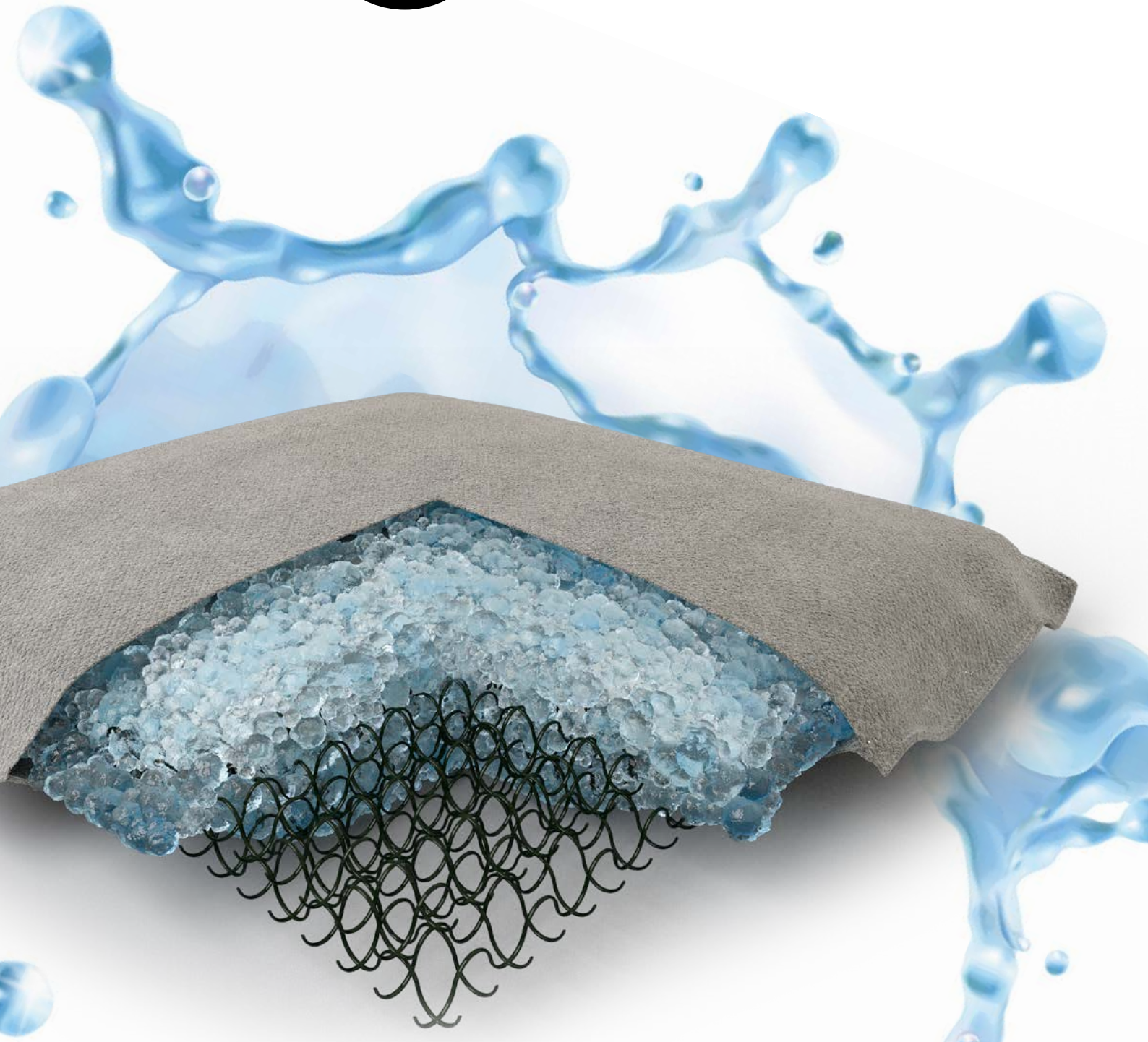
HYDROBOX®

perfect water management



DECORATIVE PLANTINGS

URBAN GREENERY

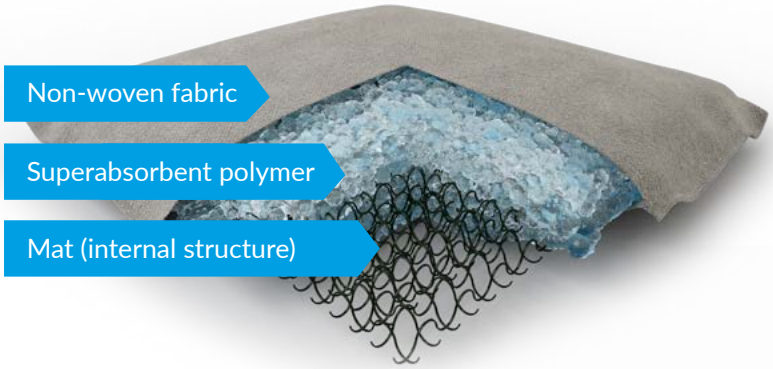
GREEN WALLS

GREEN ROOFS

SLOPES AND LEVEES

HYDROBOX®
perfect water management

PLANTS' WATERING SYSTEM



HYDROBOX is a patented system for watering garden plants, urban greenery, lawns, plantings and for erosion control.

HYDROBOX is a perfect solution both in case of water shortage in soil and its excess. It can capture and store water from rainfalls, watering and water infiltrating soil. Thanks to **HYDROBOX**, it is easier to keep plants in a good condition, even during drought.

HOW DOES **HYDROBOX** WORK?

A flexible spatial mat, performing a function of an internal structure, enables a proper work of the superabsorbent polymer which stores water. The plants' roots, thanks to hydrotropism, i.e. motor response of a plant, caused by the presence of water, grow into the inside of **HYDROBOX**. Using suction power, with the use of root hairs, they can absorb up to 95% of water accumulated in **HYDROBOX**. When the rain falls, when we switch on the irrigation system or water our plants, a water storage, which **HYDROBOX** is, will be filled up. The plants will be able to use it again. Thanks to **HYDROBOX** system, the properly cared for plants develop faster and are in a better condition

HYDROBOX	Hydrogel
Stores water effectively for a few growing seasons.	Because of the load of soil it doesn't effectively perform a function of storing water
The plants takes as much water from **HYDROBOX** as it needs and when it needs it, which effectively increases its growth and condition.	It doesn't provide the sufficient amount of water, because, being dispersed and squeezed by the soil, it doesn't have space to store water effectively.
