

DELTA®-DRAIN '000 HI-X

DELTA® High Performance Drainage Systems.
The Direct Route For Re-Directing Ground Water.



For relief of hydrostatic pressure in vertical foundation applications.
For water control in deep excavations.
For structural deck drainage in horizontal applications.





Hudson Park Pier 27 New York City

Dörken Leading by Technical Competence.

Dörken Systems Inc. delivers innovative, high performance air and moisture barriers for commercial and residential construction, under our DELTA® brand. After 120+ years in over 60 countries, there isn't anything we don't know about building enclosures. We've protected all types of buildings all over the world, in the most extreme conditions. That includes monsoons in India, the deep ice of Norway, and ever-tightening budgets everywhere. We are known for delivering high performance products while providing educational programs and full

technical support. When you need protection you can count on, you can count on Dörken and all of our DELTA® products. No one knows protection like we know protection. A North American manufacturer based in Beamsville, Ontario, Dörken Systems Inc. is a subsidiary of Ewald Dörken AG, leading European developer and manufacturer of waterproofing and drainage products sold worldwide.

For more information, please contact us at 1-888-433-5824 or visit dorken.com.



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Environmental Commitment



Our commitment to sustainability and the environment is future oriented, meaning we have a constant and never-ending commitment to improvement. Dörken has a combined quality, safety, and environmental management system. We already meet the highest standards of tomorrow. DELTA® protects property. Saves energy. Creates comfort. That is our commitment.

Building green involves the business of manufacturing. Therefore we do not manufacture products or byproducts that can have a negative impact on our world. We protect our environment and the people who are in our employ, while producing high quality, sustainable products that help create healthier living environments.

We develop and manufacture products that:

- **are non-toxic and emit zero volatile organic compounds (VOC)**
- **are produced in North America by fair market wage employees**
- **utilize high quality recycled and remanufactured ingredients**

- **are low transportable cost products**
- **have low impact on environmental resources**
- **are non-polluting**
- **are safe to handle and install**
- **are fully recyclable**
- **are sustainable (> 25 years expected service life)**

Out of respect for nature, environmental protection is strictly observed in all areas of the business. It is our fundamental belief that statutory requirements for the good of the environment should not only be fulfilled, but - wherever possible - should be surpassed.

We process High Density Polyethylene (HDPE) and Polypropylene (PP) to manufacture our DELTA® branded products. The process has virtually zero emissions. We recycle all scrap material from our production, and also purchase selected recycled resins. We utilize a unique technology to ensure sustainable long term quality. We use recyclable and minimal packaging for all our products.

We are active participants in CIPEC (Canadian Industry Program for Energy Conservation) and USGBC (US Green Building Council). Our manufacturing process is clean, allowing us to capture process heat and reuse it for the heating of our facility. We have invested in power factor correction and harmonic distortion filters for improved efficiency in motors. We utilize motion switches, low energy idling devices, and outdoor storage to save energy. We also utilize natural daylight, high efficiency electrical lighting, and water saving fixtures. We use recycled paper and environmentally friendly inks.

Dörken manufactures materials that protect a building enclosure from moisture problems. Our products are designed for long term performance. The products perform directly with the physics of fluid flow to provide a service function that works every day and for decades without requiring additional energy for their performance other than the energy in initial manufacture and to apply the materials.

The DELTA® HI-X Difference

DELTA®-DRAIN '000 HI-X High Performance Drainage Systems for civil engineering and commercial construction prove all drain boards are not created equal.

We manufacture from only premium special polypropylene. There are cheaper plastics from which similar-looking drain boards are made. However, we choose polypropylene and we make that choice for a reason: cheaper materials simply don't last. Economy drain-boards are made from polystyrene, the same material out of which coffee cup lids are made. It tears easily and doesn't take much impact. These may be desirable qualities in a coffee cup lid, but much less desirable in a drain board. So looks can be deceiving.

