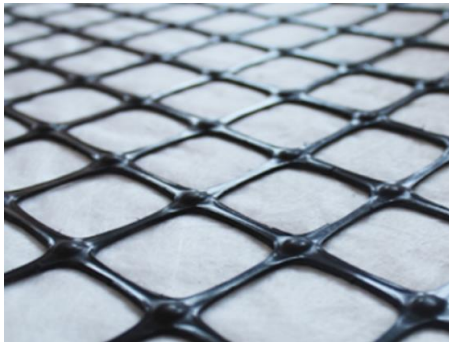
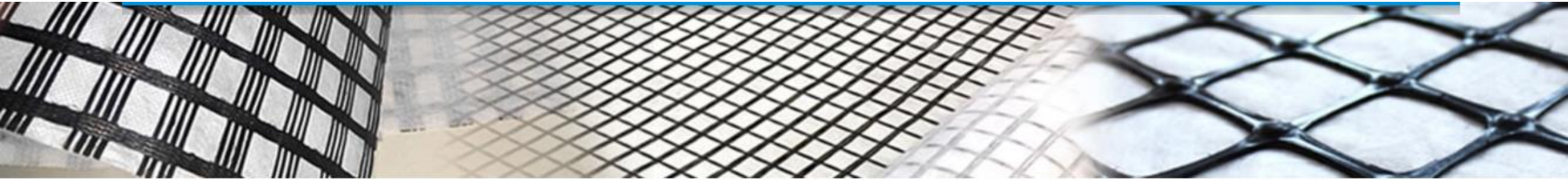
Main features	EASYLINER LD®	
Thickness of Geomembrane	0.50 – 2.00 mm	
Break Strength of Geomembrane	13 – 53 kN/m	
Puncture Resistance of Geomembrane	120 - 500 N	
Roll Dimensions	LLDPE with NW	LLDPE with W
Roll width	7.0 m	6.0 m
Roll length	50 and 100 m	50 and 100 m
Roll Weight	380 and 760 kg	210 and 420 kg

GRIDTEXTILE PET®

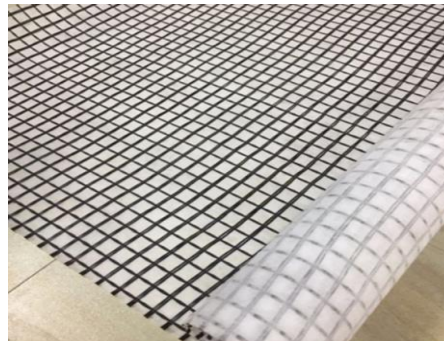
GRIDTEXTILE PP®

GRIDTEXTILE FG®

# APEC Reinforcement Composites



GRIDTEXTILE PP®



GRIDTEXTILE PET®



GRIDTEXTILE FG®

**GRIDTEXTILE-PP® geogrid composite consists of Bi-axial geogrid made from polypropylene, bonded with a non-woven geotextile on one side.** GRIDTEXTILE-PP® is available in various tensile strengths and aperture sizes.



### Functions

**Reinforcement  
Separation  
Interlocking  
Filtration**

### Benefits of GRIDTEXTILE-PP®

- When it is applied in multi layers, it improves the load bearing capacity of the ground.
- GRIDTEXTILE-PP® has high stiffness and low creep properties maximize soil performance.
- Limits differential settlements.
- High tensile strength at low stains.
- A strong mechanical interlocking with aggregates and railway ballast.
- Increases the load carrying capacity of roads and delay rutting by increasing the number of load cycles.
- GRIDTEXTILE-PP® has high resistance to abrasion, UV, weathering, acid, alkali, bio-decomposition and other possible external conditions that may affect the product performance.