Prevents the formation of an impermeable layer.	It might create an impermeable barrier, limiting the flow of water and mineral substances to a plant.
Reduces water losses, resulting from the evaporation process up to 75,3% [5].	Water from hydrogel evaporates as fast as the water form soil.
Wide range of applications – can be used on slopes.	Usage on escarpments and slopes might lead to a landslide and a fall of soil layers.
Water is available because **HYDROBOX** is installed after „soaking". Water accumulated in it might be used even after a few months.	Gel must stop the water first, which is very limited because of the load of soil.
A reusable product – it might be freely and safely taken out of soil, e.g. in case of its pollution.	A disposable product – lack of the possibility of an effective removal from the soil and another use.

DECORATIVE PLANTINGS

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SLOPES AND LEVEES

1 Even 46% bigger increments of the plants' biomass (Cabała A., Wróblewska K., Chohura P., Dębicz R.: Effect of fertilization through geocomposite on nutritional status of Hosta 'Halcyon' plants grown in containers, Acta Scientiarum Polonorum – Hortorum Cultus: 2016, vol. 15, (3), 83-93).
2 A difference in the harvest of raspberries (an average for three years) http://www.geosap.up.wroc.pl/?p=304
3 Percent of the amount of fall-outs in an experiment with the Scots pine Pinus sylvestris L. http://www.geosap.up.wroc.pl/?p=304
4 A difference in a fresh mass of the grass roots on an escarpment with a slope of 1:2.5 in the second year of the experiment http://www.geosap.up.wroc.pl/?p=304
5 Lejcuś, K., Dąbrowska, J., Garlikowski, D. & Kordas, L. (2015). Water loss from soil and water absorbing geocomposite. International Proceedings of Chemical, Biological and Environmental Engineering (IPCBEE), 84, 123–127.

