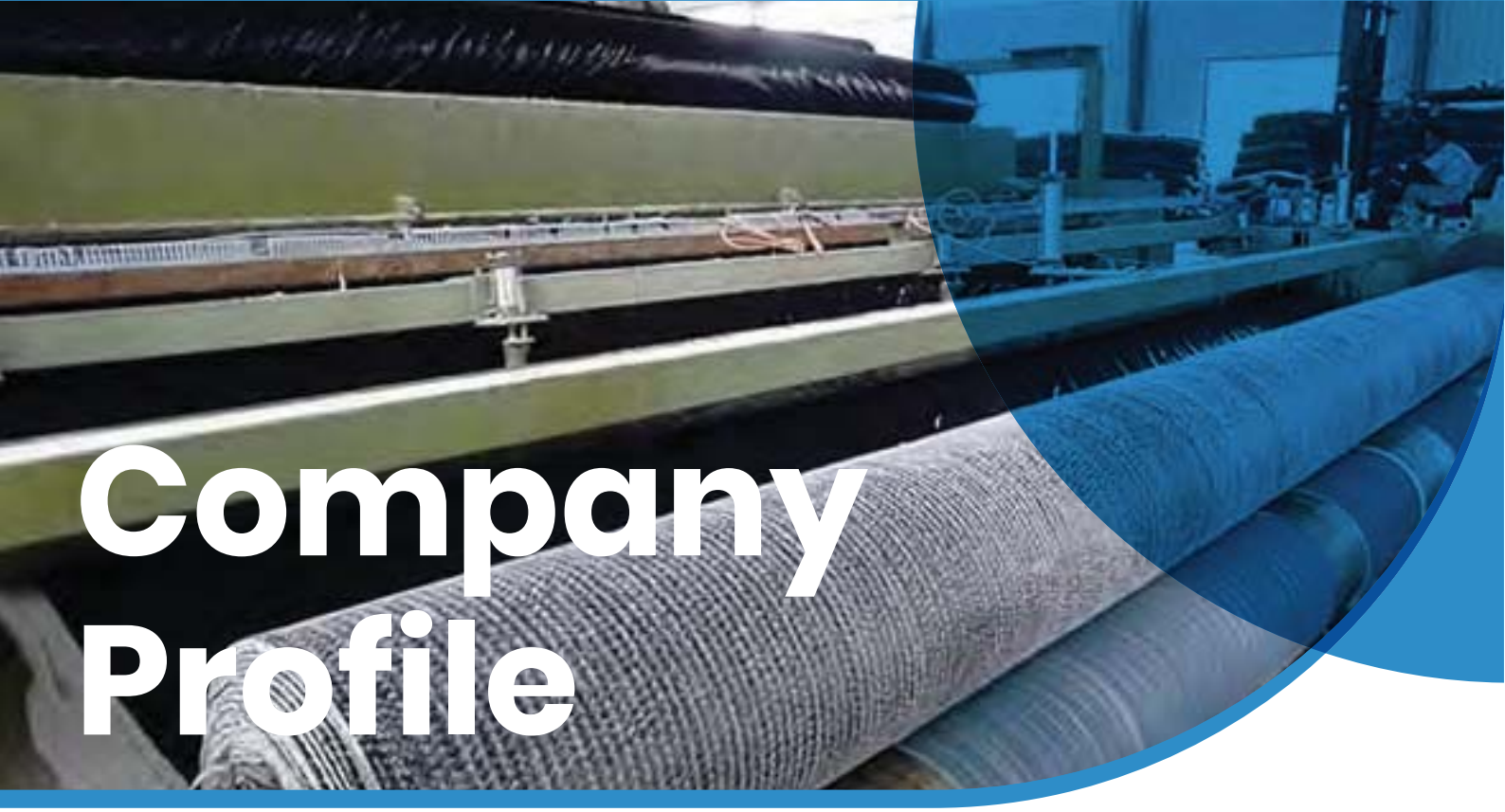
Contents



Company Profile

APEC Industries is a competitive, innovative and dynamic geosynthetics supplier and engineering solutions provider. The company was established with the singular aim to build world-class Composite Polymeric Materials, such as geosynthetic composites for civil engineering and other synthetic composites for various applications. APEC Industries is growing magnificently into becoming one of the largest, trusted and respected geosynthetic composites manufacturers in the Middle East.

APEC Industries is known for its in-depth research, attention to detail, and creativity in designing some of the most efficient geosynthetic composite products in the market. These products work as effective solutions for critical architectural, design and performance related engineering problems in geotechnical, transportation, waste management, mining, oil & gas, hydraulic, and environmental related sectors. Ever committed to building innovative solutions for projects managed by civil engineering construction professionals, including Architectural Design Engineers, Civil Consultants, and Contractors, APEC Industries has pioneered a number of unprecedented solutions in the Middle East markets:

- APEC Industries is the first company in the region to manufacture Monofilament 3d Geomats that combine to make a totally dependable erosion and drainage control system with a wide range of applications.
- APEC Industries is the only company producing a specialised Clay Liner laminated with a Geosynthetic Membrane layer in the region, offering a broad spectrum of applications for landfills and mining related projects.

APEC Industries produces preset and custom designs to meet the specific needs of clients in government and private sectors. Their huge manufacturing compound based in ICAD-1 Industrial Zone in Abu Dhabi, UAE, enables APEC Industries to deliver large orders faster and at more competitive prices than their competitors.

Keeping true to the vision of providing comprehensive innovative solutions to the world of civil engineering, APEC Industries has also stepped into designing, manufacturing and supplying acoustic solutions for high-rise development sector. Their unique acoustical engineering solutions are providing high-rise developers across UAE with soundproofing, waterproofing and sound-dampening materials with unprecedented performance quality.

Why Choose APEC

STATE-OF-THE-ART MANUFACTURING FACILITY

APEC Industrial Complex runs on cutting-edge European technology and manufactures geocomposite products of unbeatable quality through its 5 manufacturing plants. The Complex occupies 30,000 sq. meters and is a haven for latest production technology.

CUSTOMISED SOLUTIONS

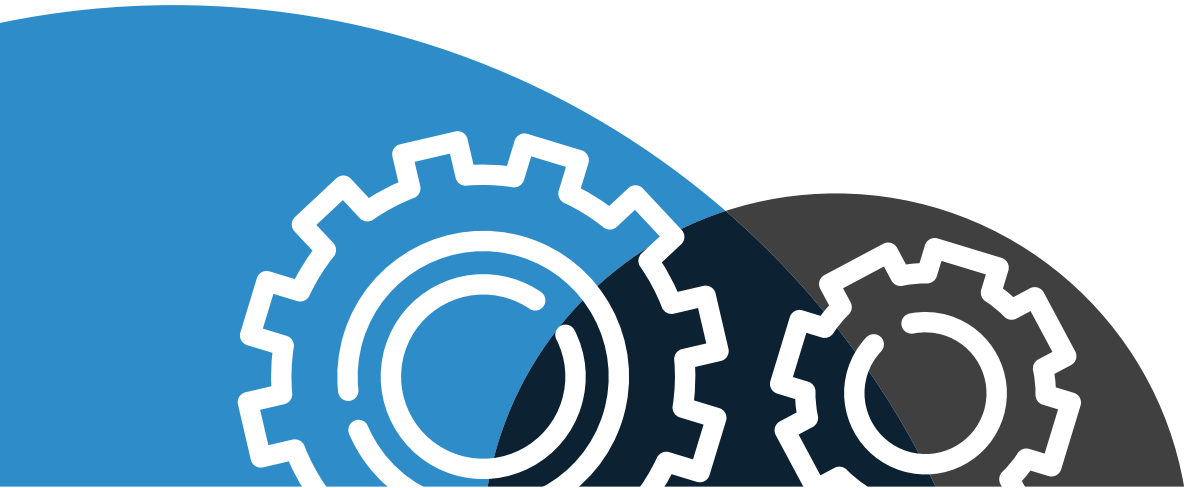
As professional geotechnical engineers, the team at APEC Industries understands every project may have its specific needs. With multiple plants and a flexible manufacturing process the company is able to offer products in various dimensions without compromising on performance quality.

BROAD PRODUCT RANGE

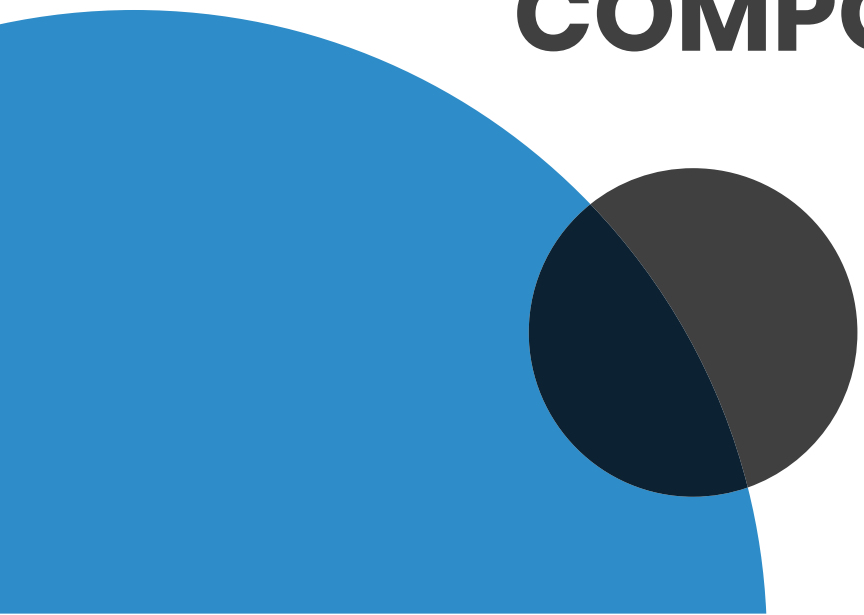
In-depth knowledge of industry needs has led APEC Industries to build a full range of products with various options so they never have to say no to a client. When it comes to geosynthetic composite products, APEC Industries truly has everything you need.

QUALITY & SPEED

APEC Industries takes pride in a highly streamlined manufacturing process – and supply chains. With supply operations working through strategic locations, APEC Industries is able to deliver products on time – always with the best quality of production and packaging. APEC Industries management systems are certified in ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 providing confidence and assurance in the quality of our products.



SALT BARRIER COMPOSITES



SALTSTOP®

SALTSTOP® is a high-functioning, comprehensive salt barrier system. It uses an HDPE geonet as its draining core with filter fabric layers on both sides.

SALTSTOP® is ideally designed for landscape and road walkway applications, especially to separate vegetative soil and saline groundwater. It is available in variable roll lengths and widths for suitable installation in large structures.

SALTSTOP® MAIN FEATURES		
Thickness at 2 kPa	7.5 mm	
In-plane water flow capacity, σ =20 kPa, Soft/Rigid contact	Gradient (i = 1.0) ~1.30 l/(m.s)	Gradient (i = 0.1) ~0.70 l/(m.s)
Tensile Strength (MD/CMD)	30/30 KN	
Elongation (MD/CMD)	50/50 %	
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	

Functions of SALTSTOP® salt barrier system

SALTSTOP® is built to deliver a highly reliable barrier system that keeps saline water and salts out of surface layers of vegetation and soil. It offers complete separation, capillary breaks, filtration, and drainage solutions.

Recommended applications

SALTSTOP® is ideal for application in landscapes, sports fields, pavements, walkways, basements, and other types of foundations for creating a dependable salt barrier. In colder regions, it prevents frost heave beneath highways

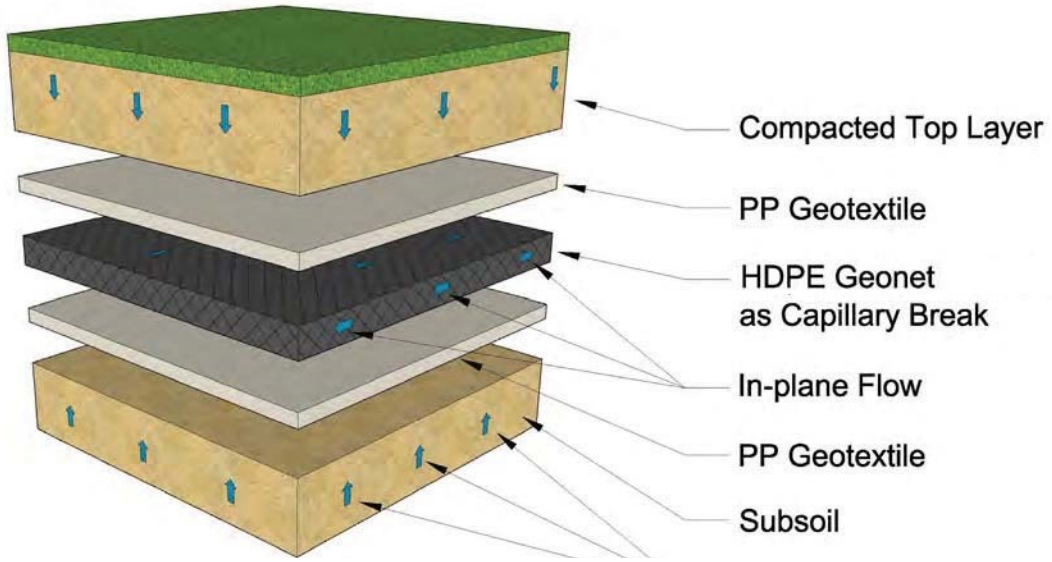
It is also applied successfully as a highly effective separation layer between vegetative soil and saline groundwater, which makes it very desirable for the sabkha soils of Middle East coastal areas.

Product benefits

SALTSTOP® completely blocks capillary rise of saline water into vegetative soil layers. It also effectively reduces negative pore water pressure caused by such capillary action and creates a stable void that works as capillary breaks throughout the mat's service life.

SALTSTOP® also prevents saline groundwater to contaminate concrete or soil layers as well as underground structures. Built with the durability that is the hallmark of all APEC Industries products, SALTSTOP® carries high loads without compromising on the capillary breakage function.

It is highly resistant to weathering, UV, chemicals and biodegradation, performing optimally for many years.



CONTAINMENT COMPOSITES

BENTOCLINE®

BENTOCLINE® is APEC Industries' primary geosynthetic clay liner product with a geomembrane base. It is made of a uniform layer of sodium bentonite trapped between a layer of geotextile and LLDPE geomembrane to deliver best performing base linings in landfills and other projects.

Built to last and deliver absolute containment and waterproofing, BENTOCLINE® can be used as a long-lasting clay liner that continues to perform well for many years to come. It is available in wide roll widths to reduce overlaps and installation time. In addition to this unique and specialized composite GM-GCL, we also manufacture standard GCLs as per the market requirement and international standards.

BENTOCLINE® MAIN FEATURES	
Thickness at 2 kPa	6.5 mm
Mass per unit area	4800 g/m2
Roll width	6.0 m
Roll length	45 m
Roll Weight	1300 kg

Functions of BENTOCLINE® clay liner

BENTOCLINE® is built to establish breach-free containment systems. As a clay liner, this quality adds to its performance and makes it one of the most reliable geomembrane base clay liners in the market. It delivers supreme performance when used for containment, separation or waterproofing, often performing a combination of these functions.

