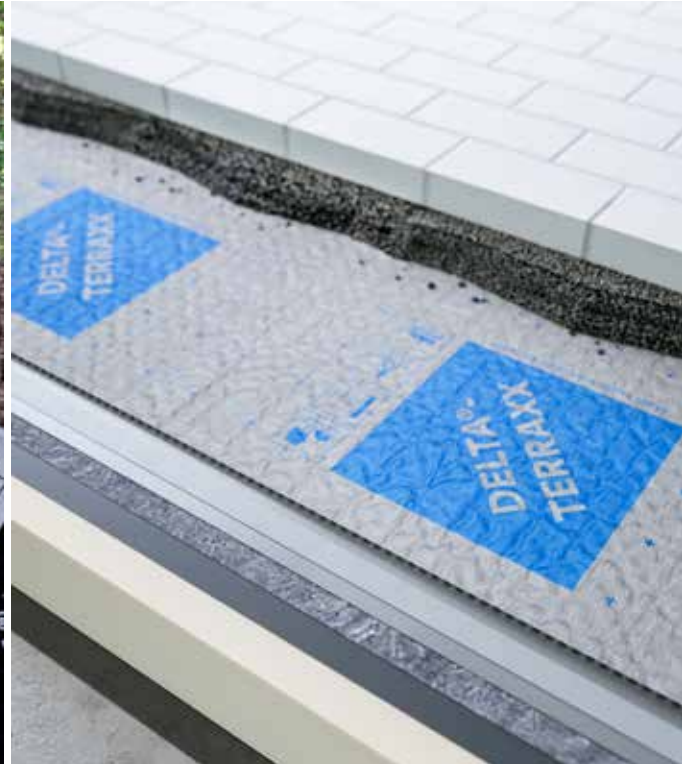


# DELTA®

## DELTA®-TERRAXX: The best for protection and controlled drainage

Long-term drainage. Highly durable. Conforms to standards. Simple handling.

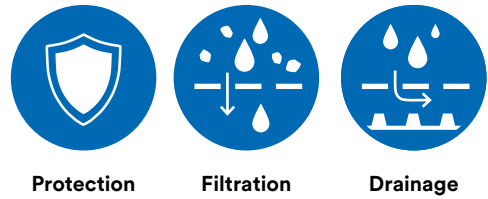


Certified long-term resistance  
**100 years**  
in accordance with EN 13252

## Now even better

The new DELTA®-TERRAXX family

For over 20 years the DELTA®-TERRAXX brand for durable and high-performance protective and drainage sheeting has proven itself as a universal solution for horizontal and vertical applications on all pressure resistant sub-surfaces. In this, the functional capability of the sheeting has been demonstrated in practical use with over 20 million square metres laid. The primary functions of the DELTA®-TERRAXX brand are unchanged, as depicted in the following pictogram:



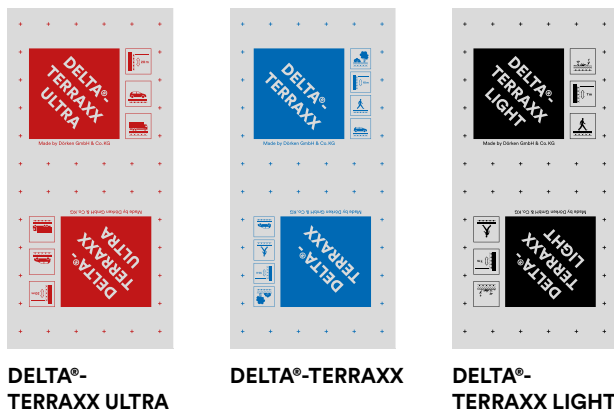
### What is new?

As specialists for long-lasting and high performance protective and drainage sheeting for diverse applications, we have used the successful DELTA®-TERRAXX as the basis for the creation of a completely new product family, with the goal of reacting more speci-

fically to diverse requirements. In this respect, the clogging behaviour and robustness of the geotextile has been optimised, together with the pressure resistance of the dimpled structure.