These are the desirable qualities of a drain board:

- **Durability**
- **Impact resistance to survive the construction process**
- **No damage from backfill**
- **Long term resistance to high soil pressures**
- **Long term drainage performance**

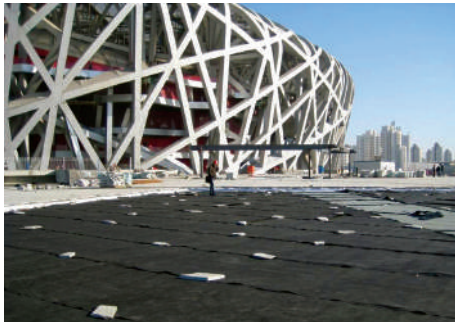
These are the qualities of premium DELTA®-DRAIN '000 HI-X. Drainage is a key part of site water management and it's a job you only want to do once.

Durable and sustainable, DELTA®-DRAIN '000 HI-X gives long-lasting, reliable, and trust-

worthy protection throughout the life of the structure.

The DELTA®-DRAIN '000 HI-X Series Drain Boards for every application:

- DELTA®-DRAIN 2000 HI-X
- DELTA®-DRAIN 6000 HI-X
- DELTA®-DRAIN 6200 HI-X
- DELTA®-DRAIN 9000 HI-X



DELTA®-DRAIN 2000 HI-X

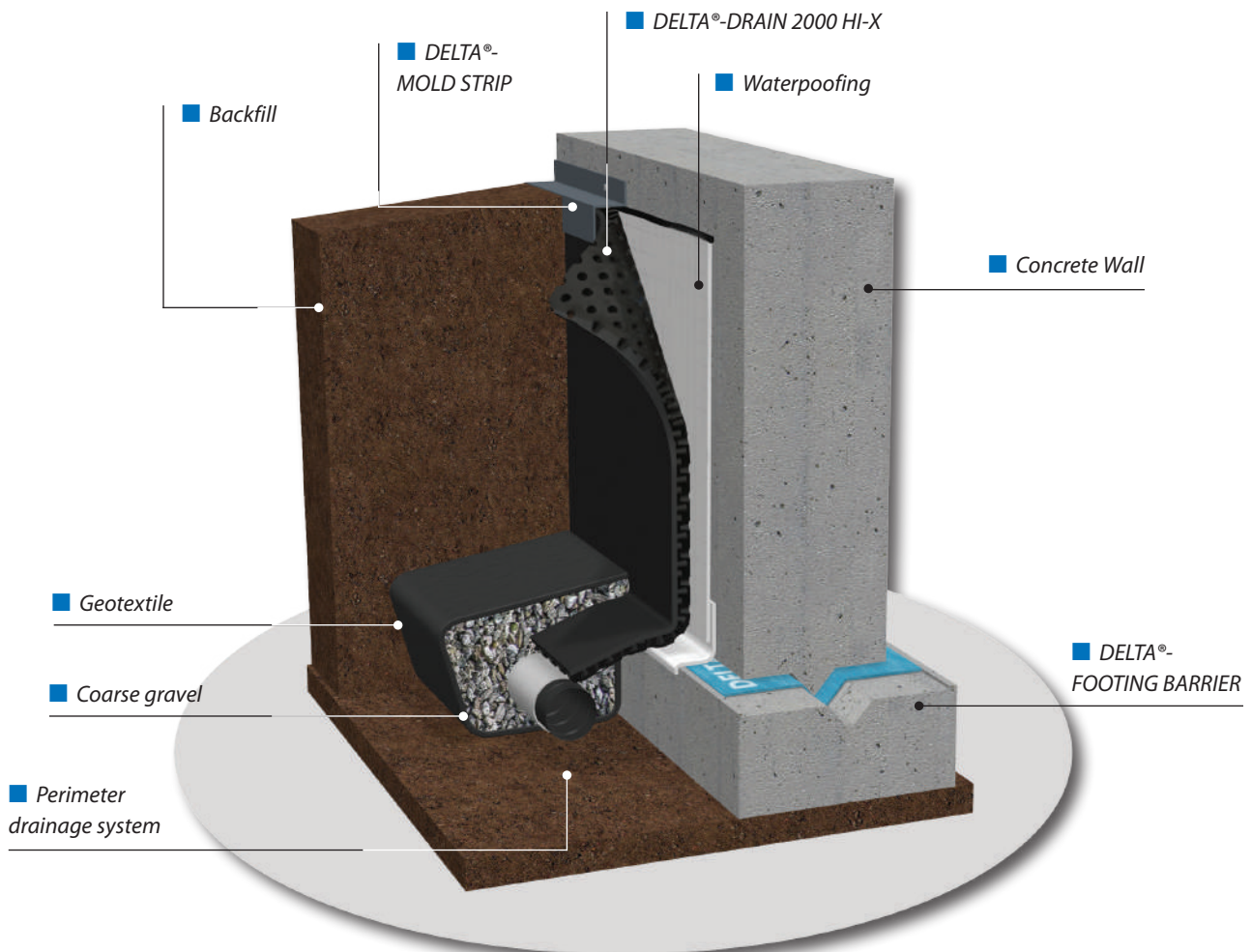
For Horizontal and Vertical Drainage Applications

