GRILTEX®

# GREEN ROOF

- Unique products and innovative solutions
- Complete range of materials
- Environmentally friendly production process
- Experience on international markets
- A Polish product from the leader in geocomposites
- ISO 9001 certificate

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# GREEN ROOF

**A multi-layered structure placed on the roof, covered with a soil substrate which allows the vegetation to grow and function.**

Over the recent years, green roofs have become very popular, especially in cities, as they offer additional biologically active area. They are becoming an increasingly important element in the process of natural ecosystem regulation in urbanised areas.
Both the inhabitants and the natural environment benefit from this solution.

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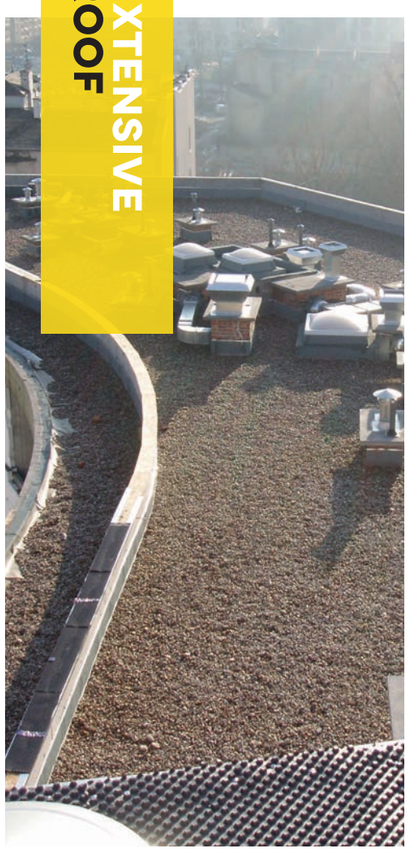
# GREEN ROOF

## EXTENSIVE ROOF



A simple, lightweight, relatively cheap and low-maintenance solution for roofs that are rarely or never walked on. Extensive roofing is implemented using a thin vegetation layer, which, for the duration of its growth, is covered with xerophyte and nearly self-sufficient plants: compositions of mosses, herbs, some grasses and sedums grown on special mats of several centimetres thickness. This type of vegetation can also be planted on structures that allow for light loads, such as timber trusses or steel halls, and on pitched roofs.

### Extensive roofs are set up to:

- plant vegetation in unused areas at low cost
- improve the thermal quality or fire resistance of the building
- delay rainwater drainage
- improve the aesthetic qualities of the building
- create conditions for the maintenance of a diversity of fauna and flora species

| PROJECT ASPECTS | |
|---|---|
| lightweight | limited range of plant species to choose from |
| a good solution for large surfaces | the space is not usually available as a recreational area or for any other use |
| suitable for roof pitches of up to 30° inclination | unattractive appearance in winter |
| requires minimal maintenance | |
| does not require frequent irrigation | |
| relatively little technological know-how required for installation and care | |
| can be used in building renovation or modernisation projects | |
| relatively inexpensive | |
| natural appearance | |

## INTENSIVE ROOF

Heavy structure with functional purposes, usually placed on floor slabs of underground garages and terraces. It is implemented in order to restore the ground conditions in a given place, which will allow vegetation to grow. Intensive roofs also frequently include paths, playgrounds or recreational areas. The vegetation is made up of trees and shrubs, often in combination with ground covers. It is intended to resemble a garden or a square and therefore requires appropriate care and watering.

### Intensive roofs are set up to:

- provide space for vegetation
- create traffic routes (pavements, car parks, fire lanes)
- develop recreational space (playground, fountain, swimming pool)
- install small architecture elements (benches, lighting, waste bins)

| PROJECT ASPECTS | |
|---|---|
| very good insulation properties | high weight |
| diversified vegetation and environment | extensive irrigation and drainage system required |
| allows use of roof space for leisure, relaxation, growing vegetables and fruit | requires extensive professional experience |
| more favourable conditions for plant vegetation | |
| visually appealing | |
| accurately represents the vegetation that occurs in ground conditions | |

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# IT'S WORTH KNOWING
# DESIGN GUIDELINES

1

As recommended, a drainage layer - **GXP® DREN** geocomposite (dimpled membrane integrated with geotextile) is laid under the substrate layer. Alternatively, a geotextile with an **dimpled membrane (e.g. GXP® PLUS 20P)** can be laid independently.