	DELTA®-TERRAXX ULTRA	DELTA®-TERRAXX	DELTA®-TERRAXX LIGHT
<b>Mechanical resistance</b>	Very high	High	Normal
<b>Pressure resistance</b>	750 kN/m <sup>2</sup>	400 kN/m <sup>2</sup>	250 kN/m <sup>2</sup>
<b>Static puncture resistance (CBR test)</b>	2.9 kN	1.0 kN	0.95 kN
<b>Surface weight of non-woven fabric</b>	260 g/m <sup>2</sup>	110 g/m <sup>2</sup>	100 g/m <sup>2</sup>

To illustrate the fact that these are new products with significantly improved characteristics we have also improved the printing. This now offers a lattice as cutting aid and simple distinction between the three grades via colour and integrated usage pictograms.





**“Cellar and flat roof are critical areas: Moisture can cause great damage here, often necessitating extensive repairs. This is why I play it safe: DELTA® protective and drainage sheeting separates damp earth or substrate from the structure, drains off water optimally and provides reliable protection for the waterproofing.”**



## Main characteristics of the new DELTA®-TERRAXX family

In addition to the numerous properties that already distinguish DELTA®-TERRAXX and set the new grades apart from the competition, new characteristics have also been added. In particular, these concern the geotextile and pressure resistance.

DELTA®-TERRAXX ULTRA	DELTA®-TERRAXX	DELTA®-TERRAXX LIGHT
 <p><b>Silver dimpled structure from virgin HDPE:</b> 100 years of certified long-term resistance</p>		
<p>10 mm product height: Significantly higher water drainage than a 50 cm thick mineral drainage layer (e.g. 0/32 gravel with vertical application).</p>		
<p>Smooth sheeting edge <b>with integrated adhesive zone:</b> Simple creation of flat overlaps to establish a second aquiferous level before the lining; increased position stability against wind and additional protection of the lining against encroaching gravel and soil.</p>		
<p><b>Premium filter textiles:</b> Extreme filter stability and maximum protection of the dimpled structure against clogging with fine soil particles.</p>		
260 g/m <sup>2</sup> / ASQUAL	110 g/m <sup>2</sup> / ASQUAL	100 g/m <sup>2</sup>
<p>Optimal ratio of dimpled structure and surface weight: Ideal combination of drainage performance and selected pressure resistance for diverse requirements.</p>		
750 kN/m <sup>2</sup> compressive strength (short time) / 200 kN/m <sup>2</sup> permanent load	400 kN/m <sup>2</sup> compressive strength (short time) / 100 kN/m <sup>2</sup> permanent load	250 kN/m <sup>2</sup> compressive strength (short time) / 70 kN/m <sup>2</sup> permanent load



## Key advantages of the new DELTA®-TERRAXX family

Based on the previously mentioned characteristics, there are key benefits for our customers compared to other protective and drainage sheeting:



### long-term drainage

- High drainage capacity, including under extreme loads
- > 70 % of initial value after continuous load and fatigue testing (400,000 cycles)
- > 80 % of initial value after clogging testing
- Improved UV resistance of non-woven fabrics



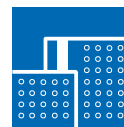
### long-lasting

- 100 % virgin raw materials
- Certified long-term resistance of 100 years
- 100 % recyclable after removal



### certified & safe

- Certified according to CSTB\* (Avis Technique), ASQUAL\*\*, FIFA\*(artificial turf) etc.
- FLL compliant\*\*
- Harmless to drinking water
- Reduction of impact sound of up to 32 dB
- Protection of waterproofing against point loading and settlement of soil (80 % contact area)
- Protection of waterproofing against encroaching gravel and soil via self-adhesive edging



### universal & user friendly

- Suitable for use with diverse horizontal and vertical applications
- Compressive strength of up to 750 kN/m<sup>2</sup>, tailored to diverse applications
- Quickly applied and simple in detail, thanks to 2.40 m width, roll format and ease of cutting
- Self-adhesive for improved position stability against wind
- Overall height of 10 mm replaces approx. 50 cm thick mineral seepage layer.