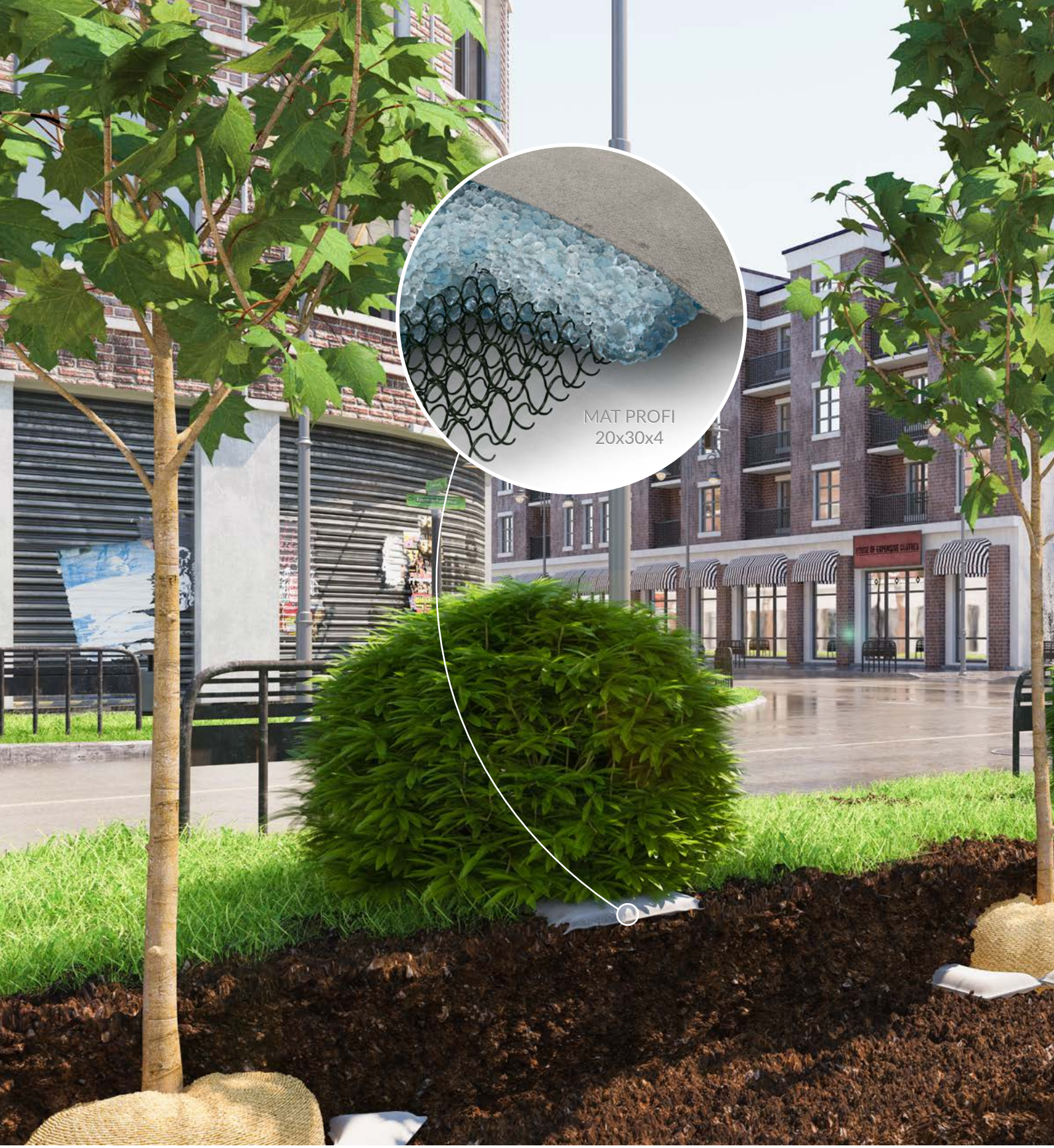
DECROATIVE PLANTINGS OF PERENNIALS AND FLOWERS

Perennials is a very important group of the garden plants. They are called the supplementary plants by designers. As far as the trees and shrubs constitute a framework of a garden's design, the perennials and flowers add aesthetic value to a garden. It is often the case that they decide about the final visual effect of the garden.