2

We recommend using ready-made **GXP® DREN** geocomposite - it enables easy and convenient installation, saves time during assembly, reduces the risk of mechanical damage to the geocomposite, ensures the proper functioning of the system and decreases the cost of delivery.

3

In the design of an intensive roof, you must always consider the permissible load on the structure, as the weight of the layer system can reach up to several hundred kilograms per square metre. It is also necessary to consider the number and distribution of sprinklers as part of the irrigation system.

4

For sloped roofs with vegetation, it is recommended to additionally use a geogrid to prevent the substrate and plants from sliding off.

5

Any skylights and ventilation chimneys must be brought above the green roof layer and properly secured.

## BENEFITS

- **recovery of biologically active surface**
- **additional thermal insulation of the building**
- **soundproofing**
- **reduction of rainwater run-off**
- **purification of the air**
- **environment for biodiversity**
- **improved aesthetics of the roof and its surroundings**

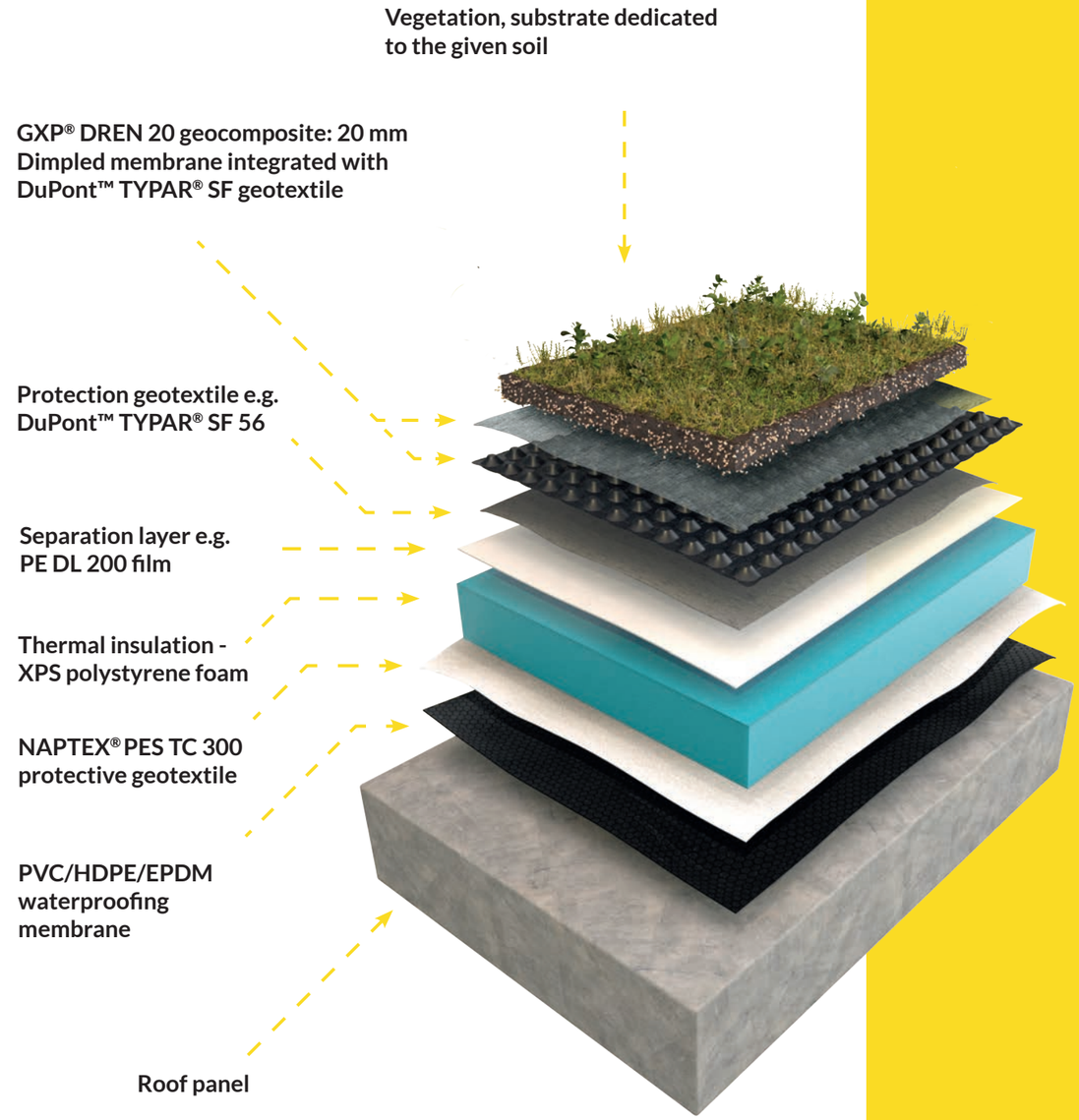
# PRODUCTS
## FOR GREEN ROOFS

# GXP® DREN 20

### DRAINAGE OF PARTICULARLY LARGE ROOF SURFACES

The new GXP® Drain 20 membrane manufactured using high density polyethylene (HDPE), thermally welded with high quality TYPAR® fleece, has a very high drainage capacity of 10 l/s/m, making it versatile for use on site. It can be used to secure and drain foundations as well as for landfill sites or road construction. It is most frequently used in the construction of green roofs with irrigation systems and in green areas above underground car parks.

| TECHNICAL DATA | | |
|---|---|---|
| Weight | 900 g/m² | 1100 g/m² |
| Material thickness | 0,9 mm | 1,0 mm |
| Compressive strength | 160 kN/m² | 200 kN/m² |
| Height of embossing | 20 mm | 20 mm |
| Number of embossings | 400 / m² | 400 / m² |
| Roll size | 2,0 x 10 m | 2,0 x 12,5 m |
| Temperature resistance | -40 to +80°C | -40 to +80°C |
| Air space between dimples/studs | 14 l/m² | 14 l/m² |
| Drainage capacity | 10 l/s/m,<br>600 l/min./m,<br>36000 l/h/m | 10 l/s/m,<br>600 l/min./m,<br>36000 l/h/m |