High compressive strength. Excellent drainage capacity. Exceptional long term performance. This is DELTA®-DRAIN 2000 HI-X, the best choice drainage board that meets the requirements for light commercial applications and shallow depth foundations.

Manufactured from a special copolymer polypropylene, nothing is tougher on the jobsite. DELTA®-DRAIN 2000 HI-X has superior impact resistance, tear resistance and stress cracking resistance when compared to poly-

styrene look-a-likes. It does not crack, break or shatter when being installed or handled roughly, maintaining its integrity even under the toughest conditions. It provides water flow rates in highly demanding conditions. DELTA®-DRAIN 2000 HI-X is designed to protect underground structures against water damage by eliminating hydrostatic pressure. The needle-punched geotextile is highly tear- and puncture-resistant and proven to prevent clogging of the drainage core. The geotextile meets AASHTO M288 Class 3.

When drainage is critical, DELTA®-DRAIN 2000 HI-X delivers reliable in-ground performance for many years to come.



DELTA®-DRAIN 6000 HI-X

For Horizontal and Vertical Drainage Applications

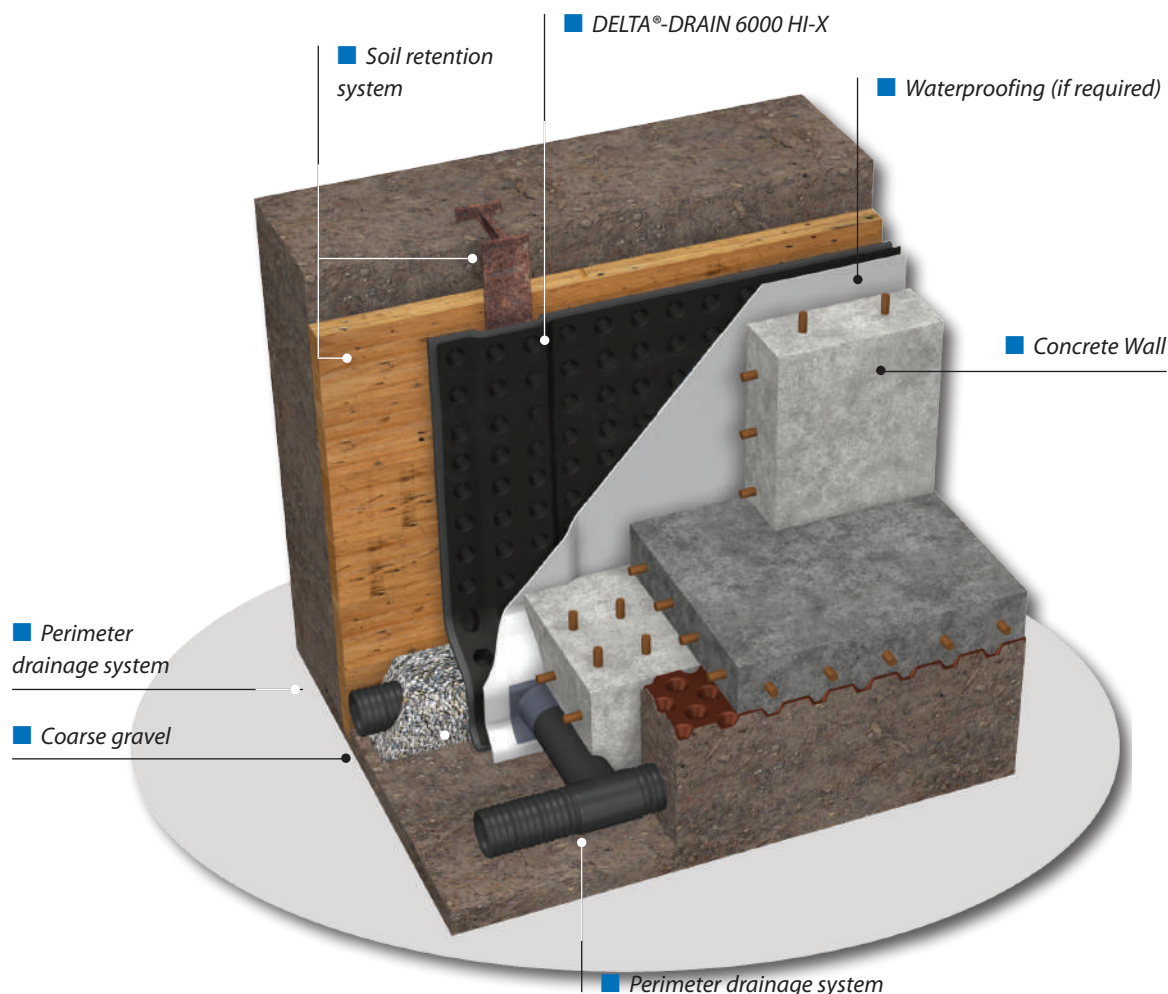
DELTA®-DRAIN 6000 HI-X is a heavy-duty drain board, ideally suited for subsurface drainage applications where high compressive strength and high flow rates are required.

Manufactured from a special copolymer polypropylene, nothing is tougher on the jobsite. DELTA®-DRAIN 6000 HI-X has superior impact resistance, tear resistance and stress cracking resistance when compared to polystyrene look-a-likes. It does not crack,

break or shatter when being installed or handled roughly. When drainage is critical DELTA®-DRAIN 6000 HI-X delivers superior in-ground performance for many years to come.

Outstanding compressive strength and high water flow rate characterize this premium commercial-grade drainboard. Its high-strength core provides a continuous path for water discharge, eliminating the potential for build-up of hydrostatic pressure.

The non-woven geotextile allows water to pass freely into the drainage core. At the same time, it prevents the passage of soil particles to ensure that the drainage core doesn't get clogged. The geotextile meets AASHTO M288 Class 3. The special copolymer polypropylene provides unmatched tear, puncture and chemical resistance, and – unlike polystyrene drainboard imitations – is unaffected by environmental stress cracking.