\* DELTA®-TERRAXX

\*\* DELTA®-TERRAXX / DELTA®-TERRAXX ULTRA

## Example applications\* for the DELTA®-TERRAXX family

The protective and drainage sheeting of the DELTA®-TERRAXX family has been developed especially for use in the flat roof and cellar areas. The fundamental task of the DELTA®-TERRAXX sheeting is to separate the structure from the damp soil, protect pressure resistant waterproofing and drain off accumulated water. It achieves this by guiding the excess water reliably in the direction of the roof guttering or ring drainage and protecting the lining against point loading and settlement of soil. In addition, the function of the perimeter insulation is also aided.

### DELTA®-TERRAXX ULTRA

- 1 Vertical application to an installation depth of up to 20 m  
(also suitable for engineering structures)
- 2 Truck-bearing areas in front of loading bays or fire service access points

### DELTA®-TERRAXX

- 3 Drainage beneath base plate
- 4 Surface areas with intensive or extensive greening
- 5 Accessible areas with paving in gravel bed and possible base course or levelling course
- 6 Vertical application to an installation depth of up to 10 m
- 7 Car-bearing areas

### DELTA®-TERRAXX LIGHT

- 8 Accessible areas with paving in gravel bed
- 9 Roof surfaces with gravel
- 10 Roof surfaces with extensive greening

#### Note:

DELTA®-TERRAXX ULTRA can also be used for the applications described for DELTA®-TERRAXX and DELTA®-TERRAXX LIGHT. The same applies for DELTA®-TERRAXX with regard to the application of DELTA®-TERRAXX LIGHT.



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# DELTA®-TERRAXX ULTRA

Highly pressure resistant protective and drainage system as second aquiferous level before the waterproofing. For extreme loads. With integrated self-adhesive edging.





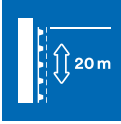
- Tested long-term durability of 100 years**
- Compressive strength 750 kN/m<sup>2</sup>**
- Geotextile robustness class GRK4**
- Reduction of impact sound up to 32 dB**
- FLL compliant**
- ASQUAL certification**

## Main characteristics

- Material compound of pressure resistant HDPE dimpled sheeting and welded, filter stable GRK4 geotextile (260 g/m<sup>2</sup>)
- Compressive strength (short-term load): 750 kN/m<sup>2</sup>
- Compressive strength (long-term load): 200 kN/m<sup>2</sup>
- Compressive strength (fatigue load at 400,000 cycles): 350 kN/m<sup>2</sup>
- Drainage capacity with vertical application below 200 kN/m<sup>2</sup>: approx. 2.4 l/(s · m)
- Reduction of impact sound up to 32 dB

## Main applications

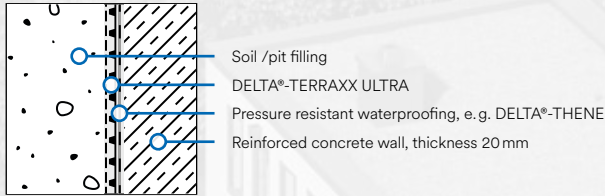
DELTA®-TERRAXX ULTRA is primarily used for the following applications.

Applications	Functions
 <p>Applicable under drivable areas with intensive traffic (e.g. large parking sites).</p>	<p>For fast drainage within the structure. Prevention of frost damages and efflorescences at the flagging. Optimal protection for the underlying waterproofing.</p>
 <p>Applicable under drivable areas with lorries (e.g. access for fire brigade).</p>	
 <p>For vertical application in civil and underground engineering with installation depth up to 20 m.</p>	<p>Protection, filter and drainage layer to prevent backwater.</p>