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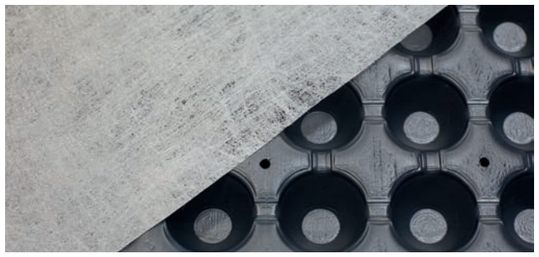
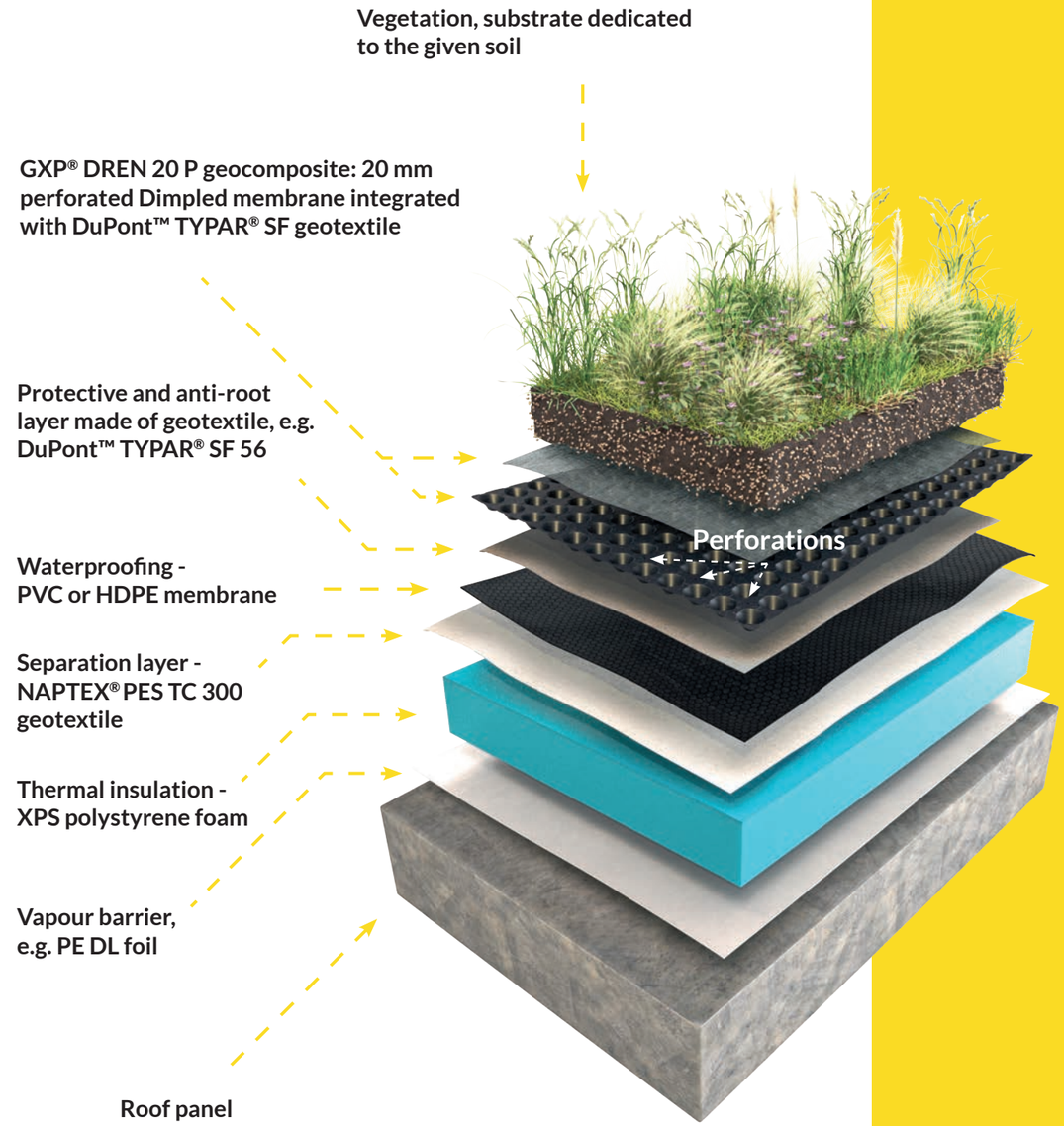
# PRODUCTS
## FOR GREEN ROOFS

# GXP® DREN 20 P (perforated)

GXP® DREN 20 P membrane is made of high density polyethylene (HDPE), with a weight of 900-1100 g/m² and polypropylene (geotextile filter). It is specially designed for flat surfaces covered with vegetation. The membrane provides unique properties when the collectors are directed with the openings facing upwards, thus acting as micro reservoirs to regulate the accumulation of water in the root system (in vegetated soil), while improving thermal insulation of the system and reducing heat buildup. NAPTEX® or TYPAR® geotextile, placed between the 20 mm GXP® membrane and the vegetated soil, protects against the penetration of humus (layer of gravel) into the chambers and limits root growth.