DELTA®-DRAIN 6200 HI-X

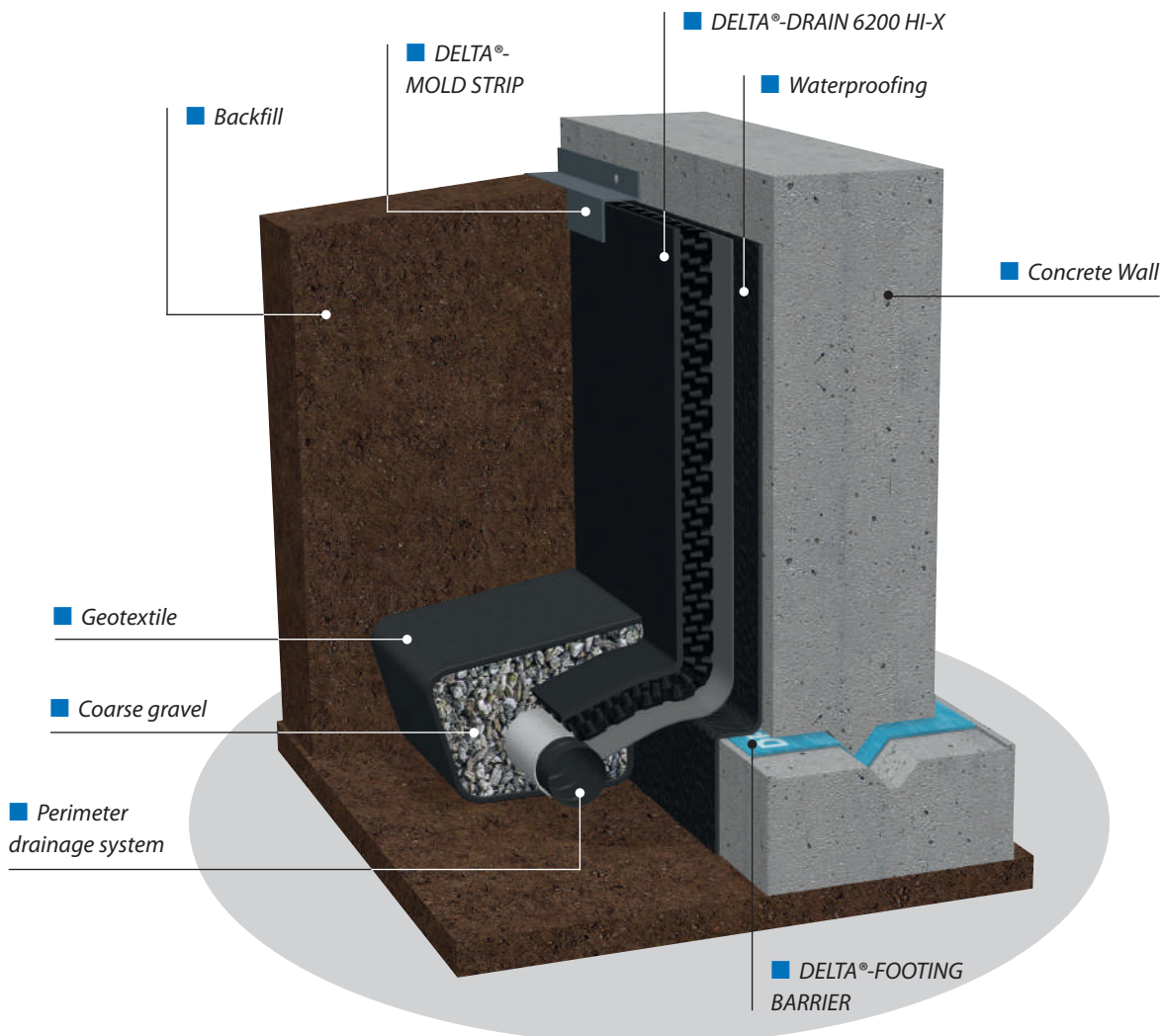
For Heavy Duty Vertical Drainage Applications Over Waterproofing

DELTA®-DRAIN 6200 HI-X is a high-performance drainboard that features a tough polymeric sheet adhered to its back surface. The protection sheet prevents viscous flow and die cutting of soft liquid or sheet applied waterproofing products.

The drainboard enhances the effectiveness of a waterproofing system by channeling sub-surface water away and preventing the

build-up of hydrostatic pressure against the structure. The polypropylene drainboard has unmatched impact and tear resistance, and is unaffected by environmental stress cracking. The non-clogging geotextile is fully bonded to the dimpled drainage core which prevents it from being pushed into the flow channels by the load from adjacent back-fill material. The geotextile meets AASHTO M288 Class 3. The copolymer drainage core

is dramatically stronger, resisting jobsite damage from rough handling and impact from fastening significantly better than polystyrene imitations.