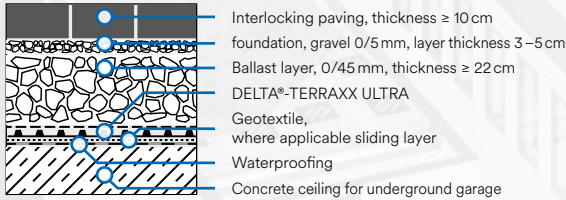


**Examples of different assemblies with DELTA®-TERRAXX ULTRA\***

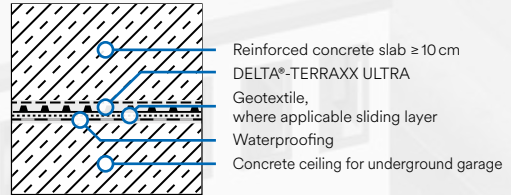
**1** Vertical drainage with installation depth of up to 20 m



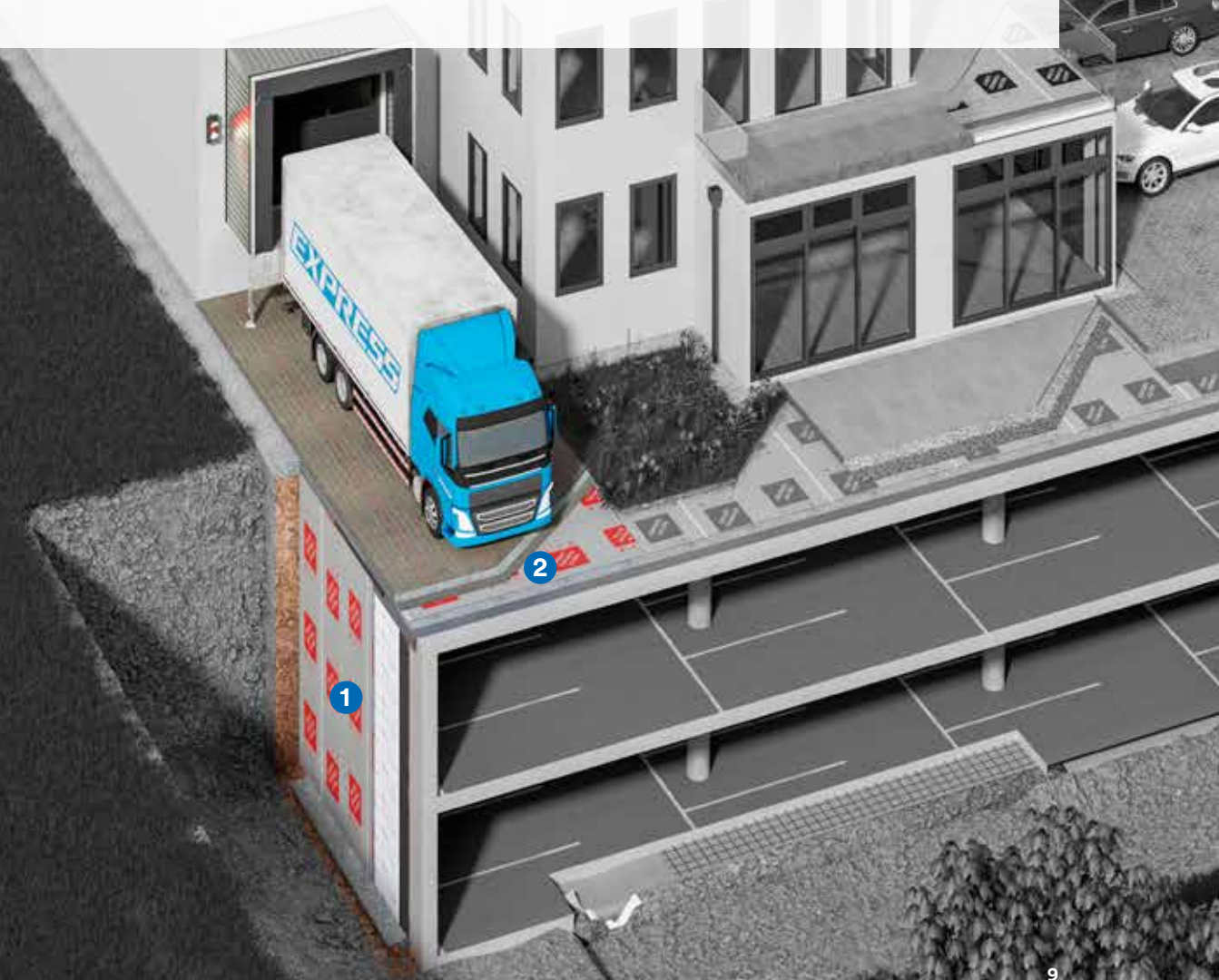
**2** Surfaces with truck traffic  
(e.g. fire service access points) and  
high level of car traffic – Configuration 1