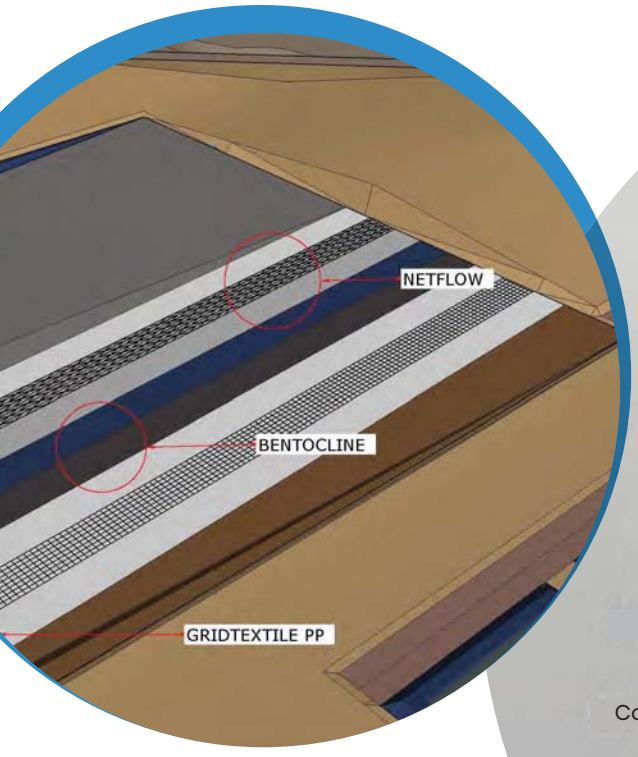
Recommended applications

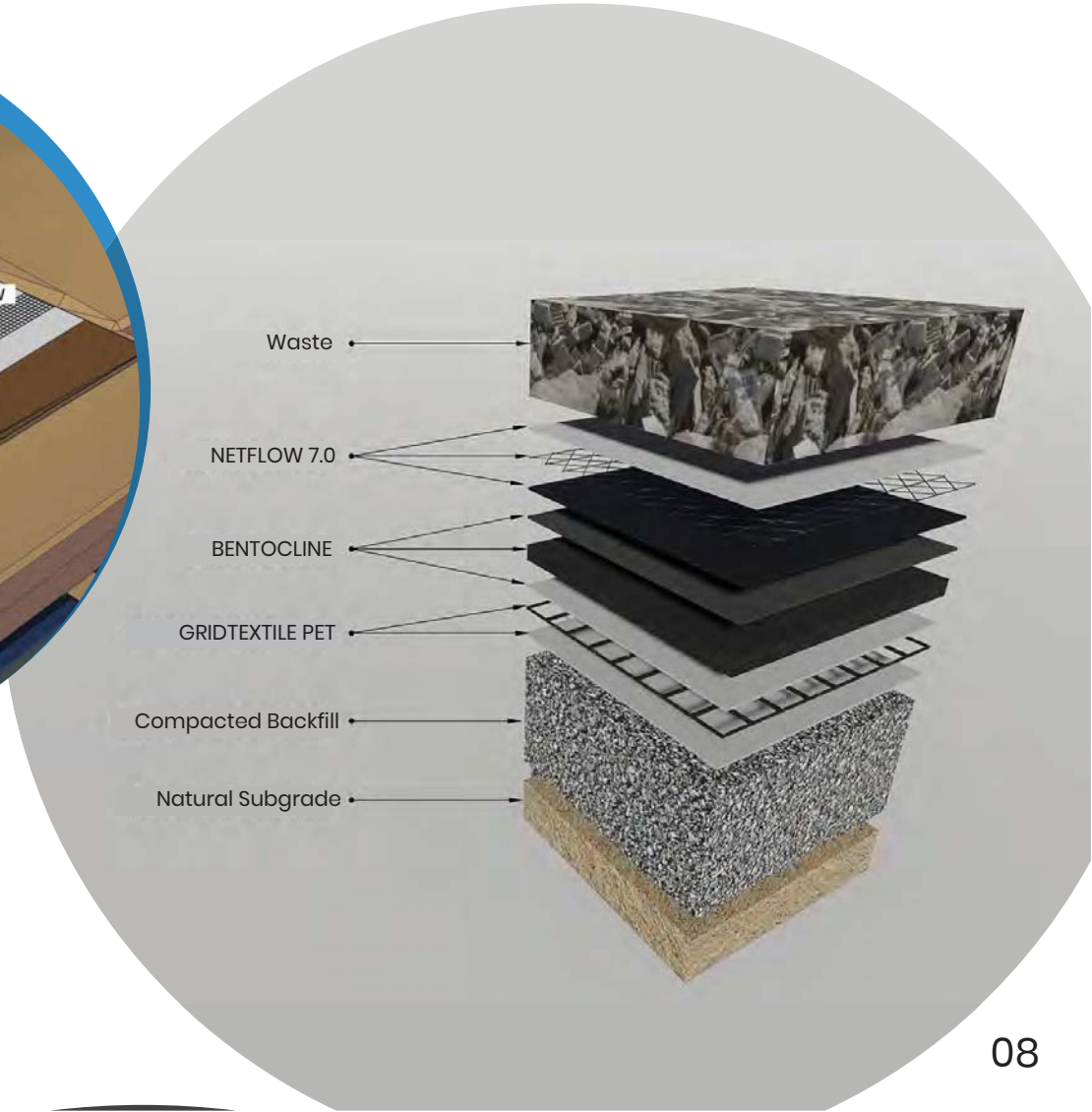
BENTOCLINE® is ideal for base lining of various types of landfills as well as landfill capping. It is highly recommended for mining remediation and reclamation as well as lining ponds, canals, and other bodies of water. Clients in the energy industry apply it in their coal ash disposal facilities.

Other applications include reservoirs, fuel spillage containment, erosion control on slopes, environmental lining of roads, groundwater protection, and waterproofing of basements.

Product benefits

BENTOCLINE® allows no flow with its geomembrane layer. Sodium bentonite powder amplifies its self-healing qualities when hydrated. It increases air space in landfills by a huge margin, reduces excavation, backfilling, and traffic volume. It has high internal shear and long-term creep resistance due to the increased mechanical bonds of the top and bottom geotextile layers. It is extremely sensitive to leachate fluids and rehydrates immediately.





EASYLINER HD®

EASYLINER HD® is a very durable and long-lasting HDPE geomembrane composite that comes with a layer of geotextile on one or both sides, depending on client needs.

EASYLINER HD® is conceived for the specialised containment and waterproofing needs of greater highway projects. It is highly flexible and custom manufactured for each application to meet the unique project needs.

EASYLINER HD® MAIN FEATURES	
Geomembrane thickness	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 (min – max)	730 – 1600 kg

Functions of EASYLINER HD® HDPE geomembrane composite

EASYLINER HD® is designed to deliver a high-performance containment, separation and waterproofing geocomposite product. It has been tested in challenging conditions for all these applications and has proven to be dependable in all conditions.

The filter fabric laminated to the geomembrane will increase the composite's puncture and tear resistance as well as the friction between the soil and the composite.

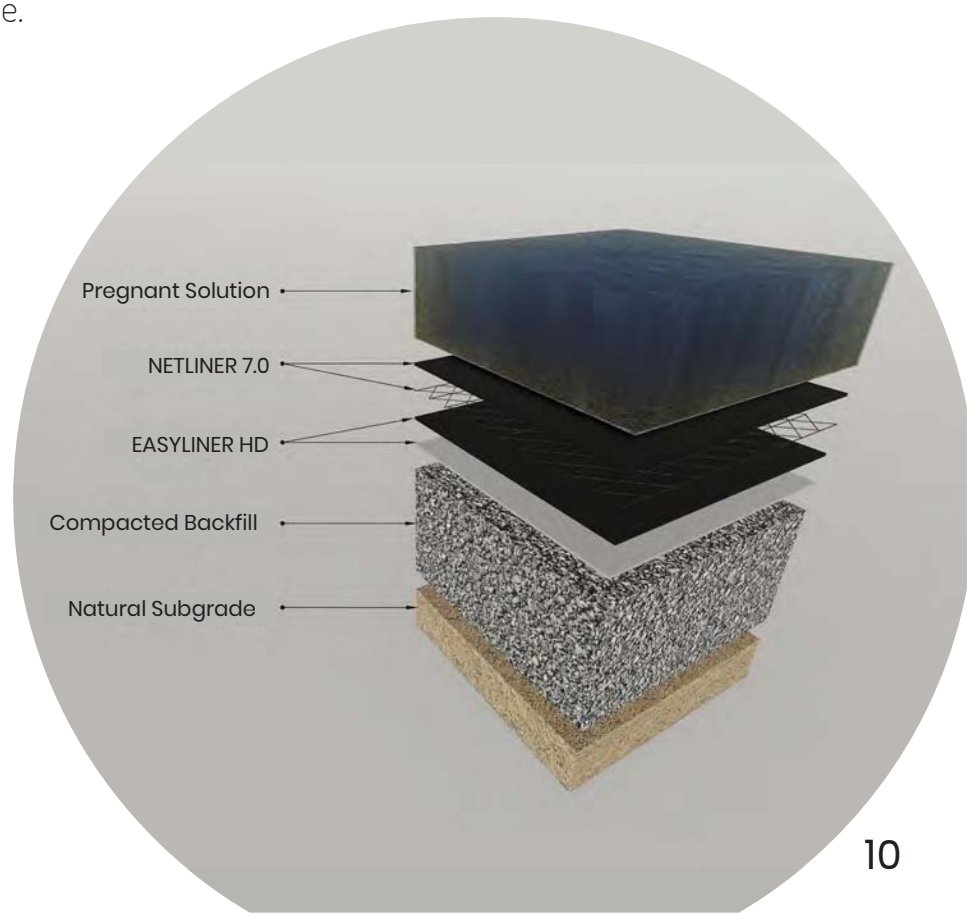
Recommended applications

EASYLINER HD® has numerous applications. It is ideally used as a liner in landfills, evaporation ponds, heap leach pads, ponds, canals, emergency spillways, railways, and agricultural needs. It provides high-functioning waterproof facing in dams and works brilliantly as a barrier to landfill odours. It is highly recommended to contain and transport fluids in the ocean.

EASYLINER HD® can create floating reservoirs for seepage control. It can be applied to prevent infiltration of water in sensitive areas. It channels water flow through desired paths and prevents pollution from de-icing salts under highways. It is also used for controlling expansive soils and to capture hazardous liquid spills. It reduces differential settlements and overlays as a waterproofing layer beneath asphalt. It contains seepage loss from existing above-ground tanks.

Product benefits

EASYLINER HD® comes with high puncture, UV and chemical resistance. It can easily be seamed together on site with hot wedge welding. It comes in wide roll widths, which reduces number of overlaps and cuts down installation cost and time.



EASYLINER LD®

EASYLINER LD® is a thin but high-performance LLDPE geocomposite that has an impermeable geomembrane covered with geotextile layers on both sides.

Since it is built to be more flexible than an HDPE geocomposite, EASYLINER LD® is ideal for a broader set of applications. It is available in multiple options for roll dimensions and is effective for application in both small and large structures.

EASYLINER LD® MAIN FEATURES		
Geomembrane thickness	0.50 – 2.00 mm	
Break strength of geomembrane	13 – 53 kN/m	
Puncture strength 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

Functions of EASYLINER LD® with LLDPE geomembrane

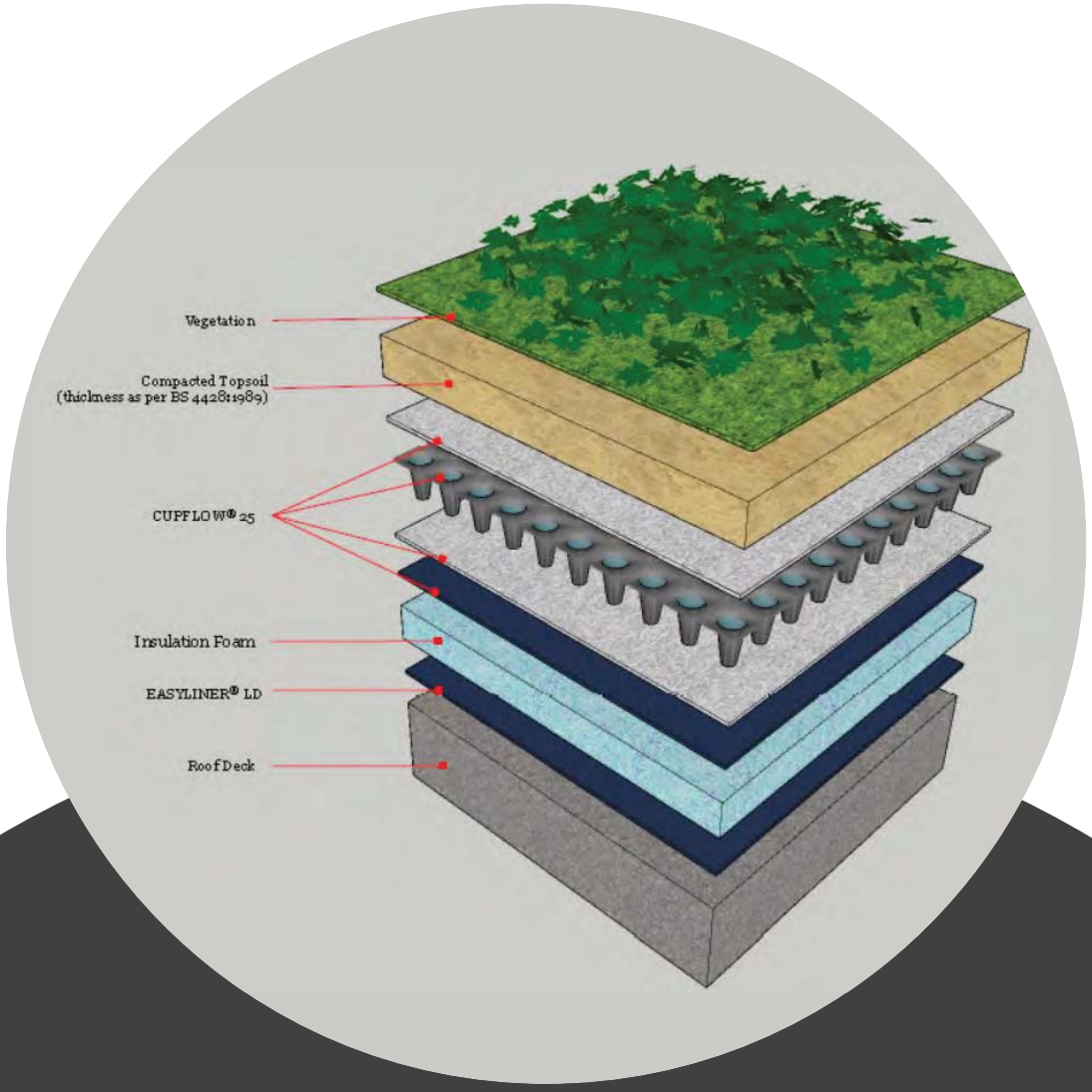
EASYLINER LD® may be thinner than its HDPE counterpart, but it offers absolute separation, containment and waterproofing.