All the plants need sunlight for proper growth. There is a significant group of perennials which feels best in full sun. There aren't many species which will grow in complete shadow – in addition, they have to compete with large trees for water.

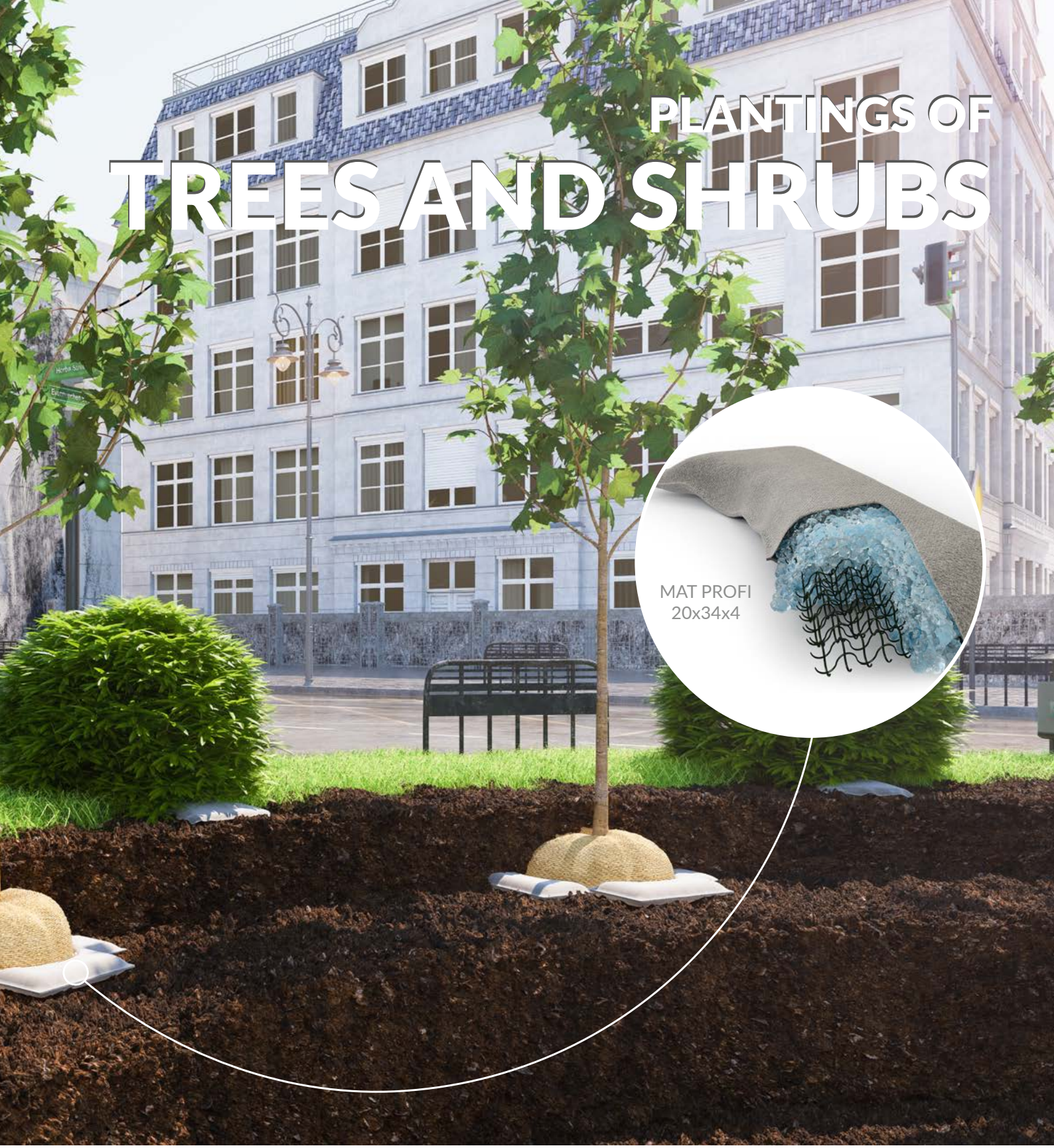
Both a shortage of water (being a result of evaporation) and its excess might have an impact on the appearance of the decorative plants. HYDROBOX, through optimization of the watering level, has a beneficial influence on the colouring and foliage of the flowers and perennials, accelerating their growth.