**2** Surfaces with truck traffic  
(e.g. fire service access points) and  
high level of car traffic – Configuration 2



\* deviating assemblies and applications should be discussed with our application engineers (atabvf@doerken.de).



# DELTA®-TERRAXX

Universal protective and drainage system as second aquiferous level before the waterproofing. For high loads. With integrated self-adhesive edging.






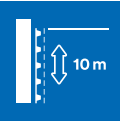
- Tested long-term durability of 100 years
- Compressive strength 400 kN/m<sup>2</sup>
- Geotextile robustness class GRK2
- Reduction of impact sound up to 32 dB
- DTA from CSTB
- ASQUAL certification

## Main characteristics

- Material compound of pressure resistant HDPE dimpled sheeting and welded, filter stable GRK2 geotextile (110 g/m<sup>2</sup>)
- Compressive strength (short-term load): 400 kN/m<sup>2</sup>
- Compressive strength (long-term load): 100 kN/m<sup>2</sup>
- Compressive strength (fatigue load at 400,000 cycles): 190 kN/m<sup>2</sup>
- Drainage capacity with vertical application below 100 kN/m<sup>2</sup>: approx. 2.5 l/(s · m)
- Reduction of impact sound up to 32 dB

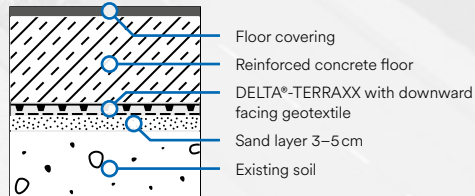
## Main applications

DELTA®-TERRAXX is primarily used for the following applications.

Applications	Functions
 <p>Applicable under areas with intensive greening.</p>	Protection, filter and drainage layer to prevent backwater.
 <p>Applicable under walkable areas with flagging and additional base course or rather levelling layer.</p>	For fast drainage within the structure. Prevention of frost damages and efflorescences at the flagging. Optimal protection for the underlying waterproofing.
 <p>Applicable under drivable areas.</p>	
 <p>For vertical application in civil and underground engineering with installation depth up to 10 m.</p>	Protection, filter and drainage layer to prevent backwater.

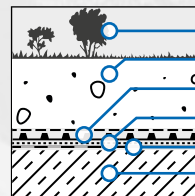
**Examples of different assemblies with DELTA®-TERRAXX\***

**3** Drainage beneath



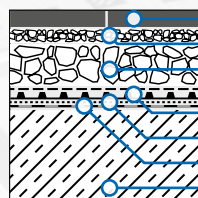
- Floor covering
- Reinforced concrete floor
- DELTA®-TERRAXX with downward facing geotextile
- Sand layer 3–5 cm
- Existing soil

**4** Intensive greening



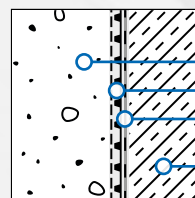
- Planting: Lawn, shrubs
- Substrate, layer thickness: approx. 30 cm
- DELTA®-TERRAXX
- Geotextile
- Waterproofing
- Concrete ceiling for underground garage