DELTA®-DRAIN 9000 HI-X

For Horizontal Drainage Applications Under Gravel, Pavers, or Concrete

DELTA®-DRAIN 9000 HI-X is a high-performance, high-strength drain board ideally suited for demanding horizontal drainage applications in plaza deck and pavement construction, and split slabs where high compressive strength and high flow rates are required.

High water flow rate and ultimate compressive strength characterize this commercial grade drain board. Its special high-strength polypropylene core provides a continuous path for water discharge. The highly puncture

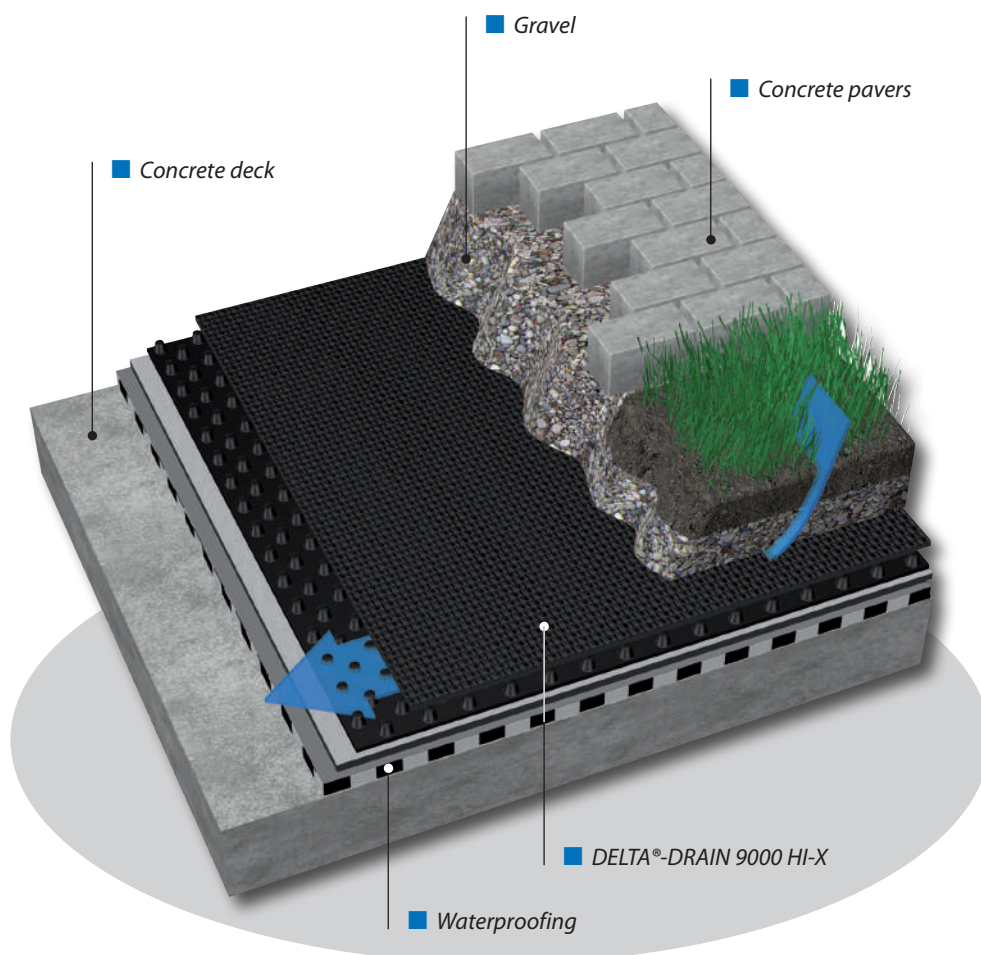
resistant woven monofilament geotextile allows water to pass freely into the drainage core while withstanding abrasion during substrate application (e.g. gravel) and is fully bonded to the dimpled drainage core to prevent it from being pushed into the flow channels by the load of the overburden material, maintaining its high transmissivity.