Recommended applications

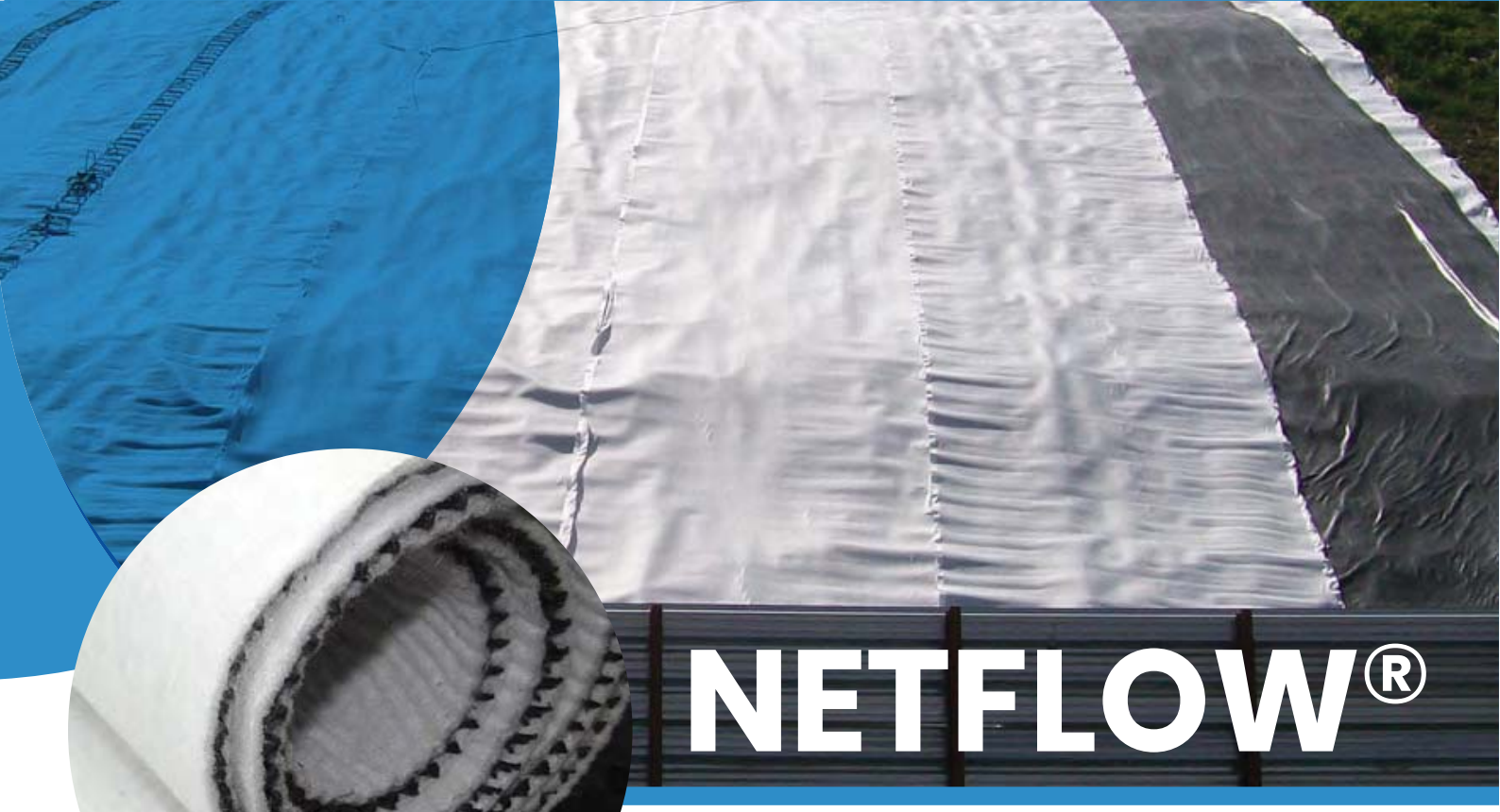
EASYLINER LD® is ideal for covering or capping landfills, as manure digester in agriculture, and for power plant coal ash management. It works remarkably well as waterproofing liner between rock face and inner concrete face of tunnels, canals, ponds, reservoirs, etc. It can also make high-functioning temporary covers on embankments and is ideal for other small waterproofing applications. It is also used for containment and transportation of fluids in trucks because it prevents infiltration of water in sensitive areas and conducts water flow on preferred paths.

Product benefits

EASYLINER LD® is available in wide roll widths to reduce installation time, costs, and number of overlaps. Its geotextile is closely bonded to the membranes on both sides, which increases its puncture resistance significantly and makes it highly tear resistant as well. It is also highly resistant to chemicals, weathering, UV, and biodegradation.



GEODRAIN COMPOSITES



NETFLOW®

NETFLOW® is a high-performance geodrain composite. It is made of a HDPE tri-planar geonet core bonded with filter fabric layer on one or both sides, depending on the client's needs.

NETFLOW® is designed to deliver optimum sub-surface drainage and has proven to be the most dependable geodrain composite. Available in blanket thickness and custom roll specifications of your choice, NETFLOW® is ready to fulfil the drainage and separation needs of all your large and small projects.

NETFLOW® MAIN FEATURES		
Thickness at 2 kPa	4.0 – 8.0 mm	
In-plane water flow capacity, σ =20 kPa, Soft/Rigid contact	Gradient (i = 1.0) ~2.70 l/(m.s)	Gradient (i = 0.1) ~0.80 l/(m.s)
Compressive strength	1917 kPa	
Roll width	2.0 to 4.0 m	
Roll length	25, 50 and 100 m	
Roll Weight (min – max)	60 – 520 kg	

Functions of NETFLOW® Geodrain composite

NETFLOW® is a multi-purpose geosynthetic composite product. Apart from delivering ideal results for drainage, it has also proven to be a reliable separator and passage for gas venting in landfills. It works as the perfect filtration layer and also reduces hydraulic pressures on structures by removing water from soils.

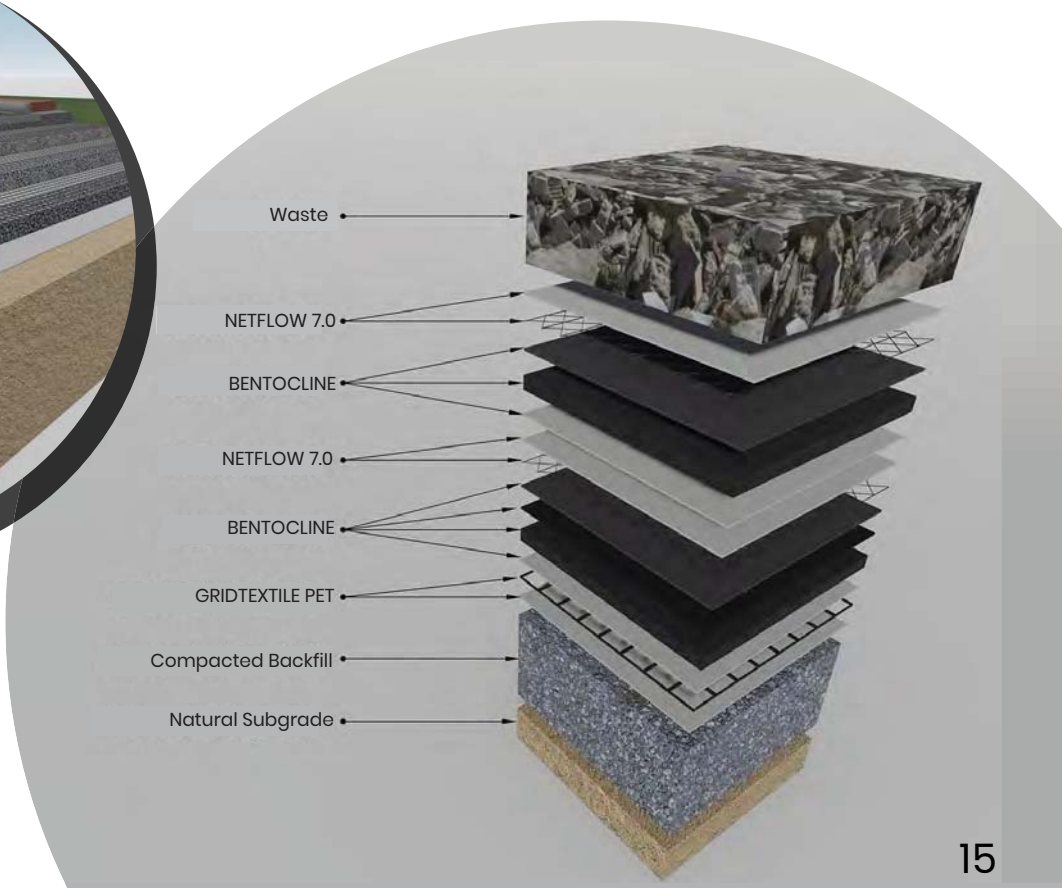
Recommended applications

When applied under roads and highways, it provides a highly effective drainage system that preserves the asphalt and keeps the surface dry. NETFLOW® is also ideally useful for leachate collection and leakage detection in evaporation ponds, landfills, heap leach pads, and other such projects. Clients also use it for venting gas – and as a drainage layer in the capping system of landfills and mining. Additionally, it is also equally effective for drainage in sports fields.

Product benefits

NETFLOW® offers high flow capacity, especially when compared to gravel drain. It also mitigates clogging much more effectively than gravel drain and saves far more air space in landfills than gravel. Furthermore, it has high resistance for chemicals and UV light.

NETFLOW® helps reduce hydraulic pressures by removing water from the soil and surface. Along with such high performance for drainage, it offers extraordinary compressive strength. NETFLOW® also offers highly reduced excavation and backfill, which makes it superior than other sub-surface drainage solutions. It also delivers high durability and filtration capacity in all types of soils and leachate solutions.



MATFLOW®

MATFLOW® is an industry tested 3D geodrain composite. It consists of a PP extruded W-shaped monofilaments core with a filter fabric layer on either or both sides, depending on client needs.

MATFLOW® is a fully capable drainage blanket designed in particular to create high-performing highway edge drains. It drains water faster than gravel drains. It is available in various sets of technical specifications but can also be manufactured for custom specs.

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

Functions of MATFLOW® geodrain composite

MATFLOW® is a high-performing drainage agent. It is designed to facilitate high water discharge with 95% voids across the blankets.

When used with the filter fabric layer on both sides, it becomes a highly effective filtration blanket and offers an impenetrable barrier for separation of materials.

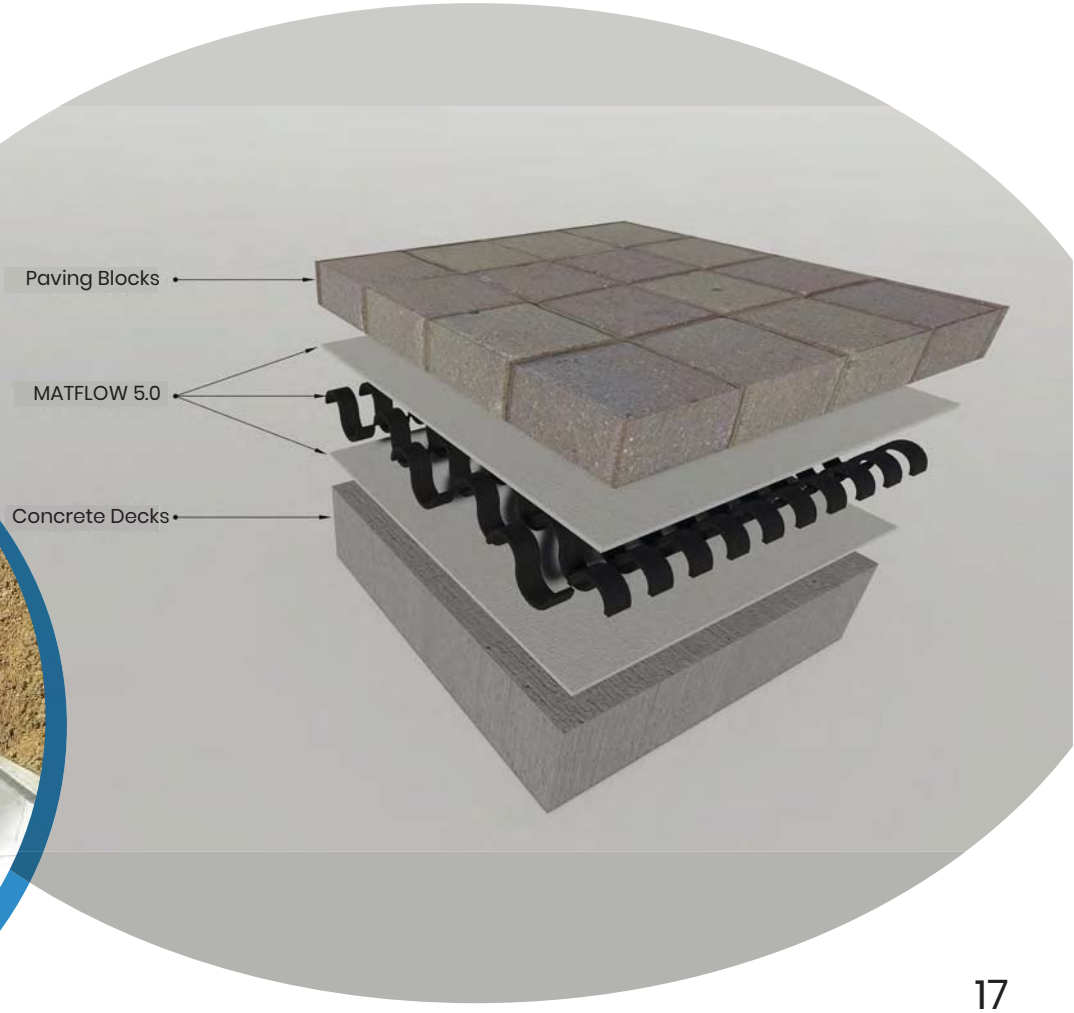
Recommended applications

As mentioned earlier, it is highly recommended for all kinds of drainage functions, especially behind basement walls, tunnel walls, for bridge abutments, wingwalls, and under tunnel floor and parking decks. MATFLOW® creates highway edges for optimum drainage and also delivers high horizontal drainage below embankments.

It is ideal for drainage in railway projects, vertical cut-off trenches, and for relieving uplift pressure beneath tanks, slabs and culverts.

Product benefits

MATFLOW® is very economical over conventional sand and gravel – aggregate – drains. It makes weep holes redundant and allows project engineers to omit them altogether. It ensures long-term discharge of percolation water from underground structures with its high anti-clogging qualities. MATFLOW's® is available in wide roll widths, reducing number of joints and installation time. Highly durable and resistant to UV, chemicals and biodegradation, MATFLOW® offers long-term performance without polluting the subsoil.



CUPFLOW®

CUPFLOW® is a specialised geodrain composite product. It is made of an impermeable draining core with filter fabric layer on one side to offer best green roof drainage, wingwall drainage, and similar applications.

CUPFLOW® is a high-performing, multi-functional geodrain composite. It allows clients a lot of variety and is available in various options for thickness, compressive strength, and flow capacities, manufactured on custom technical and physical specifications to comply with specific needs of each project. Virtually all drainage applications can be fulfilled with this especially designed geocomposite.

MATFLOW® MAIN FEATURES		
Thickness at 2 kPa	6.0 – 25.0 mm	
In-plane water flow capacity, σ =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 – 600 kPa	
Roll width	1.0, 2.0 to 4.0 m	
Roll length	25, 50 and 100 m	
Roll weight (min – max)	15 – 500 kg	

Functions of CUPFLOW® GEODRAIN composite

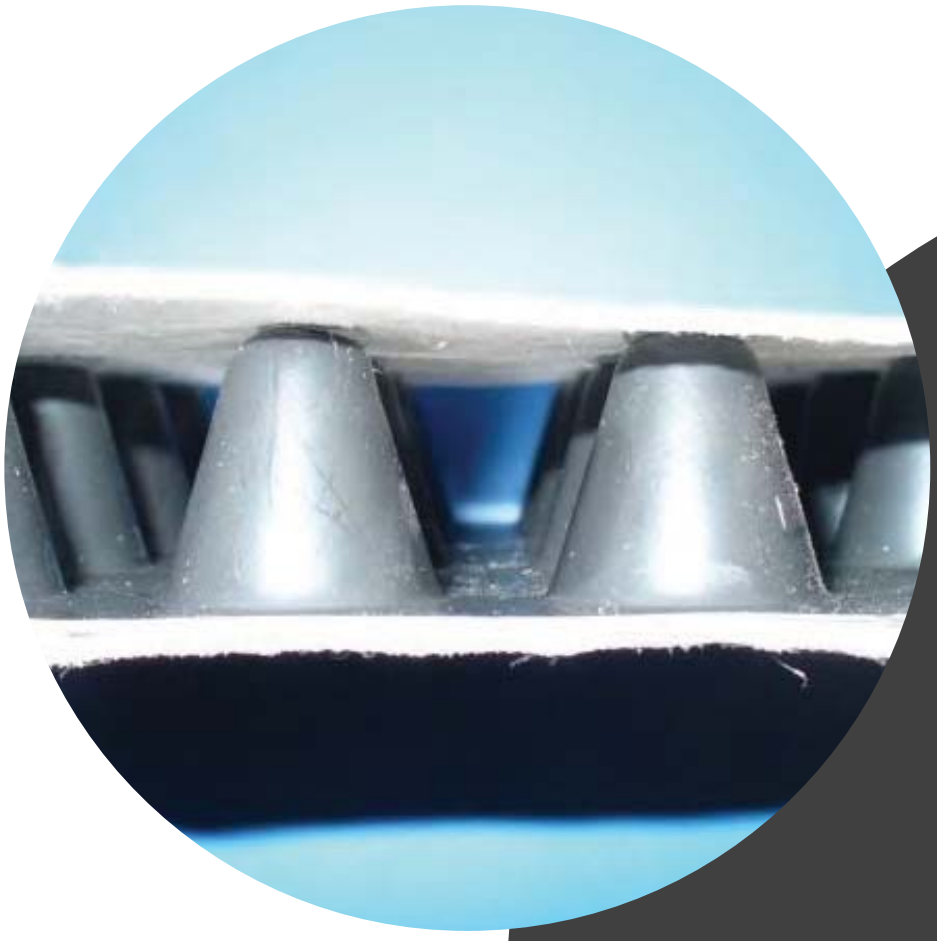
CUPFLOW® is a highly pliable drainage solution for all kinds of interior and exterior needs. This flexibility in design makes CUPFLOW® the perfect drainage, filtration, separation, and reservoir agent for a wide range of functions.