Main features	GRIDTEXTILE-PP®		
Max. Tensile Strength (MD /CMD) (kN/m)	20 / 20	30 / 30	40 / 40
Tensile Strength @ 2% strain (kN/m)	7 / 7	10.5 / 10.5	14 / 14
Tensile Strength @ 5% strain (kN/m)	14 / 14	21 / 21	28 / 28
Elongation at max. strength (MD/CMD)	11% / 11% (min)		
Flexural Rigidity (mg-cm)	700,000	2,00,000	>5,00,000
Roll width	4.0 m		
Roll length	50, 75 and 100 m		
Roll Weight (min – max)	75 – 270 kg		

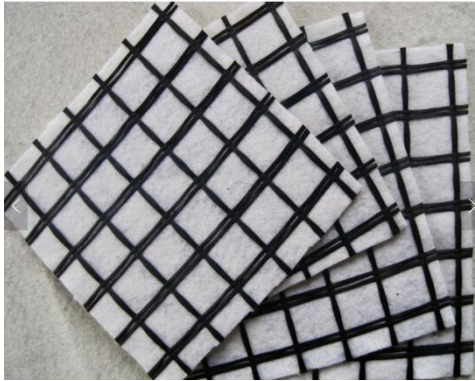
### Applications

- To confine soil and stone laterally and to develop shear resistance
- Reduce thickness of aggregate base layers
- Reduce thickness of ballast in railway applications
- Reinforcing retaining walls, slopes and foundations etc
- Stabilization and reinforcement of base and sub-base road layers
- Slope Stabilization
- Soil reinforcement
- Reinforcement in landfills
- Reinforcing below the car parking
- Load transfer platforms over piles
- Temporary crane & piling platforms
- Rail track permanent way
- Airport runways and aprons
- Cut-off trench for pipes
- Coastal and river defence walls and bunds
- Reinforcement under hydro-electric transmission line towers

# GRIDTEXTILE-PET®

## Geogrid Composite

**GRIDTEXTILE-PET® geogrid composite consists of Bi-axial geogrid made from woven high tenacity multifilament polyester yarns with durable polymer coating, bonded with a non-woven geotextile on one side.** GRIDTEXTILE-PET® is available in various tensile strengths and aperture sizes.



Main features	GRIDTEXTILE-PET®	
Max. Tensile Strength (MD /CMD)	60 / 60 kN/m	100 / 100 kN/m
Elongation at max. strength (MD/CMD)	10% / 10% (min)	
Aperture Size	25 x 25 and 40 x 40 mm	
Roll width	1.8, 3.6 and 5.3 m	
Roll length	50 and 100 m	

### Functions

**Reinforcement**  
**Separation**  
**Interlocking**

### Applications

- Basal reinforcement for embankments over soft sabkha soils
- To confine soil and stone laterally and to develop shear resistance
- Reinforcing retaining walls, slopes and foundations etc.,
- Stabilization and reinforcement of base and sub-base road layers
- Ground Stabilization
- Soil Reinforcement
- Engineered backfill Stabilization
- Load transfer platforms over piles
- Load support for strengthening access roads
- Erosion control and slope stabilization

### Benefits of GRIDTEXTILE-PET®

- GRIDTEXTILE-PET® has best performance against creep which maximize soil performance.
- GRIDTEXTILE-PET® has outstanding long-term design strength.
- When it is applied in multi layers, it improves the load bearing capacity of the ground.
- GRIDTEXTILE-PET® has high tensile strength at low elongation.
- High resistance to abrasion, UV, weathering, acid, alkali, bio-decomposition and other possible external conditions that may affect the product performance.



**GRIDTEXTILE-FG® geogrid composite consists of Bi-axial woven geogrids made from glass fibre strands arranged in a grid pattern with bitumen polymeric coating and bonded with non-woven geotextile on one side.** GRIDTEXTILE-FG® is available in various tensile strengths and aperture sizes.