HYDROBOX®



Planting trees and shrubs is one of the most important actions in creating the public space landscape. In fact, the longevity of the trees and shrubs depends on their proper placement. Particular species differ in requirements in terms of a type and dampness of soil, insolation, climatic conditions. They also put up with frost differently.

PLANTINGS OF TREES AND SHRUBS



During the first few years from setting up the garden, the newly planted trees are small. Only later they gain more characteristic features for a given species or variety.

HYDROBOX helps the trees and shrubs in taking root, reducing a number of „fall-outs" up to 65%. It also improves a development of the root system by strengthening it.

**Results obtained for plantings of trees of the Scots pine species (Pinus sylvestris) on a poor sandy site*

HYDROBOX®

GREEN WALLS

Gardens on the roof and green walls bring people close to nature. They also mitigate the urban climate. They enable hiding undesired views of the compact, concrete building development. They concentrate the sight of the passers-by, impressing with the diversity of plants. They increasingly constitute an element of interior design in the office buildings, shopping malls and hotels.

GREEN ROOFS

Advantages of the green walls and roofs are considered not only in an aesthetic dimension but also in the ecological one. They have a capacity to absorb carbon dioxide and produce oxygen, they also decrease street noise level. Covering the walls of the buildings with climbers prevents their excessive heating during a hot summer, while in winter, thanks to a layer of leaves, they keep warm air, which reduces the heat losses incurred by the building. Using HYDROBOX will reduce water evaporation and, using less water during watering, the maintenance costs will be reduced. It will enable introduction of a wide range of plants and keeping them in a good condition, through provision of a sufficient water retention. Thanks to a unique technology, combining „geocell" and HYDROBOX, green walls, as well as the sloping area and flat green roofs, can be made in an easy and economic way.

HYDROBOX®

Newly formed dikes of banks and excavations, as well as slopes and flat infrastructure surfaces of the urban areas are areas rid of vegetation. Before these areas will be covered with vegetation, apart from blowing out of the soil, there is an erosion. It causes damage to the earth structures and material losses.

SLOPES AND LEVEES

HYDROBOX could be used as an element for water retention, which supports the development of flora that constitutse a part of a biotech protection of the dikes. Apart from an improvement in the grasses' condition, HYDROBOX increases their root mass and the development of the above-ground parts. It significantly impacts an effectiveness and durability of the erosion control. HYDROBOX could be used as a supportive element for:

- grass cover,
- grass cover supported by geocells on steep slopes,
- grass cover in the geocell system separated from ground with geomembranes.

HYDROBOX®

HISTORY AND MISSION

„How to help the plants survive drought?" – this question was asked during one of the lectures on the Wrocław University of Environmental and Life Sciences. This problem was highly interesting for Krzysztof Lejcuś – PhD in Environmental Engineering and a researcher of water. He decided to start research. His aim was to find a panacea for the problems connected with a worrying hydrological situation of the world and its influence on the vegetation development.

Scientific works went on for over 7 years. PhD Krzysztof Lejcuś focused in particular on studying the features of polymers – known in the plants' watering for a long time. Around the world, it was tried to mix them with soil, however the effects were not satisfying. A polymer needed space to increase its volume to swell and keep the water – it couldn't do that while mixed with soil.

This is how an idea of creating a water storage emerged. A search for the materials perfect to develop an innovative solution started. Within this period, over 100 types of geotextiles and geosynthetics were examined and less than 4000 perennials, shrubs and trees were planted. HYDROBOX was created as a result.

HYDROBOX worked as a drip for the plants. Still during carrying out the laboratory trials, PhD Lejcuś decided to check the invention on his beds. An effect exceeded most daring expectations. The flowers and vegetables were growing rapidly.

On a plantation of raspberries, it was enough to put HYDROBOX under the plants once in 3 years to increase the crops by 36%. It soon turned out that, thanks to HYDROOX, it is possible to maintain vegetation in places so far unfavourable for it – e.g. on the escarpments, banks, steep slopes, reclaimed landfills.