Recommended applications

CUPFLOW® makes the ultimate green roof drainage system. It is also highly recommended to build road edge carriageway drains. Similarly, it is highly effective for relieving hydraulic pressure from buried structures and retaining walls. It performs brilliantly for relieving uplift pressure beneath tanks, slabs and culverts. It makes high-functioning bridge abutments and wingwall drainage systems and can also be used for optimum drainage in tunnel walls & tunnel invert and floor embankment drains. CUPFLOW® also performs great in landfill capping and slope drains. It also provides drainage for contiguous and secant piled walls.

Product benefits

CUPFLOW® is thinner and lighter than conventional drainage products. Therefore, it reduces dead load on to soil and supporting structures. It offers huge saving in air space of landfills and reduced traffic volume when compared to gravel drains. It builds water reservoirs, which can be used by plants in dry season. It eliminates the need for weep holes in retaining walls. CUPFLOW® reduces excavation and backfill. It delivers high performance with high flow capacity, matchless durability, and high UV resistance. It can be easily installed without specialised equipment. Lastly, its filtration properties are suitable for most soil types.



NETLINER®

NETLINER® is a high-performing geodrain composite, which is designed and built with an HDPE geonet covered with a filter fibre layer on one side and impermeable geomembrane on the other.

NETLINER® provides excellent draining, separation, filtration, and containment capabilities in various applications. Due to its flexible design, this geodrain composite is available in custom sizes and specs to fit your unique project needs.

NETLINER® MAIN FEATURES		
Thickness at 2 kPa	4.0 – 7.0 mm	
In-plane water flow capacity, x =20 kPa, Soft/Rigid contact	Gradient (i = 1.0) ~1.60 l/(m.s)	Gradient (i = 0.1) ~0.30 l/(m.s)
Roll width	2.0 to 4.0 m	
Roll length	25, 50 and 100 m	
Roll weight (min – max)	70 – 540 kg	

Evaporation Pond

Functions of NETLINER® GEODRAIN composite with geomembrane

NETLINER® is built to deliver absolute separation and filtration, which also makes it highly useful for other functions, including drainage, gas venting, and containment. It is known to perform brilliantly in all these areas.

Recommended applications

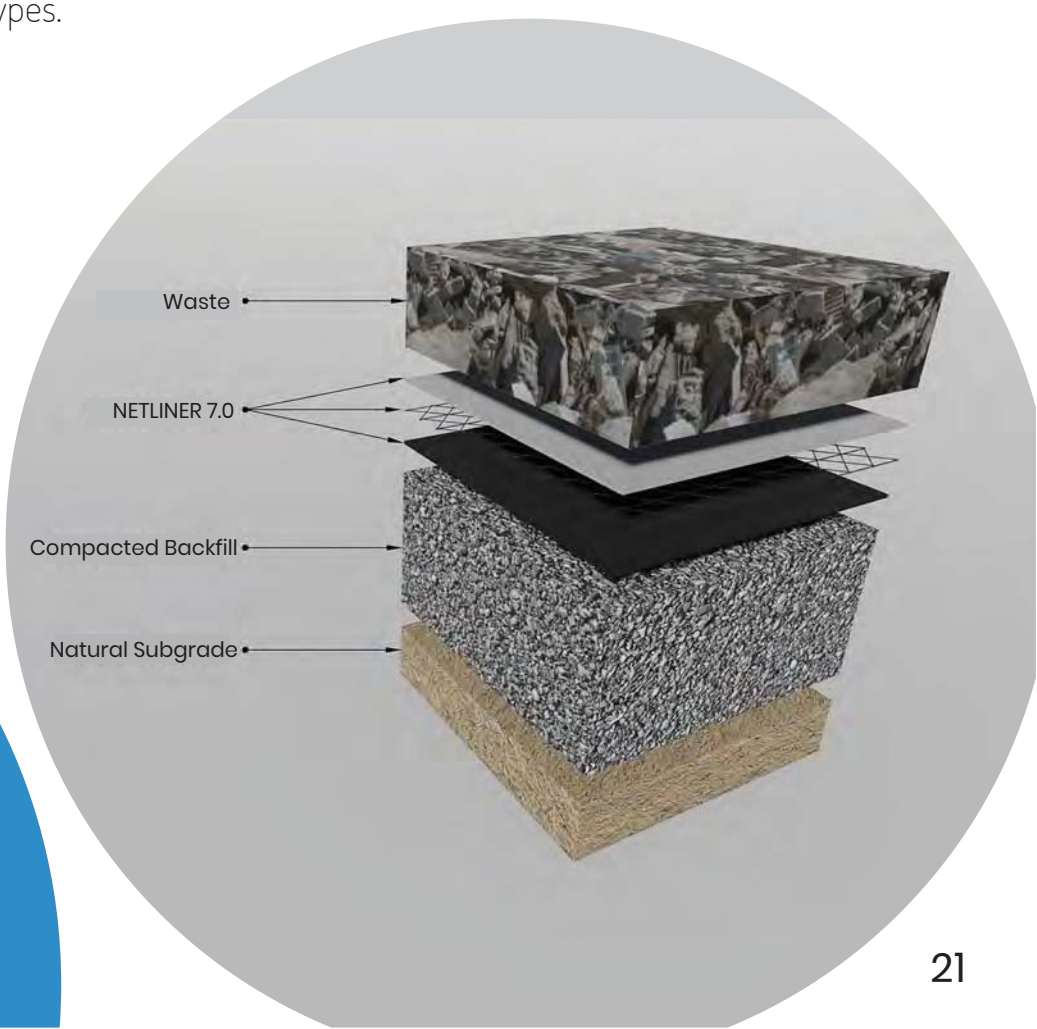
NETLINER® is the ideal choice for leachate collection in landfills. It is also strongly recommended for leakage detection in landfills, evaporation ponds, heap leach pads, and other such structures. It also works splendidly as a landfill capping system as well as for drainage under roads and highways.

Landfills can also benefit from NETLINER® for gas venting. As for drainage capabilities, the product is ideal for sports fields and other sub-surface drainage applications.

Product benefits

NETLINER® is a much better performer for drainage than gravel drains in many ways: it lasts longer, offers higher flow capacity, and saves a lot more airspace in landfills.

NETLINER® offers impressive impact and compressive strength. It is highly effective in reducing hydraulic pressures thanks to its high discharge capacity which drains the water out of the soil completely. It provides reduced excavation and backfill, and is highly durable. It is also highly resistant to UV light and harmful chemicals, which prolongs its life even further. Additionally, the filtration it offers is effective for a wide range of soil types.



MATLINER®

MATLINER® is a 3D geocomposite that is made of a PP extruded pyramid shaped monofilaments core bonded to a filter fabric layer on the top and an impermeable membrane at the bottom.

MATLINER® is designed for a variety of drainage and waterproofing applications, which makes it a versatile geocomposite. This flexibility also enables APEC Industries to manufacture it for custom thickness, weight, and flow capacity needs of each project.

MATLINER® KEY SPECS		
Thickness at 2 kPa	4.0 – 20.0 mm	
In-plane water flow capacity, σ =20 kPa, Soft/Rigid contact	Gradient (i = 1.0) ~5.20 l/(m.s)	Gradient (i = 0.1) ~0.70 l/(m.s)
Mass per unit area	560 – 1260 g/m2	
Roll width	2.0 to 4.0 m	
Roll length	25, 50 and 100 m	
Roll weight (min – max)	30 – 510 kg	

Functions of MATLINER® geodrain composite with geomembrane

MATLINER® is a specialised geodrain composite that performs beyond expectations in terms of longevity and efficiency. It is designed to function admirably for separation, filtration, drainage, protection, and containment.

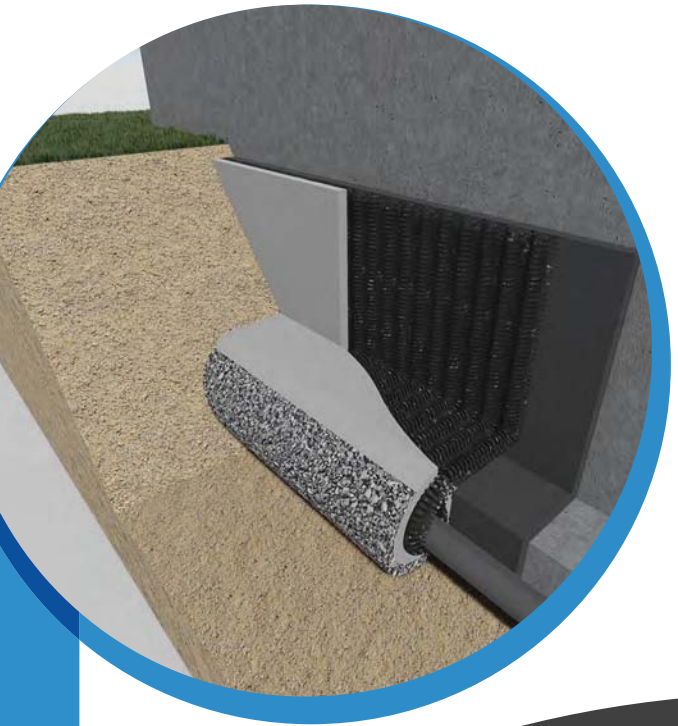
Recommended applications

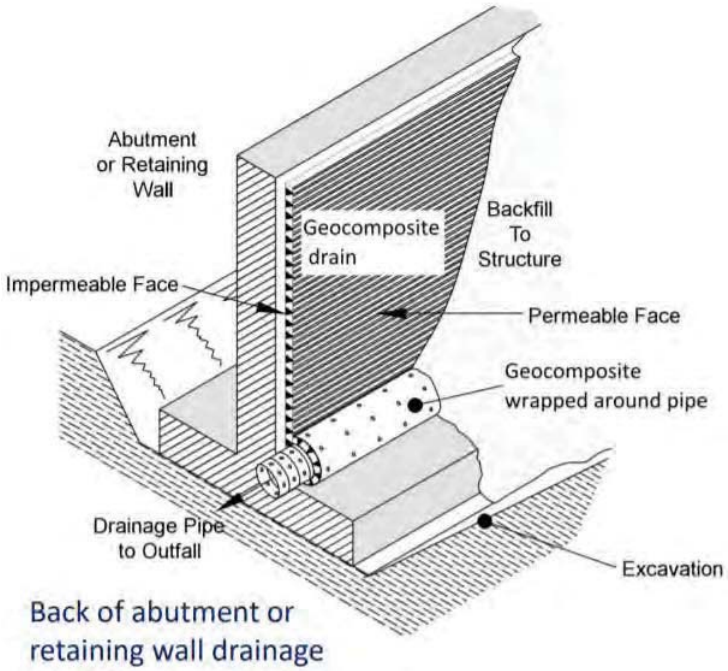
MATLINER® is ideally applied behind basement walls to provide drainage as well as waterproofing structures behind the composite. It is also very effective in relieving hydraulic pressure from buried structures and retaining walls. Drainage related applications include bridge abutments and wingwalls, tunnel walls and floor, parking decks, highways edge drains, railway line drains, and more. It is also very effective in relieving uplift pressure beneath tanks, slab and culverts.

Product benefits

Along with the drainage quality, MATLINER® has extra functions of protection and waterproofing. During the backfilling process, the drain mat acts as a protective layer to prevent construction equipment from damaging the waterproofing membrane bonded to it. It also keeps sharp rocks and debris from puncturing the waterproofing membrane. It offers higher ROI in comparison with conventional drains made of sand or gravel.

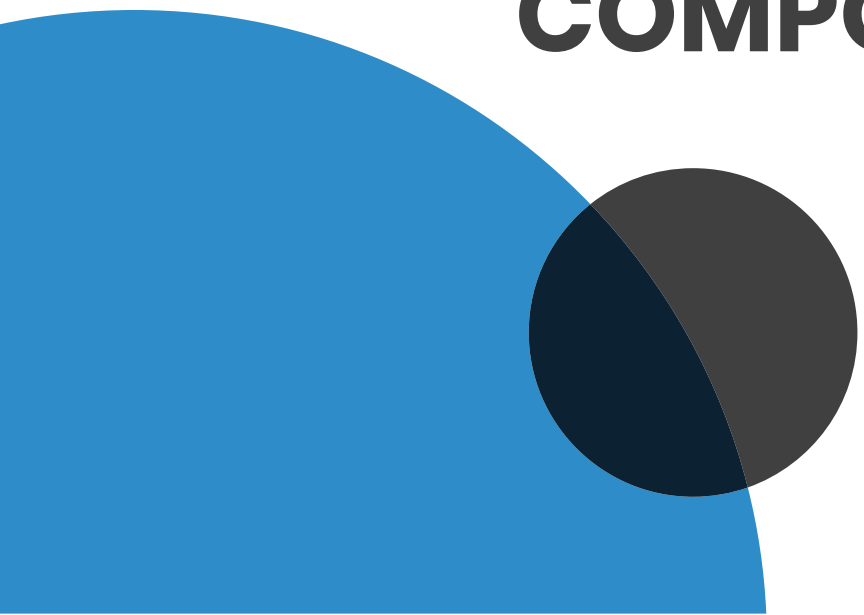
MATLINER® discourages clogging, ensures long-term discharge of percolation water, omits the need for weep holes, and is highly durable. It offers filtration for almost all soil types and does not pollute the subsoil at all. It lasts long with high resistance to UV, chemicals and biodegradation.





Back of abutment or retaining wall drainage

REINFORCEMENT COMPOSITES



GRIDTEXTILE-PP®

GRIDTEXTILE-PP® is a bi-axial geogrid composite made with polypropylene bonded with a non-woven geotextile on one side. Its superior rib thickness improves the interlocking mechanism and in turn increases the load-bearing capacity significantly.

GRIDTEXTILE-PP® is a multi-purpose geosynthetic composite product that cuts down project budget for stabilisation, reinforcement, separation, load capacity amplification, and much more.

GRIDTEXTILE-PP® MAIN FEATURES			
Max. Tensile Strength (MD /CMD) (kN/m) Tensile Strength @ 2% strain (kN/m) Tensile Strength @ 5% strain (kN/m)	20 / 20 7 / 7 14 / 14	30 / 30 10.5 / 10.5 21 / 21	40 / 40 14 / 14 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		

Functions of GRIDTEXTILE-PP® GEOGRID composite

GRIDTEXTILE-PP® is built to fulfil complex needs in foundations. It can address problems as diverse as stabilization reinforcement, layer separation, and interlocking in any combination. It is also equally effective for slope stabilization.