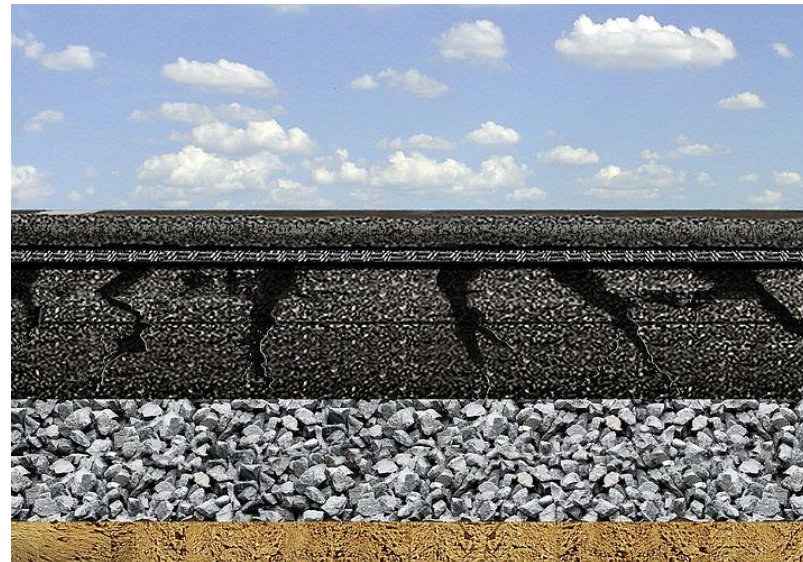
### Functions

Reinforcement

Separation



Main features	GRIDTEXTILE-FG®	
Max. Tensile Strength (MD /CMD)	50 / 50 kN/m	100 / 100 kN/m
Elongation at max. strength (MD/CMD)	3% / 3%	
Aperture Size	12.5 x 12.5 and 25 x 25 mm	
Youngs modulus of Geogrid	76 GPa	
Roll width	2.0, 4.0 and 5.0 m	
Roll length	100 m	
Roll Weight	90 – 350 kg	



### Applications

- Airport runways, taxiways, roads, bridges, parking lots, jointed concrete highways to control reflective cracking.
- High traffic pavement to control rutting.
- New highway construction, and other road maintenance/repair jobs to improve pavement life.

### Benefits of GRIDTEXTILE-FG®

- GRIDTEXTILE-FG® is suitable for all types of asphalt mixes.
- **High temperature resistance. FG- Melting point- 260 °C, where as Bitumen at 175 °C.**
- Minimizes both thermal and stress related reflective cracking.
- Reduces pavement rutting under high ambient temperatures and intense wheel loads.
- Increases the fatigue life of pavements with weak foundations.
- GRIDTEXTILE-FG® extends pavement life.
- Provides cost benefits by increasing pavement life cycle.
- Fast, easy installation and recyclable.

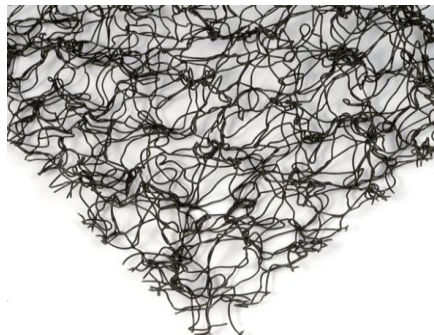
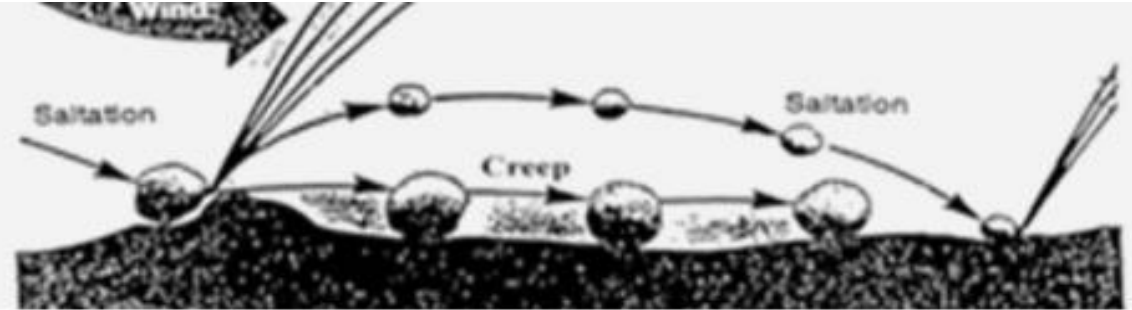
EROGRID®

