DELTA®

DÖRKEN

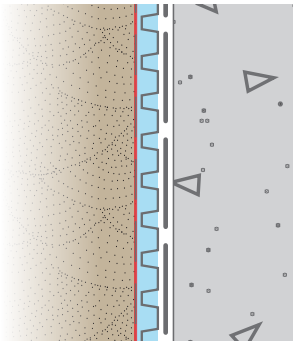
DELTA®-TERRAXX Drainboard Bulletin

LONG-TERM DRAINAGE PERFORMANCE

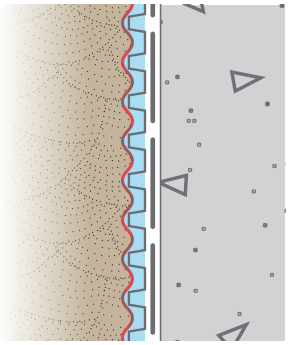
One of the challenges designers face when selecting drainboard is that the water flow rates claimed on technical data sheets are often not representative of the actual in-service drainage performance of the products. This is because during service, the soil pressure against the drainboard deflects the geotextile into the drainage space created by the dimples, thereby reducing the in-plane water flow rate.

Dörken completed third party testing of drainboard products available in the market using a modified ASTM D4716M-22 test, with one rigid plate and one sand plate to be more reflective of actual in service conditions. The modified testing at 3,759 lbf/ft^2 and 1.0 hydraulic gradient* found a 20-78% reduction in water flow rate amongst other drainboards in the market. One drainboard claimed a flow rate of ~21 gal/min/ft but only achieved ~5 gal/min/ft when tested, a 78% reduction in flow rate when in service.

The required compressive strength of drainboard depends on its application and the type of assembly it is used in.



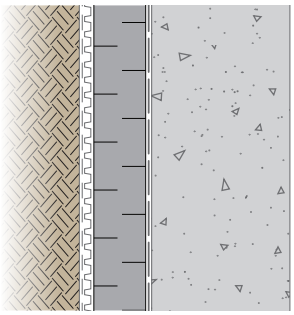
Drainage core without geotextile deflection



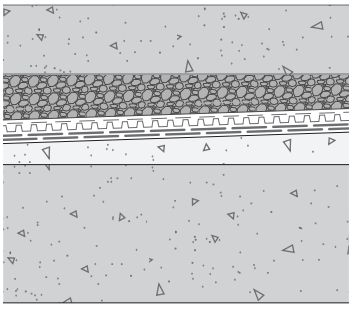
Reduced drainage core width from geotextile deflection

DELTA®-TERRAXX has a compressive strength of 8,500 lbf/ft^2 which is appropriate for a wide range of residential and commercial building assemblies, such as the following:

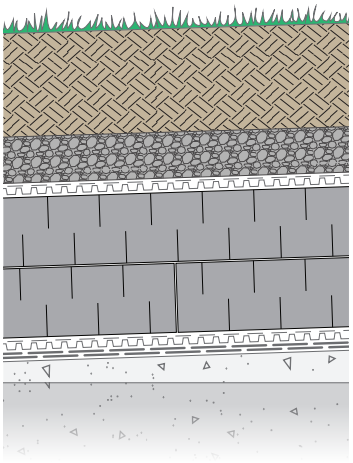
* Hydraulic gradient refers to the rate of change in total head per unit distance of flow in a particular direction.



Below-grade Walls
(See table on last page)



Vehicular Access Roofs
(with concentrated live load up to 8,000 lbf on an area of 5" x 5")



Green Roofs
(Extensive, Intensive and Deep)

HIGH-PERFORMANCE MATERIALS

DELTA®-TERRAXX drainboard drainage core is made from high-density polyethylene (HDPE), a stable and inorganic plastic. While still providing the needed compressive strength for many applications, DELTA®-TERRAXX drainage core is more malleable than most competitors making it extremely easy to handle and cut. The fully bonded non-woven polypropylene geotextile filter fabric allows water to pass into the drainage core but limits the passage of soil particles to ensure long-term drainage capacity.

INSTALLER FRIENDLY DESIGN

DELTA®-TERRAXX by Dörken is designed with ease of installation in mind. These are some key features and properties that result in a quick and easy installation.

1 SELF-ADHERING EDGE

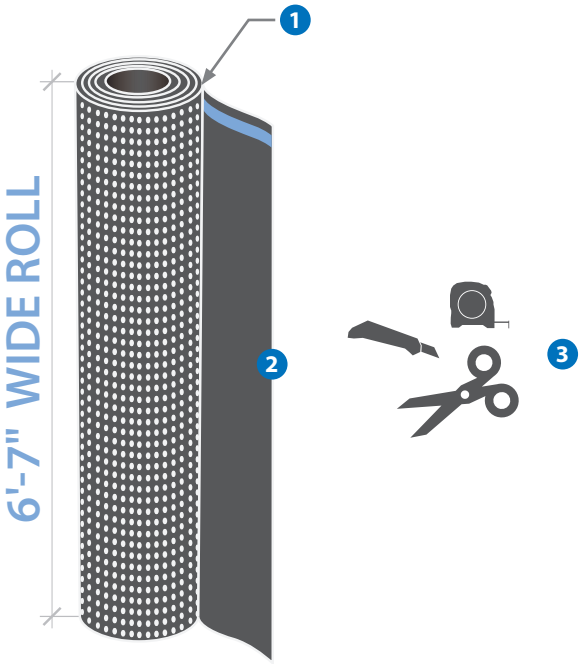
DELTA®-TERRAXX comes with a self-adhering drainage core edge, for a better, faster, and easier sealing of drainboard laps. Both the self-adhering drainage core edge and cantilevered geotextile can be sealed to achieve a continuous drainage core, that prevents backfill material from trickling in. High performance tape can also be used to effectively seal the geotextile filter fabric at butt edges.