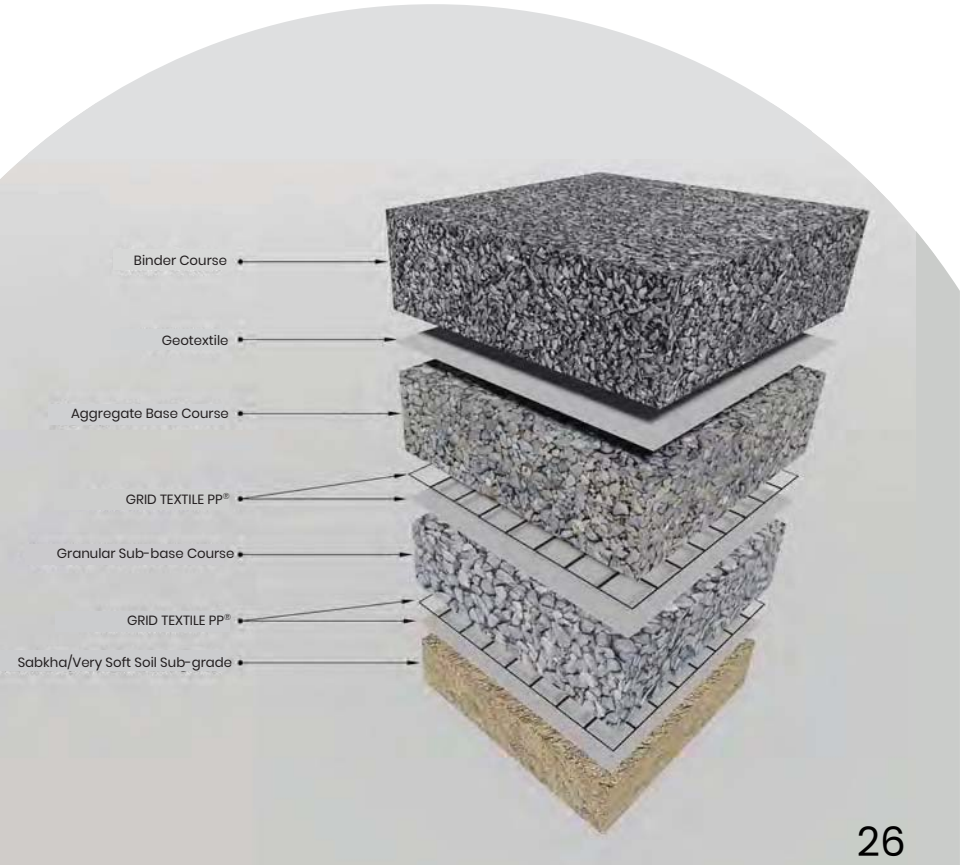
Recommended applications

GRIDTEXTILE-PP® was designed to solve a number of problems for civil engineering projects. This geogrid composite can at once confine soil and gravel laterally, develop shear resistance, and enhance bearing capacity. Therefore, it can be applied to solve all such problems, including a need for reducing differential settlements, reducing thickness of aggregate base and granular sub-base layers in roads and highways, sub-grade stabilization in very soft soils, strong interlocking mechanism with aggregates and railway ballast, as well as reinforcing below car parking zones.

GRIDTEXTILE-PP® is also highly recommended for reinforcing retaining walls and foundations, temporary cranes and working platforms, in airport runways, and cut-off trenches for pipes, among other applications.

Product benefits

GRIDTEXTILE-PP® can offer unmatched enhancement in load bearing capacity of the ground if applied in multiple layers. To maximize soil performance, it is also designed to ensure low creep and high stiffness. It is one of the very few geogrids in the market that offer high tensile strength at low strains. It delivers strong interlocking between aggregate and ballast layers. It is highly resistant to abrasion, UV, chemicals and more. It increases the flexible pavements service life by increasing the number of load cycles, delay rutting, and stress cracks.



GRIDTEXTILE-PET®

GRIDTEXTILE-PET® is a bi-axial geogrid that is built with high tenacity multifilament polyester yarns. It delivers maximum soil performance with its durable polymer coating and geotextile layer on one side. It delivers impeccable performance in many applications.

GRIDTEXTILE-PET® is a high-tensile strength reinforcement geogrid composite designed especially for basal reinforcement of embankments on sabkha / soft soils. It is available in multiple tensile strength and aperture size options.

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

Functions of GRIDTEXTILE-PET® GEOGRID composite

GRIDTEXTILE-PET® is ideally applicable in foundations where reinforcement or separation of layers is the objective.

Its bi-axial design allows it to effectively deliver on this diverse set of functions, and it is among the top performing geogrids in the market.

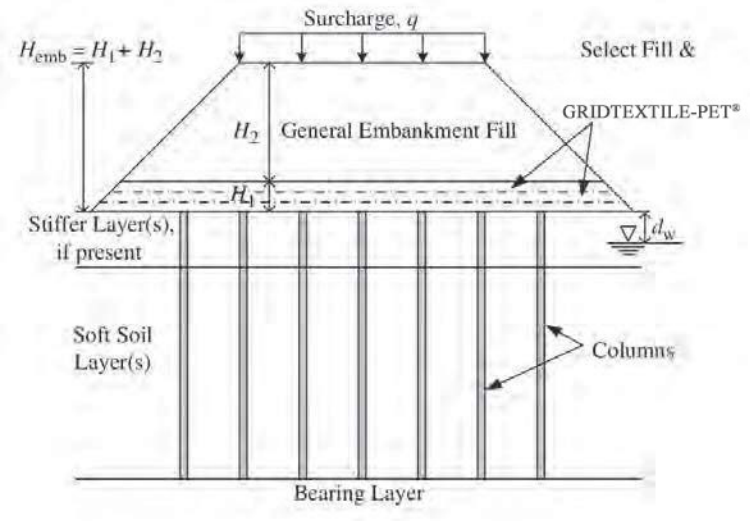
Recommended applications

It is highly recommended for basal reinforcement of embankments over soft sabkha soils. It is also highly effective in confining soil laterally while enhancing shear resistance. It performs brilliantly when applied for reinforcing retaining walls, slopes, and foundations.

GRIDTEXTILE-PET® is also recommended for engineered backfill stabilisation, soil reinforcement, creating load transfer platforms over piles, and providing load support for strengthening access roads. It is also an effective geocomposite for erosion control.

Product benefits

GRIDTEXTILE-PET® delivers optimal performance against creep, reducing it to a negligible level and thus maximising soil performance. It is a great investment because it delivers long-term durability. When applied in multiple layers, it enhances load bearing capacity of the ground. It offers high tensile strength at low elongation and is super-resistant to weathering, UV, chemicals, biodegradation, abrasion, and other challenging external conditions.



GRIDTEXTILE-FG®

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. It enhances pavement service life, controls projection of stress cracks on the surface, and delays surface rutting.

In other words, GRIDTEXTILE-FG® is designed specially to support, strengthen, and reduce the thickness of asphalt road layers. It is often applied right under the top tarmac layer but can also be used as an effective separator for any two layers.

GRIDTEXTILE-FG® MAIN FEATURES		
Max. Tensile Strength – MD / CMD	50/50 kN/m	100/100 kN/m
Young's modulus of geogrid	76 GPa	
Elongation at Max. Tensile Strength – MD / CMD	3% / 3%	
Aperture size	12.5 x 12.5 and 25 x 25 mm	
Roll width	2.0, 4.0 and 5.0 m	
Roll length	100 m	
Roll Weight (min – max)	90 – 350 kg	

Functions of GRIDTEXTILE-FG® geogrid composite

GRIDTEXTILE-FG® is designed to deliver and enhance pavement strength while controlling stress cracks and reducing rutting. It works best with asphalt mixes.

Recommended applications

GRIDTEXTILE-FG® is ideally suited for airport runways, taxiways, roads, bridges, parking lots, and jointed concrete highways to control reflective cracking. It is also recommended for high-traffic pavements to control rutting.

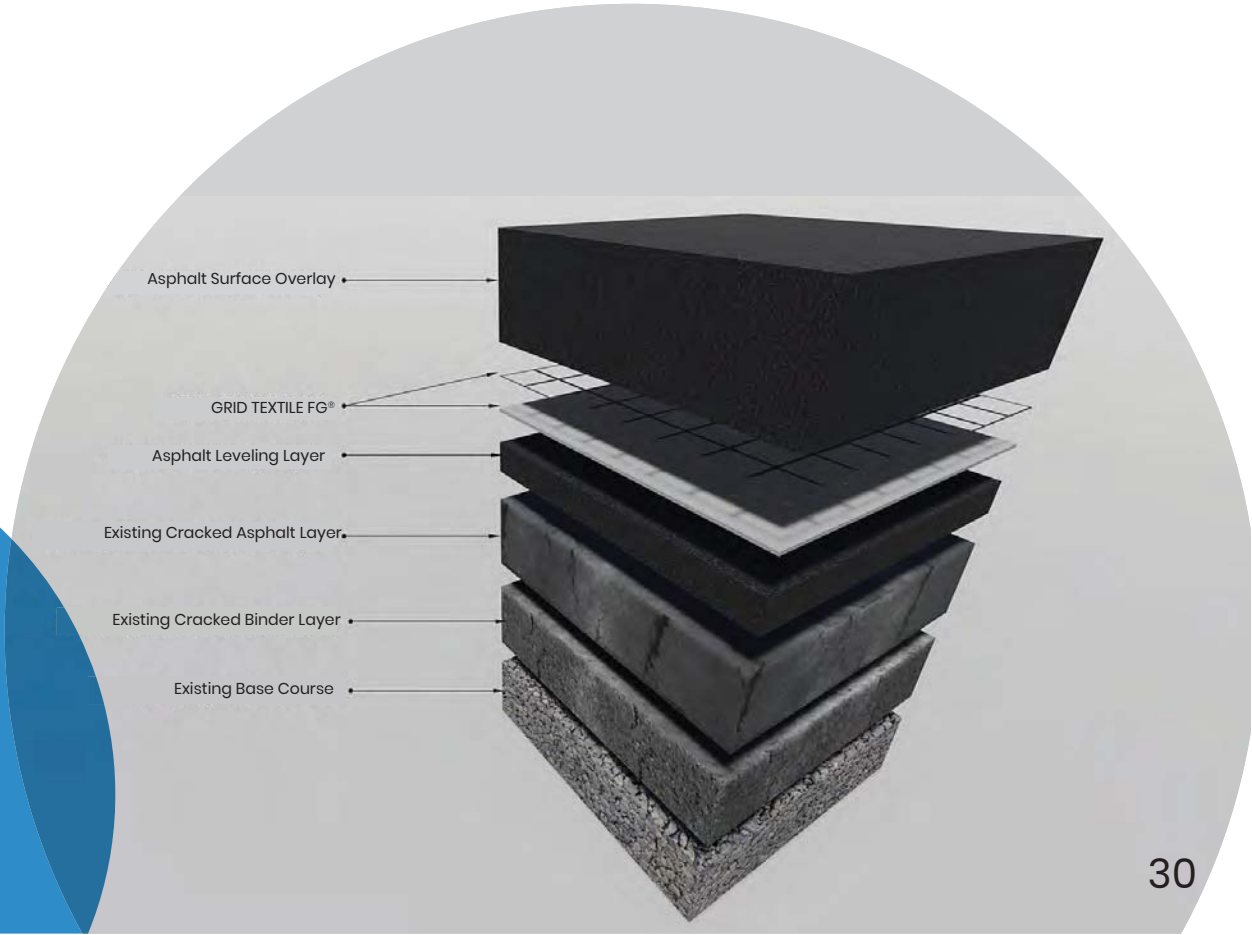
It is highly recommended for all of these applications and any other that may aim to deliver high pavement life. It delivers excellent results when used as the key material to repair roads.

Product benefits

GRIDTEXTILE-FG® delivers maximum performance when used with asphalt, supporting all types of mixes. It drastically minimises both thermal and stress induced reflective cracking. It beats its competition in reducing rutting under high ambient temperatures and intense wheel loads by a long margin.

GRIDTEXTILE-FG® also improves the fatigue life of pavements with weak foundations. It is also recyclable and easy to install.

All these benefits make GRIDTEXTILE-FG® a high-returns investment.



EROSION CONTROL COMPOSITES

EROMAT®

EROMAT® is a highly effective Erosion Control System designed and manufactured by APEC Industries. It is a light-weight, flexible 3D polyamide geomat made with polymer monofilament yarns. It builds a virtually maintenance-free system in slopes, spillways and lakes with its high durability and high resistance to UV, chemicals and biodegradation.

EROMAT's® erosion control blankets are available in various measures of thickness and rolls of 100m and 150m in length. The customisability of sizes makes EROMAT® suitable for a variety of erosion control needs.

EROMAT® MAIN FEATURES	
Thickness	10-20mm
Max. Tensile Strength – MD / CMD	2.0 / 1.5 kN/m
Elongation at Max. Tensile Strength – MD / CMD	80% / 80%
Soil Retention Factor	1810m filaments per m^2
Roll width	1.0 to 4.0 m
Roll length	100 and 150 m
Roll Weight (min – max)	40 – 160 kg

Functions of EROMAT® erosion control system

EROMAT® was manufactured to address the key problems relating to controlling erosion and stabilising soil on slopes in various kinds of settings and environments. It adds to slope stability by preventing erosion caused by soil transportation through wind and water. As for performance specifications, it can resist shear stresses up to 0.75 kN/m2 and flow velocities up to 4.5 m/s.

Recommended applications

EROMAT® is ideal for installation in wet and dry slopes, including lakes, river embankments, spillways, canals, and reservoirs.

It may also be used as an added grip layer on rocky and smooth surfaces as well as over geomembranes. In short, EROMAT® fulfils all erosion control needs of projects with high slope stabilisation demands.

Erosion can ruin landscape design by carving gullies and uprooting plants. Traditional erosion control strategies like rain gardens, applying mulch, and planting soil-stabilising vegetation will give no immediate relief, as these products work only once plant roots lock into the soil structure, which takes time. Additionally, even at full function capacity, these strategies are not as effective as EROMAT®.

On the other hand, EROMAT® becomes fully functional the moment its installation is complete. Its 3D structure holds the cover vegetative soil and accelerates the growth of plantation and landscaping.

Product benefits

One of the biggest reasons clients say they love EROMAT® is how it seamlessly blends into the landscape.

However, EROMAT® is built to deliver a much larger set of benefits. EROMAT® is designed to offer excellent bonding of individual filaments, which results in higher durability and performance than other erosion control blankets in the market.

With 90% voids across the blanket, swift vegetation growth is encouraged. Vegetation growth on top of EROMAT® reinforces the structure by allowing its roots to penetrate to the natural soil.

It can be installed on steeper grades compared to rip-rap and armour rock.

It is light, flexible, has high UV – and chemical – resistance, and it does not float on water.

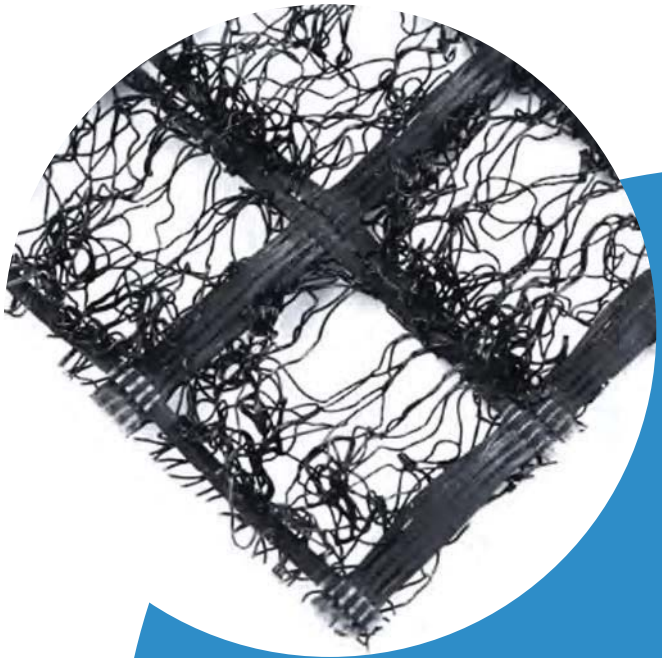
EROGRID®

EROGRID® is APEC Industries' other Erosion Control System. It also delivers maximum soil reinforcement and slope stabilisation thanks to its lightweight and flexible 3D polyamide geomat composite made from polymer monofilaments with integrated high-tensile strength polyester geogrid.

This polyester geogrid is included in the design to add performance stability and soil reinforcement in challenging slope settings, such as steep slopes.

This erosion control blanket is designed to withstand more resistance and perform ideally in steeper slopes than EROMAT®, which is designed for less steep dry and wet slopes. EROGRID® can resist shear stresses of up to 0.95 kPa and flow velocities exceeding 6 m/s (2.5 times more than just vegetation).

EROMAT® MAIN FEATURES	
Thickness	10-20mm
Max. Tensile Strength of PET GRID – MD / CMD	40/40 kN/m
Elongation at Max. Tensile Strength – MD / CMD	80% / 80%
Soil Retention Factor	1810m filaments per m^2
Roll width	1.0 to 4.0 m
Roll length	100 and 150 m
Roll Weight (min – max)	~50 - ~290kg



Functions of EROGRID® erosion control system

EROGIRD® is designed to deliver a complete slope soil reinforcement solution for shorelines and failing slope with heightened steepness. It delivers equally potent results for erosion control and slope stabilisation.