| TECHNICAL DATA | | |
|---|---|---|
| Weight | 900 g/m² | 1100 g/m² |
| Material thickness | 0,9 mm | 1,0 mm |
| Compressive strength | 160 kN/m² | 200 kN/m² |
| Height of embossing | 20 mm | 20 mm |
| Number of embossings | 400 / m² | 400 / m² |
| Roll size | 2,0 x 10 m | 2,0 x 20 m |
| Temperature resistance | -40 to +80°C | -40 to +80°C |
| Air space between collectors | 14 l/m² | 14 l/m² |
| Water storage capacity | 6 l/m² | 6 l/m² |

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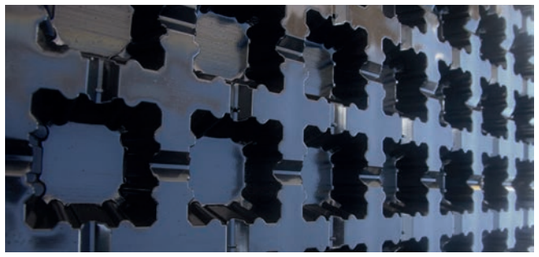
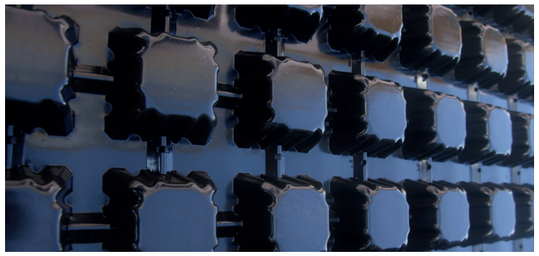
# PRODUCTS
## FOR GREEN ROOFS

# GXP® PLUS 40 P

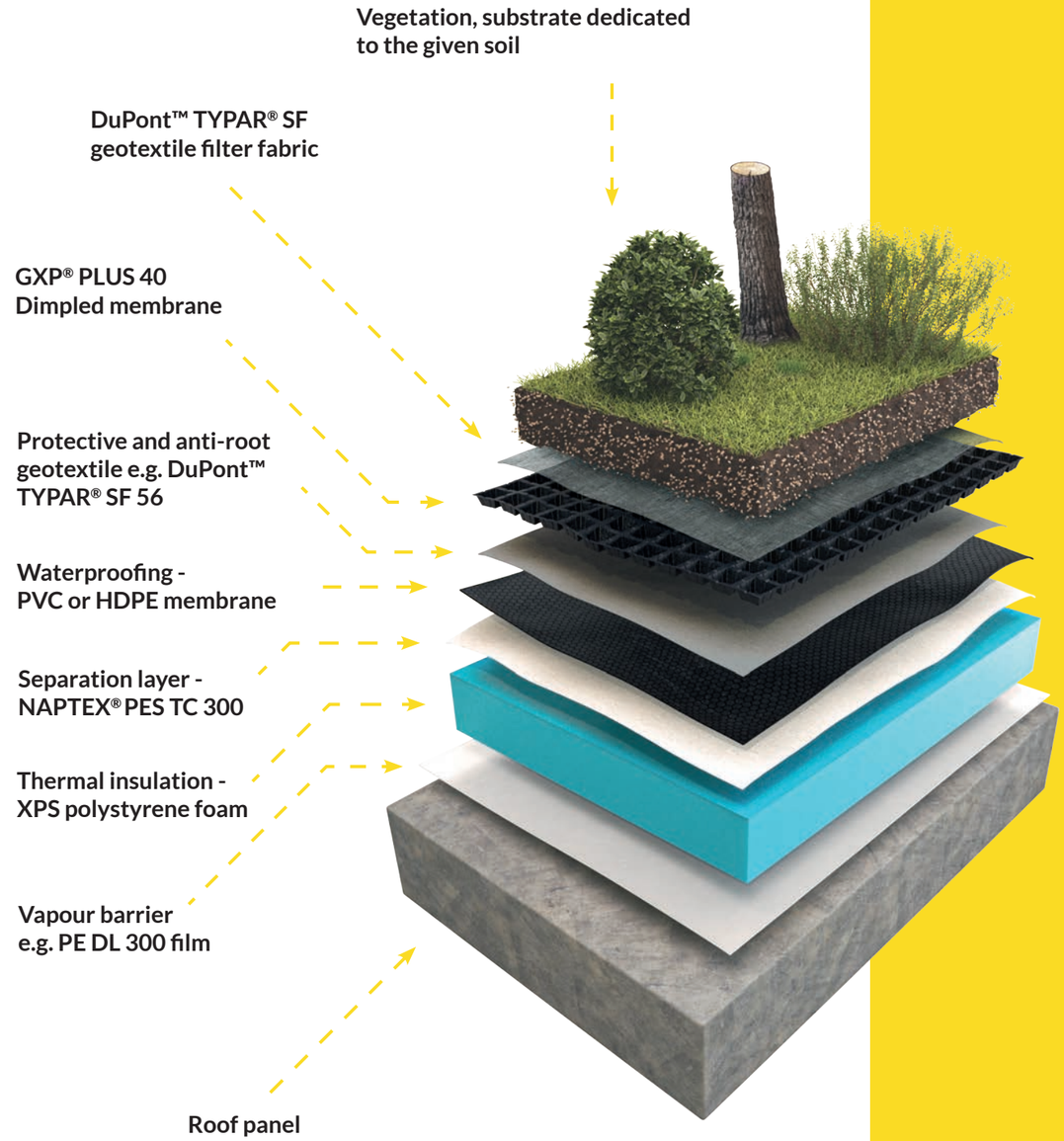
### INTENSIVE ROOF WITH SPECIAL REQUIREMENTS