HYDROBOX quickly gained acclaim of the scientific institutions around the world. It was awarded for innovativeness in Poland, Belgium and Malaysia. European (Spain, Italy) and Arab countries (United Arab Emirates, Saudi Arabia, Turkey) in which there are problems with water shortage, got interested in this innovative solution.

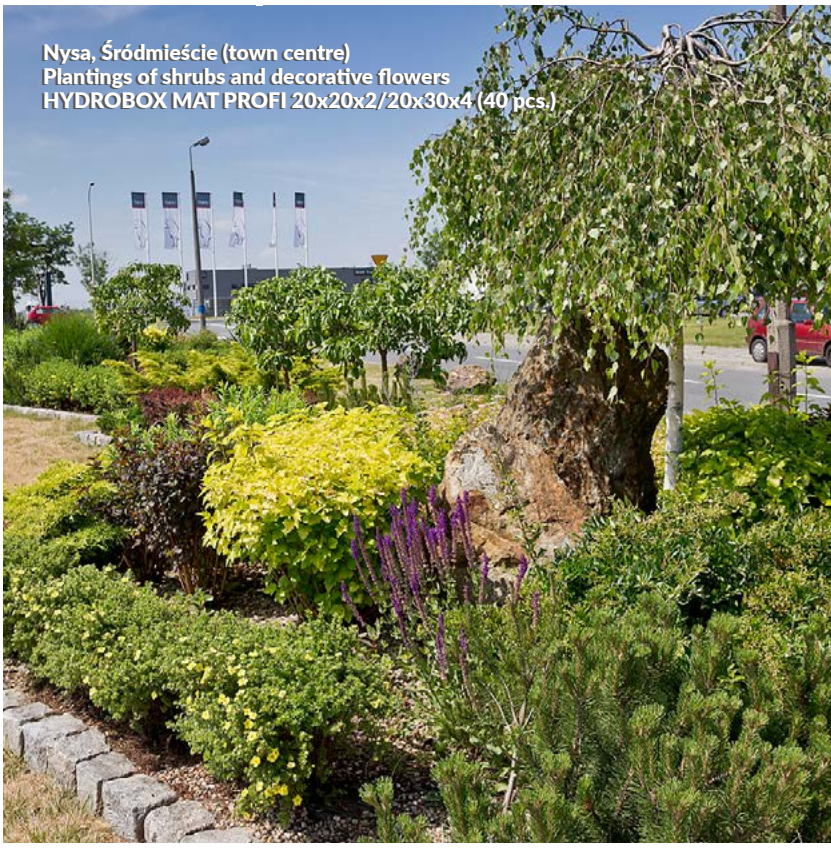
In 2012 the invention got commercialized. It was the first commercialization in the country, under the EU's Innovative Economy Programme. An increased interest of the media resulted in acquisition of independent investors and production development on a mass scale.