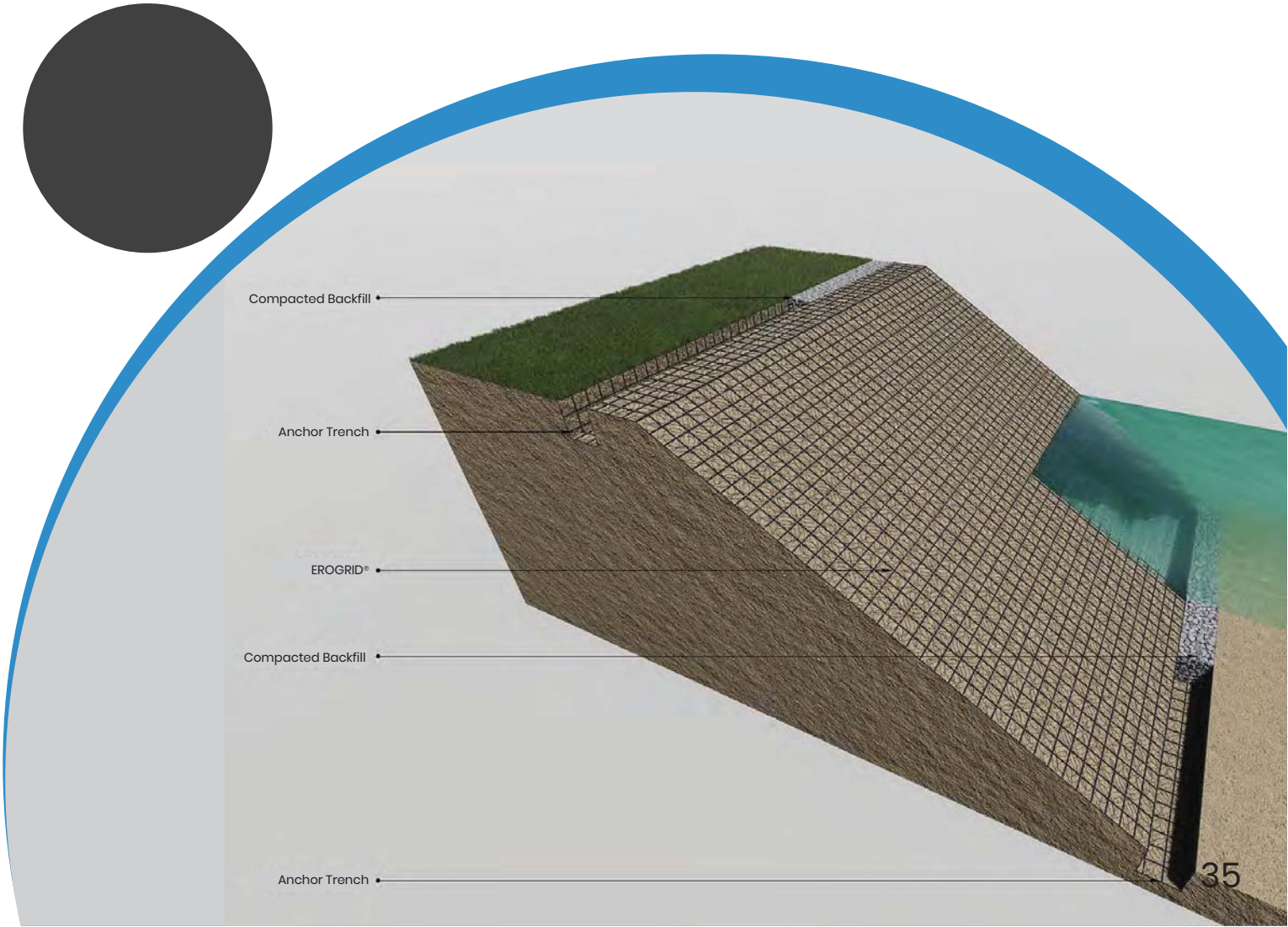
Recommended applications

Due to its outstanding performance on steep slopes, EROGRID® is highly recommended for all such settings. Additionally, it is ideally built to protect canals and shorelines, repair slope failures, and stabilise channels. Furthermore, it is highly recommended for percussive driven earth anchors and where wave action is high.

Product benefits

Since EROGRID® is a specialised version of EROMAT®, the two products offer a number of similar benefits. EROGRID® provides high soil stabilisation on steep slopes, thus preventing erosion and reinforcing the soil at low elongations. It also offers unmatched resistance to burrowing animals and hydraulic shear stresses, withstanding high flow velocities.

EROGRID® is light and flexible with optimal resistance to UV light, chemicals, and biodegradation. It is designed with 90% voids across the mat, which encourages vegetation growth and the roots to reach through to the natural soil, further adding reinforcement.



ROOT BARRIER COMPOSITES

ROOTDIVERT HD®

ROOTDIVERT HD® is a very durable and long-lasting root barrier system. Built to support long-term service life projects, this system creates an impenetrable geocomposite barrier between tree roots and project soil.

ROOTDIVERT HD® is available in various options for membrane thickness, roll widths, and roll lengths.

ROOTDIVERT HD® MAIN FEATURES	
Thickness at 2kPa	~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 – 1460 kg

Functions of ROOTDIVERT HD® root barrier system

ROOTDIVERT HD® is built solely to function as a breach-free barrier between project soil and tree roots from the surrounding wilderness.

Recommended applications

ROOTDIVERT HD® is ideally applied in projects to protect roads, highways, basements, foundations, pavements, buried pipelines, and other underground structures from tree roots.

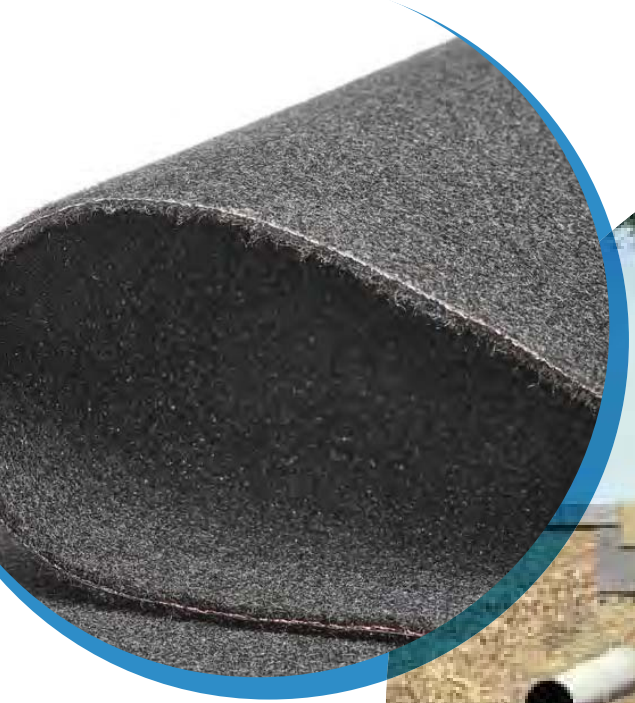
It is also highly recommended for green roof systems and segmentation.

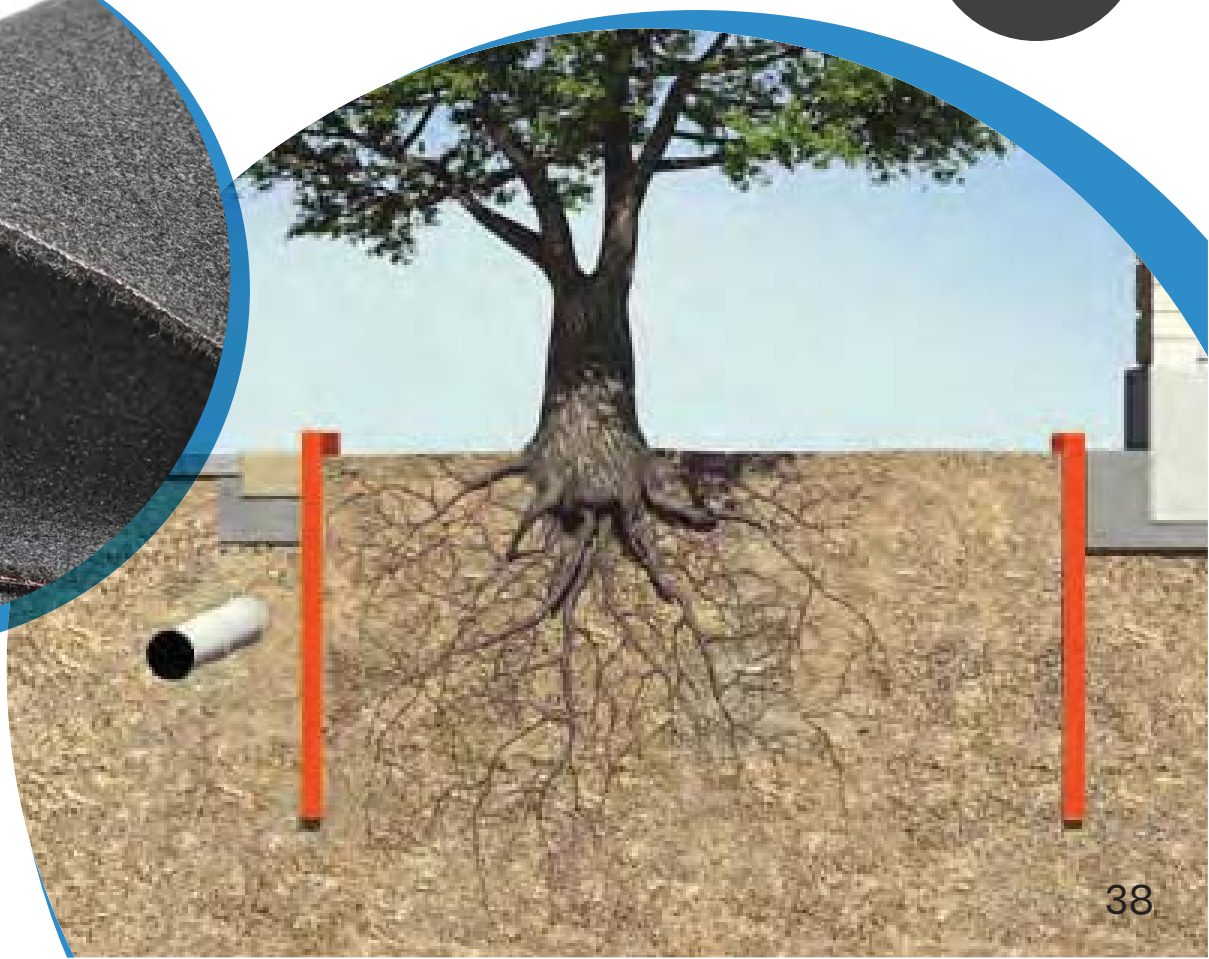
Product benefits

ROOTDIVERT HD® prevents root penetration from damaging concrete structures, foundations, road base layers and other buried structures. It prevents water seepage into buried structures as well and also protects concrete from soils and groundwater with high sulphate and chloride content.

ROOTDIVERT HD® stabilises reactive clay materials below foundations and provides a permanent root barrier solution, as the composite is highly resistant to biodegradation. It encourages root penetration to move deeper instead of wider, which protects any surrounding structures.

It is UV stabilised, light weight, easy to install, and with high puncture tolerance.





ROOTDIVERT LD®

ROOTDIVERT LD® is an LLDPE geomembrane root barrier system for projects with limited root load. It is more flexible in design but delivers a permanent root barrier solution.

The LLDPE geomembrane in ROOTDIVERT LD® is bonded with woven geotextile on both sides, which makes the barrier strong and high-performance.

ROOTDIVERT LD® MAIN FEATURES	
Thickness at 2kPa	~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 of ROOTDIVERT LD® LLDPE root barrier system

ROOTDIVERT LD® is designed and built to provide a reliable root barrier system in projects that have low root penetration risk.

Recommended applications

ROOTDIVERT LD® is highly recommended as a root barrier as well as waterproofing in boundary walls, roof decks, around underground plumbing, and other sub-surface objects that need protection from tree roots.

Product benefits

ROOTDIVERT LD® effectively prevents root penetration from damaging concrete walls, roof decks, and other buried structures. It also prevents water seepage into concrete and can also be applied between concrete and soils to protect the former from the soils' high sulfate and chloride contents.

It provides a permanent root barrier solution thanks to its high resistance to biodegradation. It encourages root penetration to go deeper and not wider, which protects surrounding structures. It effectively regulates growth of shrubbery to a specified area and separates decorative aggregates from mixing.

APEC Industries
Composite Polymeric Materials LLC

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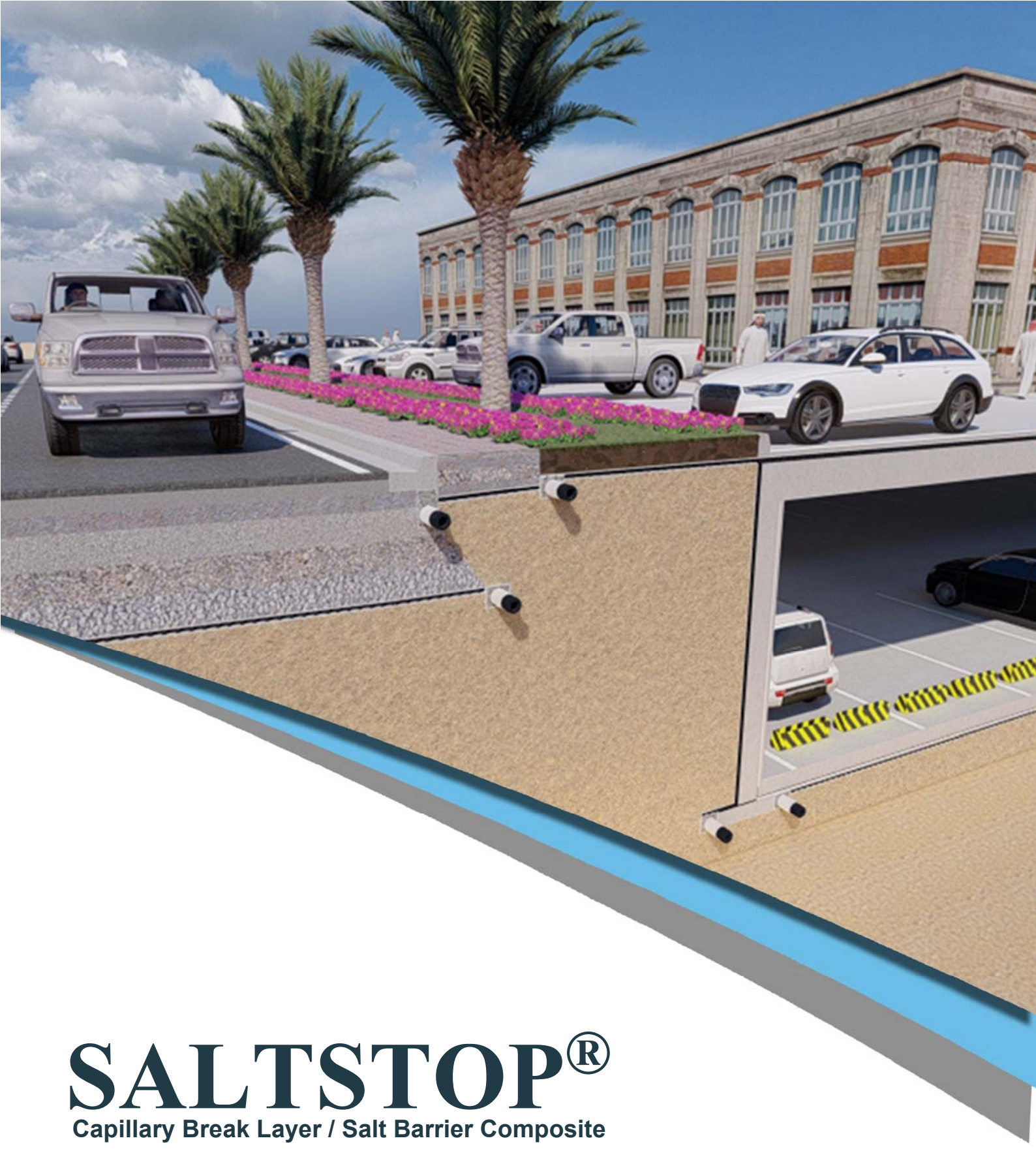
ENGINEERING SOLUTIONS

Product Technical Application



SALTSTOP®

Capillary Break Layer / Salt Barrier Composite

Certified to ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018

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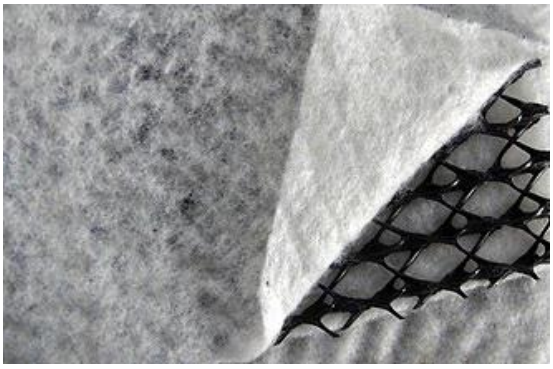
What is SALTSTOP?