**5** Accessible areas with paving and additional base course or levelling course



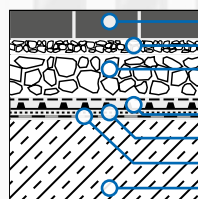
- Concrete paving slabs, 40×40, thickness ≥ 4 cm
- Foundation, gravel 0/5 mm, layer thickness 3–5 cm
- Base course or levelling course, Layer thickness as required
- DELTA®-TERRAXX
- Geotextile
- Waterproofing
- Concrete ceiling for underground garage

**6** Vertical drainage with installation



- Soil / pit filling
- DELTA®-TERRAXX
- Pressure resistant waterproofing, e.g. DELTA®-THENE
- Reinforced concrete wall

**7** Car-bearing area on underground garage



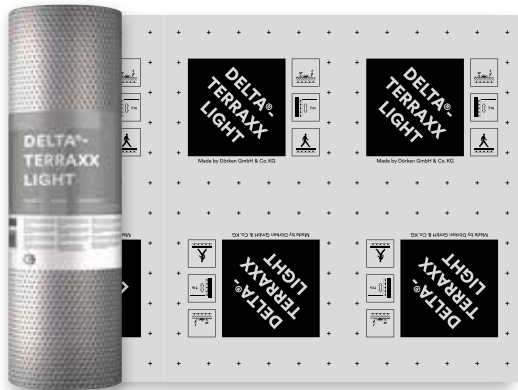
- Concrete paving slabs, 10×20, thickness ≥ 8 cm
- Foundation, gravel 0/5 mm, layer thickness 3–5 cm
- Ballast layer, 0/32 mm, thickness ≥ 12 cm (at 0/45: 15 cm)
- DELTA®-TERRAXX
- Geotextile
- Waterproofing
- Concrete ceiling for underground garage

\* deviating assemblies and applications should be discussed with our application engineers (atabvf@doerken.de).



# DELTA®-TERRAXX LIGHT

Reliable protective and drainage system as second aquiferous level before the waterproofing. For normal loads. With integrated self-adhesive edging.



Tested long-term durability of 100 years

Compressive strength 250 kN/m<sup>2</sup>



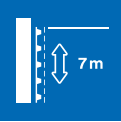
Geotextile robustness class GRK1

## Main characteristics

- Material compound of pressure resistant HDPE dimpled sheeting and welded, filter stable GRC1 geotextile (100 g/m<sup>2</sup>)
- Compressive strength (short-term load): 250 kN/m<sup>2</sup>
- Compressive strength (long-term load): 70 kN/m<sup>2</sup>
- Compressive strength (fatigue load at 400,000 cycles): 120 kN/m<sup>2</sup>
- Drainage capacity with vertical application below 70 kN/m<sup>2</sup>: approx. 2.56 l/(s · m)

## Main applications

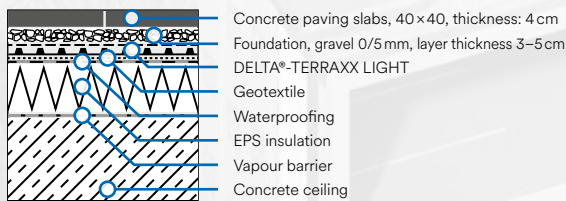
DELTA®-TERRAXX LIGHT is primarily used for the following applications.

Applications	Functions
 <p>Applicable under areas with extensive greening.</p>	Protection, filter and drainage layer to prevent backwater.
 <p>Applicable under walkable areas with flagging in split bed.</p>	For fast drainage within the structure. Prevention of frost damages and efflorescences at the flagging. Optimal protection for the underlying waterproofing.
 <p>For vertical application in civil and underground engineering with installation depth up to 7m.</p>	Protection, filter and drainage layer to prevent backwater.