CEMENTMAT®

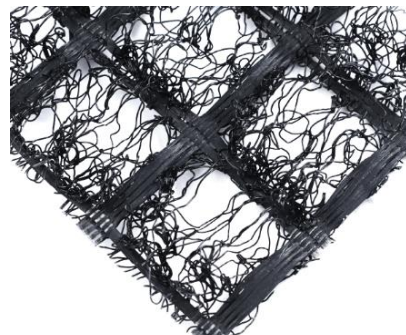
EROMAT®

SANDSEAL®

# APEC Erosion Control Composites



EROMAT®



EROGRID®



CEMENTMAT®



SANDSEAL®

**EROMAT® is a flexible, light weight three-dimensional, polyamide/PP Geomat made from polymer monofilament yarns.** Flow velocity < 4.5 m/s – EROMAT is recommended.

### Applications

- Erosion control in lakes, river embankments, dry slopes, spillways, canals and reservoirs
- A stabilisation grip layer on rocky slopes, smooth surfaces and geomembranes
- Landscaping

### Functions

#### Erosion Control

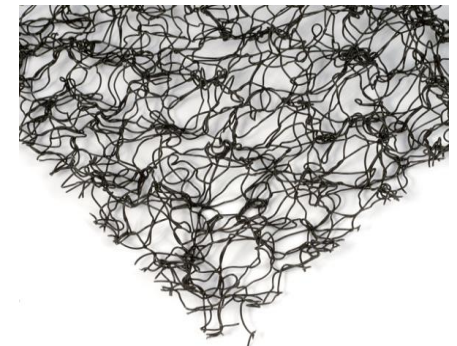
#### Slope Stabilization

### Benefits of EROMAT®

- EROMAT® offers permanent green solution and adds to slope stability by preventing erosion caused by soil transportation through wind and water.
- EROMAT® excellent bonding of individual filaments
- **Has over 90% voids which promotes swift vegetation growth.**
- Vegetation growth on top of EROMAT® reinforces the structure by allowing its roots to penetrate to the natural soil.
- Light, flexible, has high UV and chemical resistance and does not float in water.
- EROMAT® is highly resistant to bio-degradation and highly durable thereby providing a maintenance free system.
- **Blends discretely into the landscape.**



Main features	EROMAT®
Max. Tensile Strength – MD / CMD	14 / 14 kN/m
Elongation at Max. Tensile Strength – MD / CMD	60 % / 60 %
Roll width	2.0 to 4.0 m
Roll length	25 , 50 and 100 m
Roll Weight (min – max)	20 – 160 kg



# EROGRID®

## Erosion Control System



**EROGRID® geocomposite consisting of a flexible, light weight 3D polyamide/PP Geomat made from polymer monofilament yarns, manufactured with polyester geogrid as an integral part of it.** Flow velocity 4.5 – 6.0 m/s – EROGRID is recommended.