The new GXP® PLUS 40 P membrane is a drainage and retention module (HDPE) with above-average water storage capacity and load-bearing capacity. It is intended for use in intensive green roof systems. The innovative shape and carefully selected blend of hardened HDPE polyethylene provide above-average retention parameters in its class. Its features include very high compressive strength of approx. 400 kN/m$^2$ (approx. 600 kN/m$^2$ when filled with aggregate) and above-average water accumulation capacity of approx. 15 litres per square metre.





| TECHNICAL DATA | |
|---|---|
| Material | HDPE |
| Height of embossing | 40 mm |
| Weight | 2,3 kg/m$^2$ |
| Material thickness | 1,4 mm |
| Water capacity | 15 l/m$^2$ |
| Number of embossings on the panel | 162 |
| Maximum load without filling | 400 kN/m$^2$ |
| Tensile strength | 21 kN |
| Panel size | 2 x 1 m |

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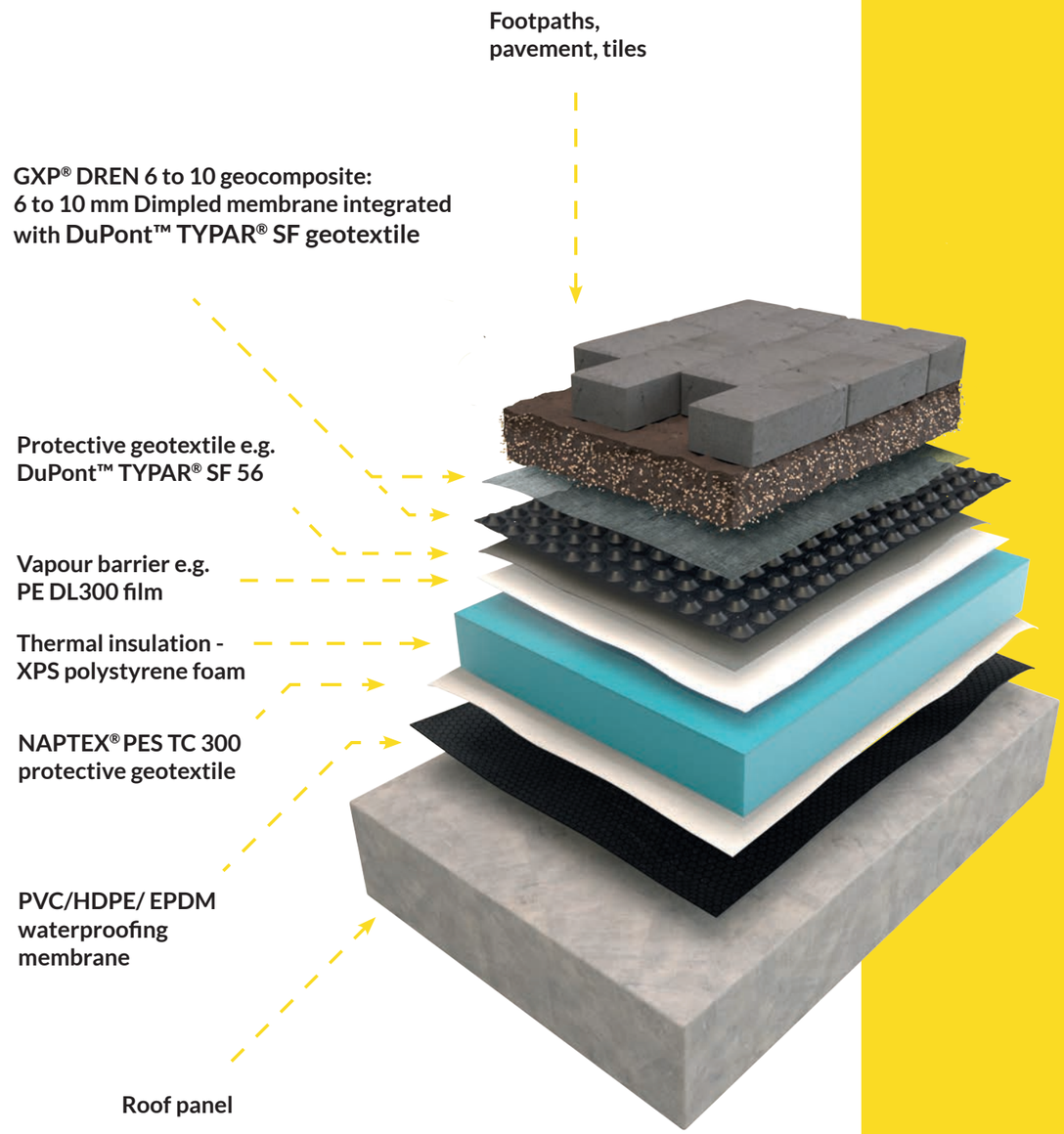