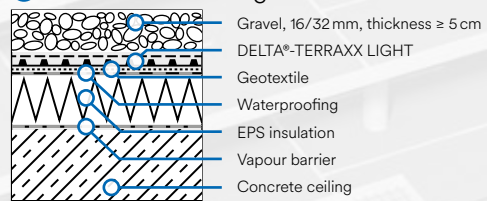


**Examples of different assemblies with DELTA®-TERRAXX LIGHT\***

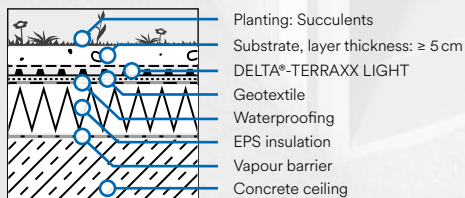
**8 Accessible areas with paving**



**9 Roof surface with gravel**



**10 Extensive greening**



\* deviating assemblies and applications should be discussed with our application engineers (atabvf@doerken.de).

# Technical data

## DELTA®-TERRAXX ULTRA

Characteristics	Methods	Values
<b>Description</b>		
		The geocomposite consisting of a pressure-resistant dimpled structure and a filter-stable geotextile serves as a drainage layer and effectively protects pressure-stable substrates against mechanical impacts.
<b>Characteristics of the dimpled sheet</b>		
Material	–	Virgin PE-HD (silver) with laminated geotextile
Thickness	EN ISO 9863-1	approx. 0.9 mm
Height of dimples	–	approx. 10 mm
Flat edge / integrated self-adhesive edge for overlappings	–	Yes / yes
Number of dimples per m <sup>2</sup>	–	2,500 pieces/m <sup>2</sup>
Contact area dimples/surface	–	8,000 cm <sup>2</sup> /m <sup>2</sup>
Air gap between the dimples	–	7.9 l/m <sup>2</sup>
<b>Characteristics of the geotextile</b>		
Material	–	Virgin Polypropylen (light grey), thermal bonded
Surface weight	EN ISO 9864	approx. 260 g/m <sup>2</sup>
Resistance to static puncture (CBR-test)	EN ISO 12236	approx. 2.9 kN
Class of robustness	–	GRK4
Characteristic opening size	EN ISO 12956	approx. 75 µm
Water permeability	EN ISO 11058	approx. 0.012 m/s
Dynamic perforation resistance (cone drop test)	EN ISO 13433	approx. 22 mm
Tensile strength MD/CMD	EN ISO 10319	approx. 20.0 kN/m
Resistance to weathering	EN 12224	To be covered within two weeks after installation
<b>Characteristics of the composite</b>		
Surface weight	EN ISO 9864	approx. 1,160 g/m <sup>2</sup>
Compressive strength (short-term compression behaviour)	EN ISO 25619-2	approx. 750 kN/m <sup>2</sup>
Strain at compressive loading 1,008 h (compressive creep)	EN ISO 25619-1	< 4% (at 200 kN/m <sup>2</sup> )
Endurance and fatigue test	ANTEA	400,000 cycles at 350 kN/m <sup>2</sup> load
Maximum installation depth	–	20 m
Tensile strength MD/CMD	EN ISO 10319	approx. 30.9 kN/m / 30.6 kN/m
Elongation at maximum tensile strength MD/CMD	EN ISO 10319	approx. 65% / 42%
Durability	EN ISO 13438	Durable for 100 years in natural soil with 4 ≤ pH ≤ 9 and soil temperature ≤ 25 °C
<b>Water flow capacity in the plane</b>		
Compressive stress	Hydraulic gradient:	<b>i = 0.02</b> <b>i = 0.10</b> <b>i = 1.00</b>
20 kPa	EN ISO 12958	0.35 l/(s·m)      0.85 l/(s·m)      3.00 l/(s·m)
50 kPa		0.30 l/(s·m)      0.75 l/(s·m)      2.72 l/(s·m)
70 kPa		–      –      –
100 kPa		–      –      –
200 kPa		0.26 l/(s·m)      0.65 l/(s·m)      2.43 l/(s·m)
<b>Miscellaneous</b>		
Reduction of impact sound	Hochschule RheinMain	up to 32 dB
Temperature resistance	–	-30 to +80 °C
Dimension	–	10.50 m × 2.40 m
Weight of one roll	–	29.2 kg
Packaging unit	–	15 rolls/pallet
CE-conformity	–	EN 13252
Conformity rules and standards	–	DIN 18531, DIN 18533, DIN 4095
Certificates	–	Asqual (Geotextile)

## DELTA®-TERRAXX

## DELTA®-TERRAXX LIGHT

The geocomposite consisting of a pressure-resistant dimpled structure and a filter-stable geotextile serves as a drainage layer and effectively protects pressure-stable substrates against mechanical impacts.