### Functions

**Erosion Control**

**Soil Reinforcement**

**Slope Stabilization**

### Applications

- Canal & Shoreline protection
- Repair of slope failures
- Channel Stabilization
- Steep Slopes

Main features	EROGRID®
Max. Tensile Strength – MD / CMD	40 / 40 kN/m
Elongation at Max. Tensile Strength – MD / CMD	60 / 60 %
Roll width	2.0 to 4.0 m
Roll length	25 , 50 and 100 m
Roll Weight (min – max)	20 – 160 kg

### Benefits of EROGRID®

- EROGRID® offers permanent green solution to slope stability and preventing erosion and provides maximum reinforcement at low elongations.
- Withstands wheel loading and resists burrowing animals.
- EROGRID® has unparalleled resistance to hydraulic shear stresses and withstands high flow velocities.
- EROGRID® is ideal for designs using percussive driven earth anchors.
- Has over 90% voids which promotes swift vegetation growth.
- Vegetation growth on top of EROGRID® reinforces the structure by allowing its roots to penetrate to the natural soil.
- Light, flexible, has high UV and chemical resistance and does not float in water.
- EROGRID® is highly resistant to bio-degradation and highly durable thereby providing a maintenance free system.

# CONCRETEMAT®

## Lining / Erosion Control System

Concrete mat is a flexible (pre-hydration) less permeable, fibre reinforced geocomposite. **Cementitious material that has a uniformly placed special cement mix impregnation within the geotextile fabrics which after wetting, sets to a compressive strength of 40MPa concrete.**

### Benefits:

- Compared to traditional concrete solutions, Concretemat is faster, easier and more cost effective to install and has the additional benefit of reducing the environmental impact of concreting works by up to 95%. It is available in bulk and smaller batch rolls.
- Concretemat is available in man portable rolls eliminating the need for plant on site and allowing concrete installation in areas with limited access. Prior to hydration, Concrete mat layers can be cut to length using basic hand tools eliminating the hazards associated with using power tools in high-risk environments. The concrete is pre-mixed so there is no need for mixing, measuring or compacting. Just add water.
- **Low project cost**
- **Ease of installation**
- Eco friendly - Concretemat is a low mass, low carbon technology which uses up to 95% less material than conventional concrete for many applications.

### Functions

**Erosion Control**  
**Scour**  
**Protection**  
**Filtration**  
**Separation**



### Applications:

- Lining in embankments, spillways, drop structure drains, slope stabilization, channels, bunds, dams, ponds, mine waste dump caps, weed control and alternative to grouting on mountains



Main features	CONCRETEMAT®
Mass per Unit area of Composite	1200 g/m <sup>2</sup>
Thickness	8 mm
Max. tensile strength (MD / CMD) at crack	8.5 / 6.5 kN/m
Compressive strength at 24 hours	40MPa
Initial Setting Time	60-120min.
Permeability	1x10 <sup>-9</sup>
Roll Width (m)	1.0
Roll Length (m)	120
Roll Weight (kg)	~1440

**SANDSEAL® is a multi-layered needle-punched staple fibre nonwoven with a filling of quartz sand for application in hydraulic engineering.** The product has been developed for underwater installation. Geotextile functions are separation, filtration and protection.

### Benefits:

- **SANDSEAL® achieved higher weight per unit area due to sand filling, simplifies installation and offers enhanced protection against displacement.** This allows the trouble-free, filtration-stable installation of revetments even under water.
- Simplified installation under difficult hydraulic conditions.
- Topsoil, concrete blocks, riprap as well as armour rocks can all be placed directly on top of SANDSEAL® due to its proven strength and flexibility.
- Revetment thickness can be reduced.
- Prevents erosion and displacement of subsoils in Coastal and other sensitive environments.
- It consists of a relatively stable matrix that retains its structure during handling, placement and long-term service.