- SALTSTOP is a geosynthetic composite salt barrier / capillary break layer consisting of geonet core bonded with filter fabric on both sides. SALTSTOP prevent the movement of saline water by capillary rise into the top vegetative soils, imported soils, road base & sub-base layers, and foundations. It also acts as a drainage layer to collect & discharge rainwater and surface spillage.



- SALTSTOP replaces traditional capillary breaks made up of 300mm thick crushed stone layer making significant savings in construction cost and time. SALTSTOP maintains its drainage void throughout its service life providing a permanent solution to problems caused by capillary action and it can withstand differential settlements without loss of its performance.
- APEC offers a broad range of SALTSTOP composites with various flow capacities, thickness, and dimensions.

Benefits of SALTSTOP

- SALTSTOP prevent capillary rise of saline ground water into vegetative topsoil.
- Reduces negative pore water pressure caused by capillary action.
- SALTSTOP prevent saline groundwater to encounter with imported soil or any buried / underground structures.
- SALTSTOP is durable and can carry higher loads, all while maintaining the void spaces needed for capillary break layer.
- SALTSTOP has higher compressive load resistance and almost 100% elastic recovery as compared to other capillary barriers made from cuspated sheet and geomat core which compress significantly under relatively low pressures which may result in surface settlement and significantly reduced flow rates. This makes SALTSTOP unique when it has to be placed at deeper depths or with heavier loads.
- It has strong resilience to weathering and not susceptible to chemical, biological and UV degradation.
- It avoids formation of sabkha.
- By arresting capillary rise, frost heave problem can be mitigated in cold regions.
- SALTSTOP helps in reducing heave below foundations rested on marl, clays etc. which are susceptible to swelling when comes in contact with water.

SALTSTOP in Landscapes

- Capillary rise of saline groundwater to sweet soil causes severe problems to vegetation as this will limit plant growth over the sweet soil. When unchecked, this will result to excessive soil erosion as there will be less or there will be no plants to hold the soils. This is particularly rampant in arid regions and coastal areas.
- Traditionally, crushed stone layer of 300 mm thickness was provided at certain height above the groundwater table to prevent capillary rise. This is not an economical solution and depends on the availability of crushed stone in the vicinity of the project location. It is not ecofriendly, and the supporting ground has to be prepared before placing the crushed stone capillary layer. In case of differential settlements, the effectiveness of this layer is doubtful.
- By providing SALTSTOP below the structure, the effects of capillary rise will be negated. SALTSTOP provides a stable barrier and separation functions that prevent the mixing of natural subgrade with top vegetative soil and the migration of saline groundwater into the sweet soil.

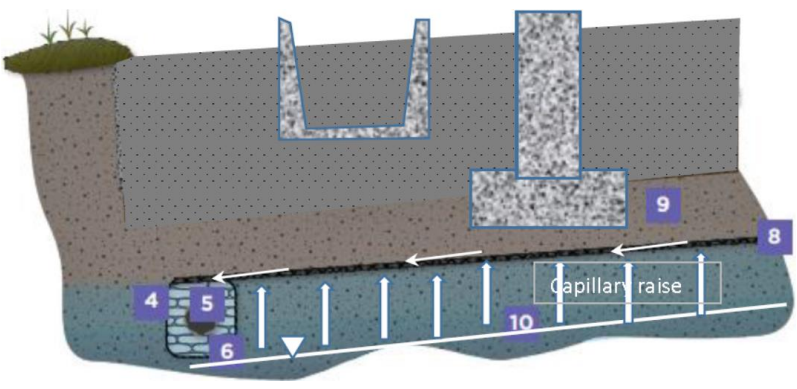
SALTSTOP in Lawns, Sports Fields, and Gulf Courses

- Same in landscaping, if the capillary rise of saline groundwater is not controlled the vegetation in the sports fields will be limited or may cause barrenness and erosion in the field.
- SALTSTOP prevents rise of saline groundwater through capillary action and prevent migration of saline moisture into sweet soils above the composite. SALTSTOP also has high in-plane flow capacity that helps in draining excess infiltration that may flood the field. This insures a permanent, stable, and efficient drainage, capillary breaker, and separation layer in green fields minimizing the need for any maintenance.
- In addition, SALTSTOP increasing the soil-water storage capacity of the sweet soils to an approximate level of 0.5m above the composite. This provides vegetation with a constant source of water which lessens the cost of irrigation and insures the life the vegetation. This is highly advantageous in arid and desert regions where fresh water is scarce.

SALTSTOP below Foundations & Basements

- Rise of saline groundwater through capillary actions exposes foundations and basements to unwanted risks. As Chloride ions within saline moisture are drawn into stone and concrete where the resultant chemical reaction causes expansion, spalling and weakening of the foundations and basements.
- With SALTSTOP, salt intrusion through capillary action into concrete are halted. It also restricts migration of subgrades with high concentration of sulfate and chloride to mix with base course materials and drains excess water from infiltration preventing the formation of pore water pressures.
- SALTSTOP provides a permanent solution with its stable void space, high compressive strength and high resistance to chemicals and biodegradation.

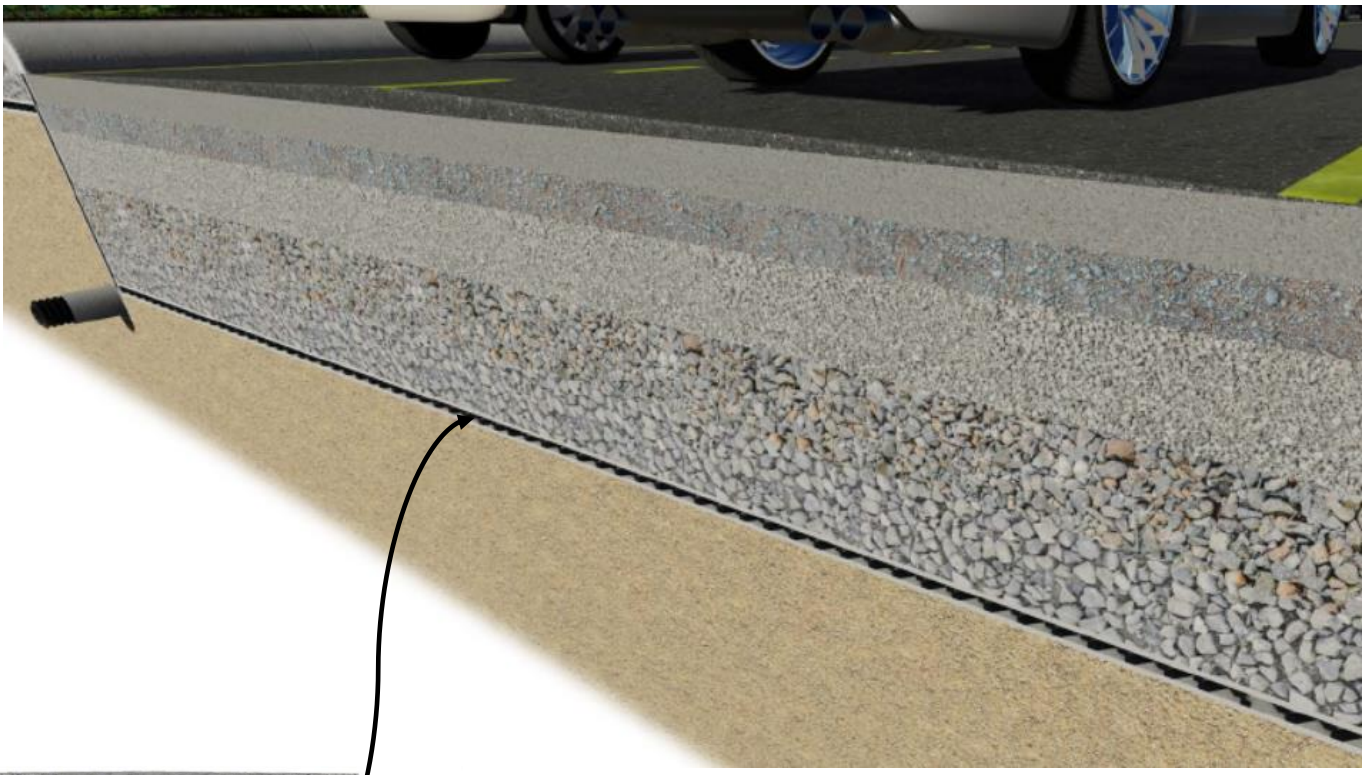
(4)--Geotextile Fabric
(5)--Perforated Pipe
(6)--Washed Stone
(7)--Prepared Subgrade or Subbase
(8)--SALTSTOP
(9)--Frost/Heave Susceptible Soils
(10)--Moisture Migrates Toward The active/Freezing Zone

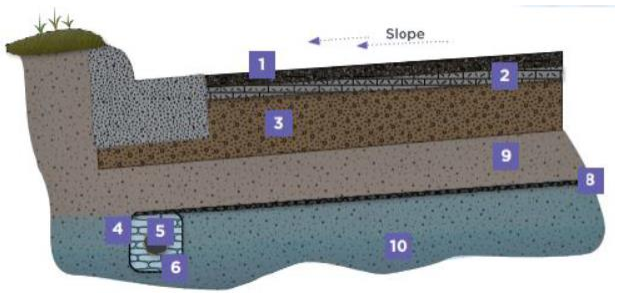


SALTSTOP below Roads & Pavements

Capillary rise of saline groundwater is detrimental in roads and pavements as these will lessen the bearing capacity of the soil. If left unchecked, this can cause excessive differential settlements which can damage the pavements and roads.

SALTSTOP is installed 250mm above the highest elevation of groundwater table, negates the effect of capillary rise. SALTSTOP ensures that capillary rise will not occur above the composite. SALTSTOP prevents the degradation of aggregate base course from chloride rich saline groundwater, maintains the CBR value of the base course and increases the road service life. Further, it is capable in providing a stable void space even when subjected high compressive stresses. This assures that it can provide an efficient drainage below the roads and pavement layers limiting the development of pore water pressures in the base / sub-base course and limits water movement into the underlying subgrade.

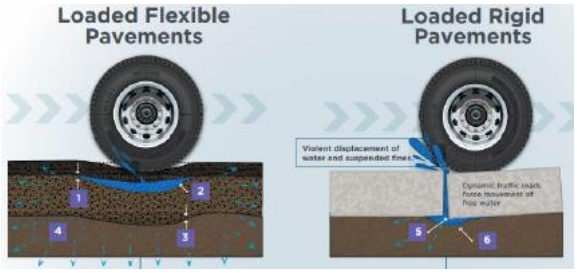




(1)-- Asphalt Surface
(2)-- Asphalt Binder
(3)-- Aggregate Base Course
(4)--Geotextile Fabric
(5)--Perforated Pipe
(6)--Washed Stone
(7)--Prepared Subgrade or Subbase
(8)--SALTSTOP
(9)--Frost/Heave Susceptible Soils
(10)--Moisture Migrates Toward The active/Freezing Zone

Problem: Premature Damage

1. Deflection of Aggregate base
2. Free water wedge
3. Deflection of subgrade
4. Hydrostatic pressure
5. Free water
6. Erosion of base material



Benefits of SALTSTOP:

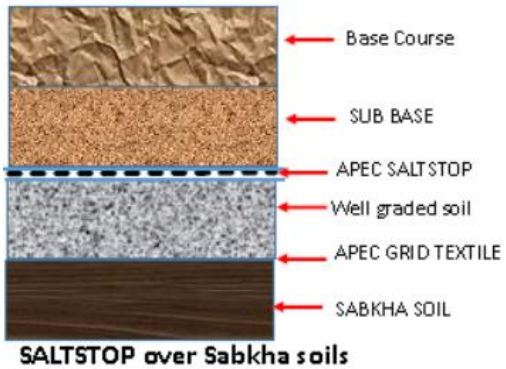
SALTSTOP is maintaining draining core with bonded filter fabric layers, and it creates the Open flow channels to direct water out past the edge of the pavement both from capillary water rise as well as infiltered water too. Rapid evacuation of water that virtually eliminates any pore pressure.
In-plane water flow capacity is 10 times more than the conventional solution.

SALTSTOP Over Very Soft / Sabkha Soils

Embankments constructed over Sabkha terrains suffer different classes of deterioration due to their low load-bearing capacity and a highly saline shallow ground water.

SALTSTOP: Geocomposite capillary break layer to prevent the rise of the saline ground water into the structural layers.

GRIDTEXTILE geocomposite: A single product to provide the critical multifunction of separation, filtration, and reinforcement.



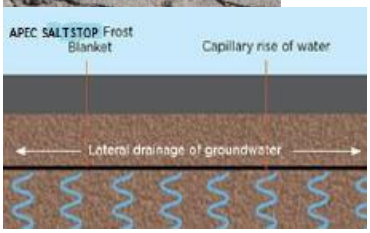
SALTSTOP over Sabkha soils

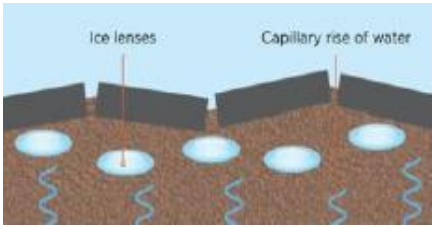
Well graded aggregate layer of designed thickness as working platform.

Preventing frost heave beneath highways:

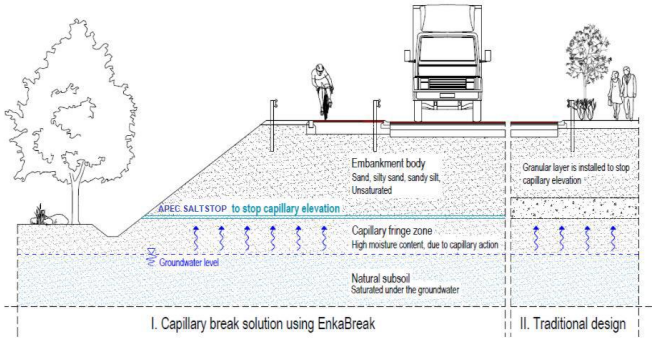
Frost-susceptible soils typically have a significant silt/fine sand content which allows the capillary rise of water. This water can turn to ice lenses in winter and further water is drawn up from the water table to balance the capillary forces. This cycle ultimately leads to heave at the surface which causes pavement cracking and uplifting.

SALTSTOP geocomposite which provides the capillary break that the soil lacks and thus prevents the upward movement of water.