Nothing is tougher on the jobsite, especially in high traffic areas. DELTA®-DRAIN 9000 HI-X special copolymer has superior impact resist-

ance, tear resistance and stress cracking resistance when compared to polystyrene look-a-likes.

It does not crack, break or shatter when being installed or handled roughly. When imitations fail, repair is virtually impossible.

When drainage is critical, DELTA®-DRAIN 9000 HI-X delivers the in-ground performance needed for many years to come.



Technical Data

	DELTA®-DRAIN 2000 HI-X		DELTA®-DRAIN 6000 HI-X	
Color	black		black	
Material	Drainage core: co-polymer polypropylene Geotextile: polypropylene		Drainage core: co-polymer polypropylene Geotextile: polypropylene	
Dimple height	approx. 2/5" (10 mm)	ASTM D1777-96 ASTM D5199	approx. 2/5" (10 mm)	ASTM D1777-96 ASTM D5199
Compressive strength	11,000 psf (527 kN/m ²)	ASTM D6364-06	15,100 psf (723 kN/m ²)	ASTM D6364-06
Drainage core impact resistance	2.9 J mean failure energy at 5 °C	ASTM D4226-09	2.9 J mean failure energy at 5 °C	ASTM D4226-09
Drainage core maximum tearing strength	MD 550 N CD 800 N	ASTM D5884-04a	MD 550 N CD 800 N	ASTM D5884-04a
Drainage core stress cracking resistance	504 hours @ 156 kPa (No cracking at test termination)	SAGEOS GD 001-2012	504 hours @ 156 kPa (No cracking at test termination)	SAGEOS GD 001-2012
Geotextile grab tensile strength	90 lbs (401 N) MD & CD	ASTM D4632	90 lbs (401 N) MD & CD	ASTM D4632
Geotextile elongation	50 % MD & CD	ASTM D4632	50 % MD & CD	ASTM D4632
Geotextile trapezoidal tear	40 lbs (178 N) MD & CD	ASTM D4533	40 lbs (178 N) MD & CD	ASTM D4533
Geotextile CBR puncture strength	265 lbs (1178 N)	ASTM 6241	265 lbs (1178 N)	ASTM 6241
Geotextile apparent opening size (AOS)	50 sieve size (0.30 mm)	ASTM D4751-99	50 sieve size (0.30 mm)	ASTM D4751-99
Geotextile water flow rate	150 gal/min/ft ² (6095 l/min/m ²)	ASTM D4491-99	150 gal/min/ft ² (6095 l/min/m ²)	ASTM D4491-99
Permittivity	2.0 sec ⁻¹	ASTM D4491	2.0 sec ⁻¹	ASTM D449
Geotextile weight (typical)	4.0 oz/yd ² (135 g/m ²)	ASTM D5261-92	4.0 oz/yd ² (135 g/m ²)	ASTM D5261-92
Geotextile UV resistance	70 % @ 500 h	ASTM D4355	70 % @ 500 h	ASTM D4355
Geocomposite water flow rate @ hydr. grad. 1.0	18 gal/min/ft (223 l/min/m)	ASTM D4716-99	18 gal/min/ft (223 l/min/m)	ASTM D4716-99
Geocomposite water flow rate @ hydr. grad. 0.1	–		3.2 gal/min/ft (40 l/min/m)	ASTM D4716-99
Toxicity	non-toxic, non-polluting		non-toxic, non-polluting	
Roll size / weight	4' x 50' (1.2 x 15.25 m) / 38 lbs (17 kg) 6' x 50' (1.83 x 15.25 m) / 56 lbs (25 kg)		4' x 50' (1.2 x 15.25 m) / 41 lbs (19 kg) 6' x 50' (1.83 x 15.25 m) / 63 lbs (28 kg)	
Service life expectancy	> 25 years (at pH between 4 and 9 and temperature below 77 °F / 25 °C). Do not expose to UV light for more than 30 days.		> 25 years (at pH between 4 and 9 and temperature below 77 °F / 25 °C). Do not expose to UV light for more than 30 days.	