### Applications:

- Reservoirs, Dams, Dykes, Scour protection, groynes, breakwaters, Roads, Tunnels and Landfills

### Functions

**Erosion Control**  
**Scour Protection**  
**Filtration**  
**Separation**



Main features	SAND MAT®
Mass per Unit area of Composite	5750 g/m <sup>2</sup>
Thickness	11.5 mm
Max. tensile strength (MD / CMD)	40 / 70 kN/m
Elongation at max. strength (MD / CMD)	70 / 40 %
Water permeability V <sub>I</sub> <sub>H50</sub> -Index	3.0 x 10 <sup>-2</sup> m/s
Puncture Resistance	6.0 kN
Roll Width (m)	5.0
Roll Length (m)	50
Roll Weight (kg)	1450

SALTSTOP®

# APEC Salt Barrier composite



# SALTSTOP® Salt Barrier System



**SALTSTOP® geocomposite consists of a HDPE Bi planar Geonet or 3D Geomat drainage core bonded with filter fabric on both sides.**



**SALTSTOP® NET**



**SALTSTOP® MAT**

## Applications

- Salt barrier in Landscapes, Sports field, Pavements, Roads, Basements and below Foundations
- Separation layer between vegetative soil & saline groundwater
- In Coastal Sabkha areas of Middle East where groundwater will be saline.



## Functions

- Separation
- Capillary Break
- Filtration
- Drainage

Main features	SALTSTOP®	
Thickness at 2 kPa	6.5 mm	
In-plane water flow capacity, $\sigma = 20$ kPa, Soft/Rigid contact	Gradient (i = 1.0) ~0.60 l/(m.s)	Gradient (i = 0.1) ~0.35 l/(m.s)
Static Puncture Resistance	5.0 KN	
Roll width	2.0 and 4.0 m	
Roll length	25 , 50 and 100 m	
Roll Weight (min – max)	50 – 400 kg	

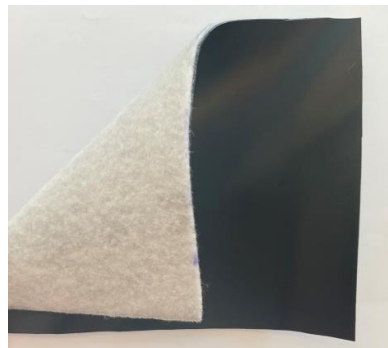
## Benefits of SALTSTOP®

- SALTSTOP® prevent capillary rise of saline ground water into vegetative topsoil.
- Reduces negative pore water pressure caused by capillary action.
- Provide a stable void space that serves as capillary breaks throughout the service life.
- SALTSTOP® prevent saline groundwater to encounter with concrete, soil or any buried / underground structures.
- SALTSTOP® is durable and carry high loads all while maintaining the void spaces needed for capillary breaks.
- It has strong resilience to weathering and not susceptible to chemical, biological and UV degradation.

ROOTDIVERT HD®

ROOTDIVERT LD®

# APEC Root Barrier Composites



ROOTDIVERT HD®



ROOTDIVERT LD®

# ROOTDIVERT HD®

## Root Barrier System



**ROOTDIVERT HD® geocomposite consisting of a HDPE geomembrane bonded with non-woven geotextile on one side.** ROOTDIVERT HD® is recommended for long-term service life projects. Available in various thicknesses, roll widths and lengths.

### Applications

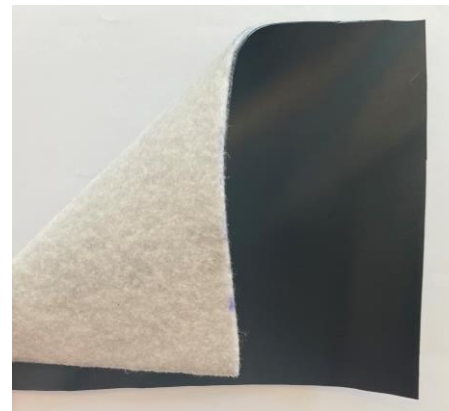
- Root Barrier in Roads and Highways, Basements and Foundations, Pavements, buried Pipelines and other buried services etc. from damage arising as a result of tree root penetration.
- Root Barrier in Green roof system.