The geocomposite consisting of a pressure-resistant dimpled structure and a filter-stable geotextile serves as a drainage layer and effectively protects pressure-stable substrates against mechanical impacts.

Virgin PE-HD (silver) with laminated geotextile

Virgin PE-HD (silver) with laminated geotextile

approx. 0.6 mm

approx. 0.47 mm

approx. 10 mm

approx. 10 mm

Yes / yes

Yes / yes

2,500 pieces/m<sup>2</sup>

2,500 pieces/m<sup>2</sup>

8,000 cm<sup>2</sup>/m<sup>2</sup>

8,000 cm<sup>2</sup>/m<sup>2</sup>

7.9 l/m<sup>2</sup>

7.9 l/m<sup>2</sup>

Virgin Polypropylen (light grey), thermal bonded

Virgin Polypropylen (light grey), thermal bonded

approx. 110 g/m<sup>2</sup>

approx. 100 g/m<sup>2</sup>

approx. 1.0 kN

approx. 0.95 kN

GRK2

GRK1

approx. 140 µm

approx. 150 µm

approx. 0.07 m/s

approx. 0.08 m/s

approx. 35 mm

approx. 40 mm

approx. 7.0 kN/m

approx. 7.0 kN/m

To be covered within two weeks after installation

To be covered within two weeks after installation

approx. 710 g/m<sup>2</sup>

approx. 570 g/m<sup>2</sup>

approx. 400 kN/m<sup>2</sup>

approx. 250 kN/m<sup>2</sup>

< 4% (at 100 kN/m<sup>2</sup>)

< 4% (at 70 kN/m<sup>2</sup>)

400,000 cycles at 190 kN/m<sup>2</sup> load

400,000 cycles at 120 kN/m<sup>2</sup> load

10 m

7 m

approx. 15.7 kN/m / 14.9 kN/m

approx. 12.5 kN/m / 12.2 kN/m

approx. 52% / 47%

approx. 53% / 39%

Durable for 100 years in natural soil with 4 ≤ pH ≤ 9 and soil temperature ≤ 25 °C

Durable for 100 years in natural soil with 4 ≤ pH ≤ 9 and soil temperature ≤ 25 °C

**i = 0.02**

**i = 0.10**

**i = 1.00**

**i = 0.02**

**i = 0.10**

**i = 1.00**

0.36 l/(s · m)

0.89 l/(s · m)

3.17 l/(s · m)

0.36 l/(s · m)

0.88 l/(s · m)

3.09 l/(s · m)

0.31 l/(s · m)

0.79 l/(s · m)

2.87 l/(s · m)

0.30 l/(s · m)

0.76 l/(s · m)

2.74 l/(s · m)

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0.28 l/(s · m)

0.71 l/(s · m)

2.56 l/(s · m)

0.27 l/(s · m)

0.67 l/(s · m)

2.51 l/(s · m)

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up to 32 dB

–

-30 to +80 °C

-30 to +80 °C

12.50 m × 2.40 m and  
stripes à 12.50 m × 0.75 m

12.50 m × 2.40 m

21.3 kg (12.50 m × 2.40 m) and  
6.7 kg (12.50 m × 0.75 m)

17.1 kg

17 rolls/pallet (12.50 m × 2.40 m) and 12 rolls/pallet (12.50 m × 0.75 m)

15 rolls/pallet

EN 13252

EN 13252

DIN 18531, DIN 18533, DIN 4095

DIN 18531, DIN 18533, DIN 4095

Asqual (Geotextile)

–

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