# PRODUCTS
## FOR GREEN ROOFS

# GXP® DREN

### CAR PARKS / ROADS / FOOTPATHS AND FIRE ESCAPES ROADS / DECORATIVE STONE /

High-density extruded polyethylene (HDPE) film, combined with Typar® SF thermally bonded polypropylene geotextile, is designed for mechanical protection of thermal insulation and optimal drainage. GXP® DREN geocomposite is also an excellent solution for various civil engineering applications (underground car parks, roads, footpaths, fire roads) and under decorative stone.

| TECHNICAL DATA | | | | |
|---|---|---|---|---|
| **GXP DREN** | **6** | **7** | **8** | **10** |
| Application | | | | |
| Geocomposite weight | 700 g/m² | 800 g/m² | 900 g/m² | 1100 g/m² |
| Compressive strength | 300 kN/m² | 350 kN/m² | 400 kN/m² | 720 kN/m² |
| Height of embossing | 8 mm | | | |
| HDPE membrane thickness | 600 µm | 700 µm | 800 µm | 1000 µm |
| HDPE membrane surface mass | 600 g/m² | 700 g/m² | 800 g/m² | 1000 g/m² |
| Volume of air between fleece and membrane | 5,30 l/m² | | | |
| Drainage capacity | 1,85 l/s/m, 276 l/min./m, 16560 l/h/m | | | |
| Width of rolls | 2,0 m, 4,0 m | | | |
| Temperature resistance | -40 to +80°C | | | |