2 WIDER AND LIGHTER ROLLS

DELTA®-TERRAXX is available in 6.58' wide rolls, making it wider than most competitors 6' wide rolls. Larger rolls means fewer rolls required for a project and less laps that require sealing, speeding up the installation process. Additionally, due to the lighter material, the wider rolls are lighter and easier to handle than competing products.

3 Workability

DELTA®-TERRAXX relaxes easily when unrolled on a flat surface, speeding up the installation process and reducing the need to temporarily hold down loose drain board on horizontal applications like roofs.



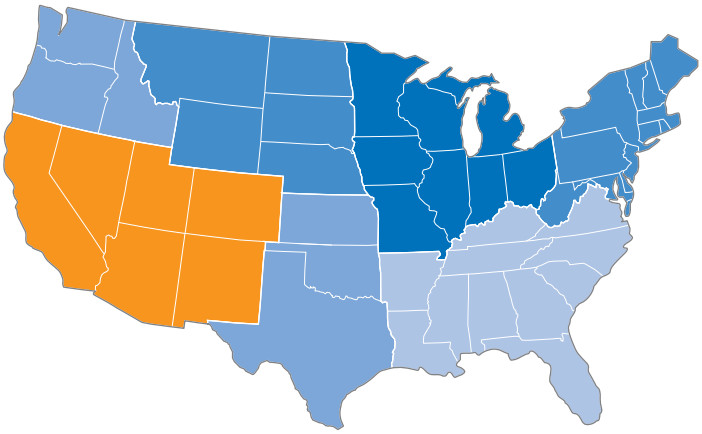
FUTURE-PROOF FLOW RATES TO PROTECT YOUR BUILDING

Buildings, and especially drainage systems, need to be future proof and resilient to the affects of climate change. This climate change resilience supports the need for higher flow rates, long-term drainage capacity, and reliable in-plane water flow rates.

For example, the southern United States is hotter and wetter than ever before. Temperatures in Houston, Texas have increased 0.6-1.0 °F and annual rainfall increased by ~2" compared to the previous 30-year averages. Extreme precipitation events are also on the rise. Each Houston county experienced less than 3 days of rain over 3" in the 1980s, but in the 2010s experienced 12-17 days.

Designers select drainboards assuming 100% of the claimed flow rate on technical data sheets but under real world conditions only achieve 22-80% of the claimed flow rate. This gap between the assumed and in-service flow rate can result in under-sized drainage systems that are already less than increasingly extreme precipitation events require, which may result in damage to below grade structures or roofs, and unexpected cost/ inconvenience to the owners & occupants.

Observed Change in Total Annual Precipitation Falling in the Heaviest 1% of Events*
(1901-2016)



* Map adapted from the National Climate Assessment Climate Science Special Report, and the US Global Change Research Program's Indicator Platform

BELOW-GRADE VERTICAL APPLICATION DESIGN TABLE

Maximum soil depths permitted with DELTA®-TERRAXX drainboard for different soil types.

	Φ (deg)	K_0	y (lbf/ft^3)	q (lbf/ft^2)	h (ft)	Factored Lateral Pressure (lbf/ft^2)
Sand	30	0.5	121	250	45	4250
Compacted Gravel	35	0.43	127	250	50	4250

The values provided in the table above are for general guidance only. Obtain soil specific properties from a geotechnical engineer for a specific location including anticipated lateral pressures on retaining walls. Maximum soil depths can generally be confirmed using the following calculation method.

Lateral soil pressure (P) = K0·(y·h + q)

- Angle of friction (Φ) used to calculate K0
- Bulk unit weight (y)
- Soil depth (h)
- Adjacent heavy truck surcharge (q) = 250 lbf/ft2
- Earth pressure coefficient (K0) based on angle of friction (Φ) and at rest condition
- No lateral water pressure is allowed for as the drainage mat relieves water pressure
- Level backfill assumed

Note: The values of angle of friction, earth pressure coefficient, bulk unit weight, and adjacent surcharge mentioned in the table above are assumed based on general design purposes.

DISCLAIMER

Information provided in this technical bulletin is for general guidance. Design and installation of appropriate drainboard and building enclosure assemblies, both for structural capacity and drainage capacity, remains the responsibility of the project team.

PERFORMANCE BACKED BY SCIENCE

RDH Building Science Laboratories has conducted thorough testing on our DELTA®-TERRAXX drainboard using the ASTM D4716M-22 Standard testing Method. This report details the observed performance and benefits of our next-generation drainboard.

ABOUT RDH

RDH Building Science Laboratories provides a range of research, testing, and education services, breaking down complex data to enable informed decision making based on science.

RDH
Making Buildings Better™

References

National Centers for Environmental Information. National Oceanic and Atmospheric Administration (NOAA). U.S. Climate Normals.

2021 International Building Code (2021 IBC). International Code Council.

ASTM D4716M-22 Standard test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geo-synthetic Using a Constant Head. ASTM International

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