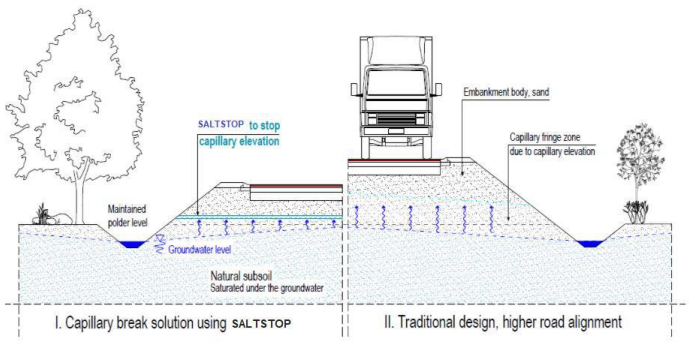




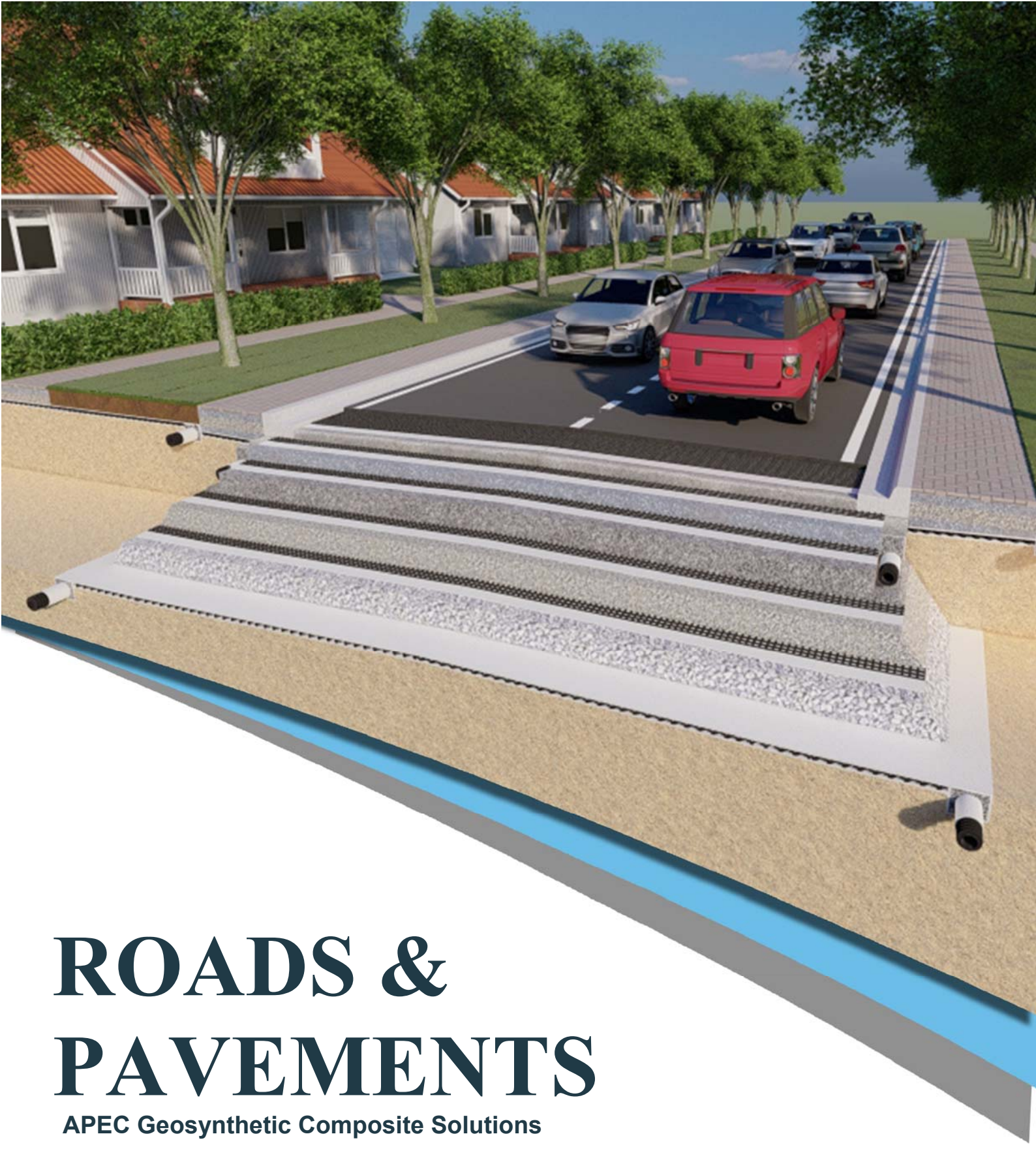
Protecting Pavements from Capillary Rise:



Capillary break solution using SALTSTOP, in case of high ground water level coupled with embankment height >2.0m



Capillary break solution using SALTSTOP, in case of high ground water level coupled with low height embankments <2.0m



ROADS & PAVEMENTS

APEC Geosynthetic Composite Solutions

Certified to ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018

APEC Industries
Composite Polymeric Materials LLC

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Web: www.apecindustries.com

Introduction to Geosynthetic Opportunities in Roads & Pavements

- In the past 25 years due to rapid urbanization use of abundant, waste, and soft soil lands increased drastically. The conventional methods of ground improvements either replacing the unsuitable soil or bypassing them with costly deep foundations are overcome using Geosynthetics which are proven to be the most versatile and cost-effective ground modification materials.
- The areas where APEC unique Geosynthetic composites can be used in modern construction of roads and pavements are:
    - ❖ Subgrade Separation & Stabilization of Temporary / Unpaved Roads – GRIDTEXTILE PET
    - ❖ Reinforcement of Base / Sub-base layers of Permanent / Paved Roads – GRIDTEXTILE PP
    - ❖ Basal reinforcement – GRIDTEXTILE PET
    - ❖ Embankment fill reinforcement – GRIDTEXTILE PP
    - ❖ Overlay stress absorption and Asphalt reinforcement – GRIDTEXTILE FG
    - ❖ Roadways Geocomposite under drainage systems – NETFLOW / CUPFLOW / MATFLOW
    - ❖ Drainage of Roadways Base / Sub-base layers – NETFLOW / CUPFLOW
    - ❖ Drainage of Surface Asphalt or Concrete Pavement – NETFLOW/NETLINER
    - ❖ Liner below the roads on swelling soils – NETLINER
    - ❖ Vertical Drains at Road Edges – MATFLOW/CUPFLOW
    - ❖ Erosion control of road embankment slopes – EROMAT
    - ❖ Drainage of Subgrade to form a Capillary Break layer – SALTSTOP
    - ❖ Root Barrier adjacent to the roadways – ROOTDIVERT HD
- APEC composite materials offers advantages like space savings, material quality control, construction quality control, cost savings, technical superiority, construction time, transportation cost, material deployment and environmental sensitivity etc.

Subgrade Separation and Stabilization of Temporary / Unpaved Roads

Temporary roads used for hauling and access roads that are subject to low volumes of traffic are often constructed without asphalt or cement concrete surfacing. In this case, a layer of aggregate is placed on the prepared subgrade of the roads to improve their load carrying capacity. Problems are usually encountered when the subgrade consists of soft clays, silts and organic soils with CBR < 3%. This type of subgrade is often unable to adequately support traffic loads and must be improved.

Typical solutions: Excavating and replacing unsuitable materials which is costly and time consuming. Other methods of subgrade improvement include deep compaction, chemical stabilization, and preloading.

Geosynthetic solution: In unpaved roads designing with GRIDTEXTILE PET geogrid composite has focused on the stabilization of the subgrade and the reinforcement of the aggregate, leading to the identification of three important functions: *membrane action*, *shear failure* and *lateral restraint*. Membrane action is the ability of GRIDTEXTILE PET to reduce and spread stress arising from the weak subgrade. Lateral restrain also called as confinement is the interaction between aggregates and subgrade, improving the strength and stiffness of the road structure. The geotextile component of the composite will separate the aggregates from weak subgrade.

The stiffness of GRIDTEXTILE PET can withstand higher strains developed from deeper ruts. A considerable reduction in aggregate thickness is possible using GRIDTEXTILE PET which is having high modulus in the direction perpendicular to the road centerline.

Therefore, GRIDTEXTILE PET increase the allowable bearing capacity of the subgrade and provide an improved load distribution ratio in the aggregate. The combined benefits can enhance load carrying capacity of the road over 50%.

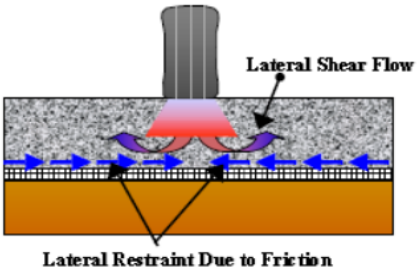


Figure 1. Lateral restraint reinforcement mechanism.

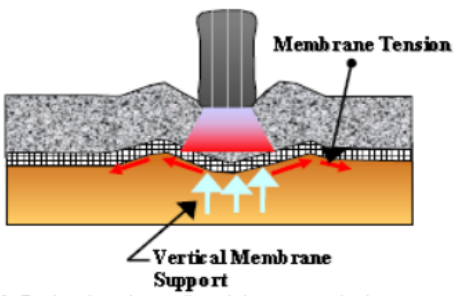


Figure 3. Tensioned membrane effect reinforcement mechanism.

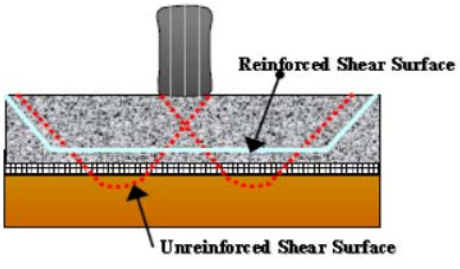


Figure 2. Improved bearing capacity reinforcement mechanism.

Reinforcement of Base / Sub-base layers of Permanent / Paved Roads

Permanent roads carry larger traffic volumes and typically have asphalt or Portland cement concrete surfacing over a base layer of aggregate. The combined surface and base layers act together to support and distribute traffic loading to the subgrade. Problems are usually encountered when the subgrade consists of soft clays, silts, and organic soils. This type of subgrade is often water sensitive and, when wet, unable to adequately support traffic loads. If unimproved, the subgrade will mix with the road base aggregate – degrading the road structure - whenever the subgrade gets wet.

Typical solutions: Excavating and replacing, or it is improved by the addition of cement, lime, of excess aggregate. In any case, the traditional solution is often costly and always time consuming.

Geosynthetic solution: In paved roads designing with GRIDTEXTILE PP reinforcement composite has primarily focused on lateral restrain also called as confinement and the stiffness is achieved by a Soil-GRIDTEXTILE PP-Aggregate (SGA) system. The benefits with SGA system are: Prevents lateral spreading of the base, increase confinement and thus stiffness of the base, improves vertical stress distribution on the subgrade and Reduce shear stress in the subgrade. The resulting benefit of GRIDTEXTILE PP as base layer reinforcement improves the Traffic Benefit Ratio (TBR) in-turn the life of overlaying roads & pavements.

In general, a geogrid with its highest strength in the direction of traffic load is laid. However, at junctions, diversions, and roundabouts a geogrid with high strength in both directions should be installed. The base reinforcement design is performed as per the guidelines given in “Modified AASHTO Design Method for Geogrid Reinforced Flexible Pavements”.

Advantages of GRIDTEXTILE PP reinforcement composite

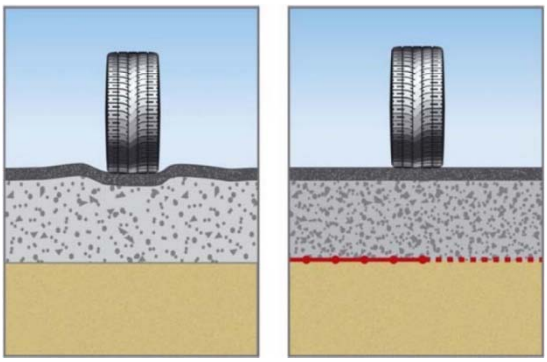


Fig. 2 Lifetime increase

Note: Additionally, Geotextile component will provide separation, filtration, and nominal reinforcement.

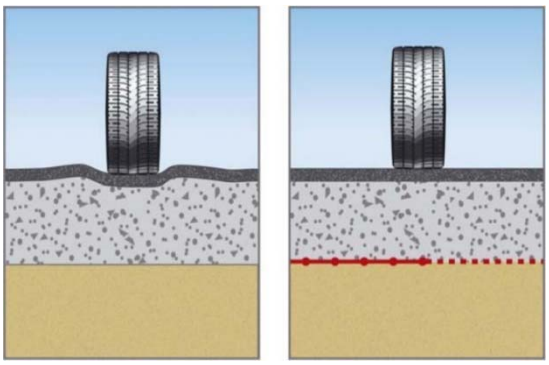


Fig. 1 Thickness reduction

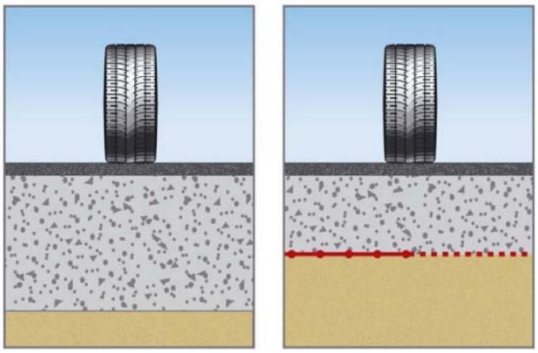
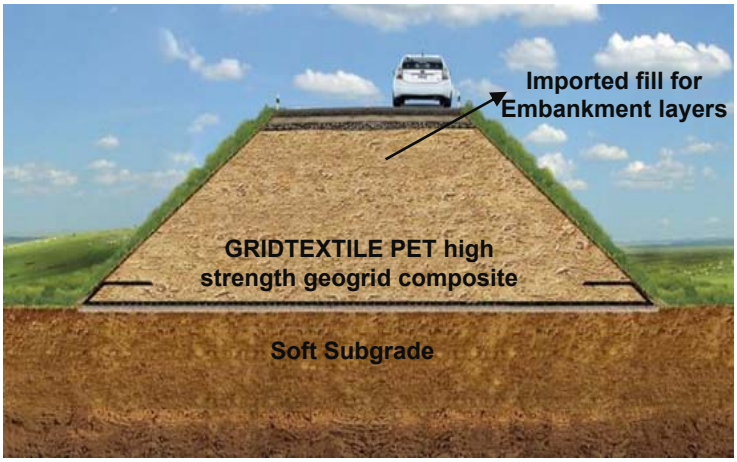


Fig. 3 Fill quality reduction

Basal Reinforcement of Embankments on Soft Sub-grades

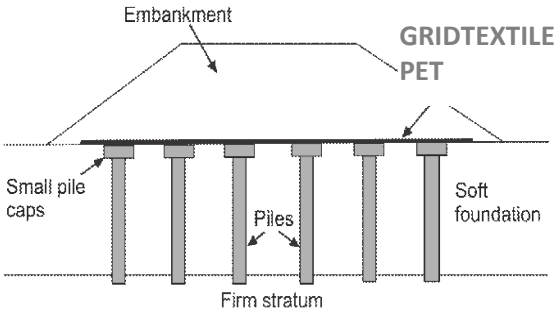


Embankments rested directly on Soft Sub-grades: Soft soils are characterized by poor shear strength, high compressibility, and low permeability. The stability of an embankment constructed on soft soil is governed mostly by the shearing resistance of the foundation and is a problem of bearing capacity. Reinforcement may be placed at foundation level to prevent shear failure both in the embankment fill and in the foundation soil.

The basal reinforcement design is performed in accordance with BS8006:2010. The reinforcement / confinement effect from GRIDTEXTILE PET, high strength geogrid composite, benefits as follows:

- Improves embankment stability by increasing their shear strength and bearing capacity
- Permits controlled construction over soft soils
- Ensures more uniform settlement of embankment
- Cost effective solutions

Embankments on GRIDTEXTILE PET Reinforced Piles Support (GRPS): Weak foundation soils are also a challenge to the design engineers. When designing embankment over weak foundations bearing capacity, slope stability, lateral pressures, movements, and differential settlements are some of the major concerns. GPRS system is a one solution for all problems.



Disadvantages of Conventional Pile Supported embankment system (CPS)	Advantages of GRIDTEXTILE PET Reinforced Piles Support (GRPS) Embankments
Requires large pile caps and very closely spaced piles to transfer embankment loads and to avoid surface deformations due to differential settlements	GRIDTEXTILE PET have a very high tensile strength which the soil lacks. It reduces the differential settlement, increase the bearing capacity, and the slope stability when used in soft soils. GRPS embankments are more rapidly constructed than CPS embankments.
The CPS requires inclined piles at the edges of the embankment to resist large lateral pressures	The GRPS system has a geosynthetic reinforced platform which increases the efficiency of transferring the load from the soil to the piles without giving rise to deflections between the pile caps
Requires a large amount of steel as reinforcement or very thick concrete slabs for successful load transfer	GRIDTEXTILE PET provides a resistance to the lateral thrust at the edges of the embankments
Percent coverage of the pile caps over the total foundation area is 60-70%	Percent coverage can be reduced to10-20%. Pile size can also be reduced. Possible reduction of pile cap thickness.