	DELTA®-DRAIN 6200 HI-X		DELTA®-DRAIN 9000 HI-X	
Color	black		black	
Material	Drainage core: co-polymer polypropylene Geotextile: polypropylene Protective backsheet: LDPE		Drainage core: co-polymer polypropylene Geotextile: Polypropylene (woven monofilament)	
Dimple height	approx. 2/5" (10 mm)	ASTM D1777-96 ASTM D5199	approx. 2/5" (10 mm)	ASTM D1777-96 ASTM D5199
Compressive strength	15,100 psf (723 kN/m ²)	ASTM D6364-06	18,000 psf (862 kN/m ²)	ASTM D6364-06
Drainage core impact resistance	2.9 J mean failure energy at 5 °C	ASTM D4226-09	2.9 J mean failure energy at 5 °C	ASTM D4226-09
Drainage core maximum tearing strength	MD 550 N CD 800 N	ASTM D5884-04a	MD 550 N CD 800 N	ASTM D5884-04a
Drainage core stress cracking resistance	504 hours @ 156 kPa (No cracking at test termination)	SAGEOS GD 001-2012	504 hours @ 156 kPa (No cracking at test termination)	SAGEOS GD 001-2012
Geotextile grab tensile strength	90 lbs (401 N) MD & CD	ASTM D4632	365 lbs (1624 N)	ASTM D4632
Geotextile elongation	50 % MD & CD	ASTM D4632	24 % MD 10 % CD	ASTM D4632
Geotextile trapezoidal tear	40 lbs (178N) MD & CD	ASTM D4533	115 lbs (512N)	ASTM D4533
Geotextile CBR puncture strength	265 lbs (1178 N)	ASTM 6241	675 lbs (3004 N)	ASTM 6241
Geotextile apparent opening size (AOS)	50 sieve size (0.30 mm)	ASTM D4751-99	40 sieve size (0.43 mm)	ASTM D4751
Geotextile water flow rate	150 gal/min/ft ² (6095 l/min/m ²)	ASTM D4491	145 gal/min/ft ² (5907 l/min/m ²)	ASTM D4491
Permittivity	2.0 sec ⁻¹	ASTM D4491	2.1 sec ⁻¹	ASTM 4491
Geotextile weight (typical)	4.0 oz/yd ² (135 g/m ²)	ASTM D5261-92	6.1 oz/yd ² (206 g/m ²)	ASTM D5261-92
Geotextile UV resistance	70 % @ 500 h	ASTM D4355	90 % @ 500 h	ASTM D4355-92
Geocomposite water flow rate @ hydr. grad. 1.0	18 gal/min/ft (223 l/min/m)	ASTM D4716-99	27 gal/min/ft (334 l/min/m)	ASTM D4716-99
Geocomposite water flow rate @ hydr. grad. 0.1	3.2 gal/min/ft (40 l/min/m)	ASTM D4716-99	5.4 gal/min/ft (67 l/min/m)	ASTM D4716-99
Toxicity	non-toxic, non-polluting		non-toxic, non-polluting	
Roll size / weight	4' x 50' (1.2 x 15.25 m) / 43 lbs (20 kg) 6' x 50' (1.83 x 15.25 m) / 63 lbs (28 kg)		6' x 50' (1.83 x 15.25 m) / 70 lbs (32 kg)	
Service life expectancy	> 25 years (at pH between 4 and 9 and temperature below 77 °F / 25 °C). Do not expose to UV light for more than 30 days.		> 25 years (at pH between 4 and 9 and temperature below 77 °F / 25 °C). Do not expose to UV light for more than 30 days.	

A Proud Member Of:



ASCE – American Society of Civil Engineers

IIFA – Industrial Fabrics Association International

GMA – Geosynthetic Materials Association

DELTA®



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