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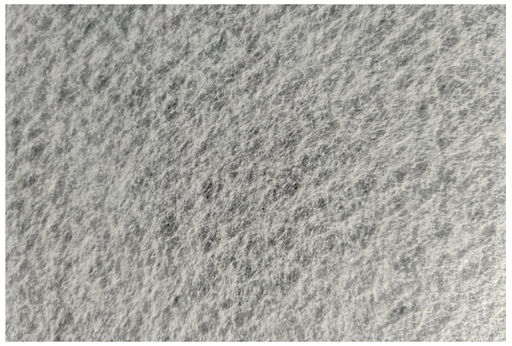
# EFFECTIVE
## INDIVIDUAL SOLUTIONS

# SUGGESTED
## GEOTEXTILES, PROTECTIVE MEMBRANES

## GXP® PLUS 20

GXP® Plus 20 membrane made of high density polyethylene (HDPE), with a weight of 800-1200 g/m$^2$, is designed for mechanical and hydraulic protection of tunnels, green roofs or other underground structures with increased water flow.



## NAPTEX® PES TC 300
### protective layer

Naptex® 100 is a non-woven geotextile fabric produced using the needle punching technique, partially calendered (thermally hardened), made of 100% polypropylene. Due to its properties, Naptex® 100 is multifunctional and has a wide range of applications - primarily for separation, filtration, reinforcement and stabilisation of substrates.

## DUPONT™ TYPAR® SF 56
### protective and anti-root layer

DuPont™ TYPAR® SF 56 geotextile is a thin, thermally-bonded and permeable geotextile made of 100% polypropylene non-woven fibres. The superior quality of the geotextile is ensured by its high initial module, ISOTOPIC STRUCTURE and homogeneity, which make it resistant to damage and provide excellent filtration, separation, drainage and protection properties. Typar® is a non-woven fabric with remarkable strength and a wide range of application options. It performs well even in very difficult conditions, in road construction, both in dry areas and in degraded areas.

## HDPE GEOMEMBRANE

HDPE geomembrane is made of high density polyethylene and provides waterproofing protection for the soil. It is used in waterproof and gas-tight barriers.

## PVC GEOMEMBRANE

PVC geomembrane is a synthetic film made of polyvinyl chloride, used in civil engineering and environmental protection, as a barrier to prevent moisture rising or water (or other liquid) permeation.

**We manufacture, distribute and sell high quality plastic construction materials.**
We specialise in geosynthetics and dimpled membranes for foundations, roofs and walls.

## Development comes first.

Since we started operating on the Polish market 25 years ago, Griltex has multiplied its technological, manufacturing, logistic and personnel capacities. As a result, we have become the leader in the production of geosynthetics. We owe it to constant improvement and theoretical and practical knowledge of our employees. Each and every one of them strives to outperform the strongest competition with the results of their work. We also reach further - we closely cooperate with academic experts, which allows us to develop and implement innovative, non-standard solutions.

## We are happy to take on challenges, as we are prepared to implement even the most demanding projects.

We export to more than a dozen countries in Asia, Africa and Central America, and all European countries. The quality of our consulting, service and distribution activities services and distribution is confirmed by the ISO 9001 certificate issued by Bureau Veritas. We are constantly implementing systems to improve production and looking for new ones, we also manage our company in a modern way, so as to exceed the expectations of a the dynamic market. We guarantee efficient service and timely completion of orders.

**The company's activities are focused and developed in three departments:**

- production and distribution of Dimpled membrane and geocomposites
- confectioning, production and distribution of confectioning, production and distribution of geotextiles
- sealing of various engineering structures  with geosynthetics

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