### Functions

**Root Barrier**

**Separation**

**Waterproofing**



Main features	ROOTDIVERT HD®
Thickness at 2 kPa	~3.7 mm
Puncture Resistance of Geomembrane	640 N
Roll width	7.0 m
Roll length	50 and 100 m
Roll Weight (min – max)	730 – 1,460 kg

### Benefits of ROOTDIVERT HD®

- Prevent root penetration from damaging concrete structures, foundations, road base layers and other buried structures.
- ROOTDIVERT HD® prevents water seepage into buried structures.
- Protects concrete from soils and groundwater with high sulfate and chloride content.
- ROOTDIVERT HD® stabilizes reactive clay materials below foundations.
- Provides permanent root barrier solution, as the composite is highly resistant to biodegradation.
- ROOTDIVERT HD® encourages root penetration to go deeper and less wide which protects any surrounding structures.
- UV stabilized, light weight, easy to install and high puncture tolerance.

# ROOTDIVERT LD®

## Root Barrier System



**ROOTDIVERT LD® geocomposite consisting of a LLDPE geomembrane bonded with woven geotextile on both side.** ROOTDIVERT LD® is recommended in projects where the root load is limited. Available in various thicknesses, roll widths and lengths.

### Applications

- Root Barrier and Waterproofing in Boundary Walls, Roof Decks, Plumbing and other buried services.
- Separate and protects hardscapes from root penetration.

### Benefits of ROOTDIVERT LD®

- ROOTDIVERT LD® prevents root penetration from damaging concrete walls, roof decks and other buried structures.
- ROOTDIVERT LD® prevents water seepage into concrete.
- Protects concrete from soils with high sulfate and chloride content.
- ROOTDIVERT LD® provides permanent root barrier solution as the composite is highly resistant to biodegradation.
- Encourages root penetration to go deeper and less wide which protects any surrounding structures.
- **Regulates growth of shrub into a specified area.**
- **Separates decorative aggregates from mixing.**



Main features	ROOTDIVERT LD®
Thickness at 2 kPa	~2.5 mm
Puncture Resistance of Geomembrane	170 N
Roll width	6.0 m
Roll length	50 and 100 m
Roll Weight (min – max)	210 – 420 kg

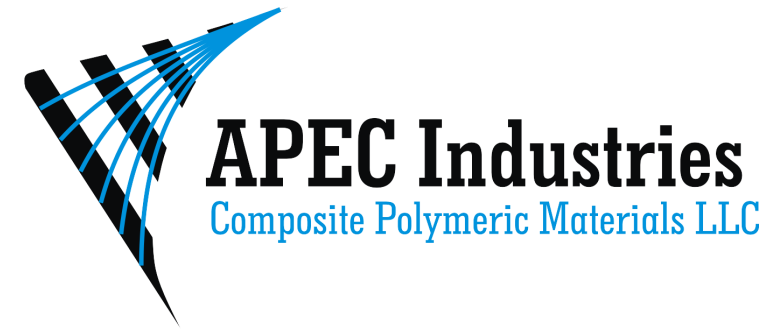
### Functions

**Root Barrier**  
**Separation**  
**Water Proofing**

# WHY “APEC Industries”

- APEC Industries provides **international standard geosynthetic composite products and engineering solutions** locally.
- Our **no-compromise approach to quality** makes APEC Industries **reliability** .
- APEC Industries has **achieved ISO 14001** certification for environmental management, **ISO 9001** for quality assurance, and **ISO 45001** certification for health and safety.
- APEC Industries having manufacturing facility in Abu Dhabi with latest European technology production plants and the manufacturing complex occupies 40000 sq. meters.
- APEC Industries is the only company to **produce a Geosynthetic Clay Barrier (GBR-C) in the region**. GBR-C is a geosynthetic clay liner composite laminated with PE film / Geomembrane.
- APEC Industries is the first company in the region to **manufacture Monofilament 3d Geomat** that combine to make a totally dependable erosion and drainage control system.





# Thank you

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