Patent – PL 211198, EP 2560472

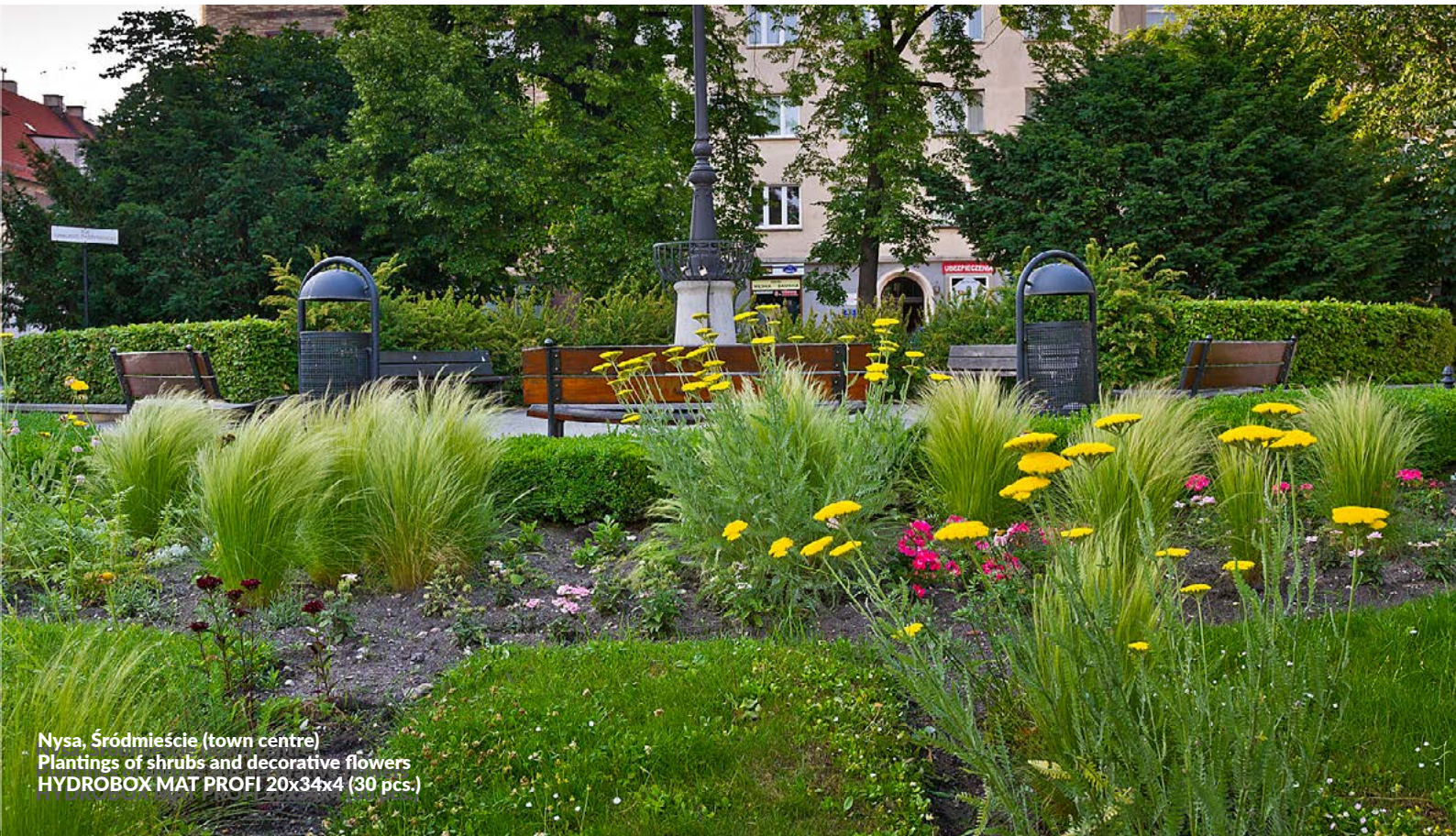
Opole, ul. Katedralna
Plantings of flowers, decorative in hanging pots
HYDROBOX MAT PROFI 20x20x2 (200 pcs.)

Wrocław, ul. Bałtycka
Plantings of trees of linden species
HYDROBOX MAT PROFI 20x34x4 (7 pcs.)

A4 motorway, Knurów interchange
Plantings of trees of maple species
HYDROBOX MAT PROFI 20x34x4 (80 pcs.)



Nysa, Śródmieście (town centre)
Plantings of shrubs and decorative flowers
HYDROBOX MAT PROFI 20x20x2/20x30x4 (40 pcs.)



Nysa, Śródmieście (town centre)
Plantings of shrubs and decorative flowers
HYDROBOX MAT PROFI 20x34x4 (30 pcs.)

MAT PROFI 10x10x4

Water capacity: 400 cm^3
Small shrubs, flowers, perennials, climbers.

MAT PROFI 15x15x4

Water capacity: 900 cm^3
Small shrubs, flowers, perennials, climbers.

MAT PROFI 20x20x4

Water capacity: 1600 cm^3
Shrubs, flowers, climbers with big water requirements.

MAT PROFI 20x30x4

Water capacity: 2400 cm^3
Shrubs, young trees with a fibrous root system, big climbers.

MAT PROFI 20x34x4

Water capacity: 2400 cm^3
Trees in bales, from containers, with exposed root system and of tap root system, big shrubs.

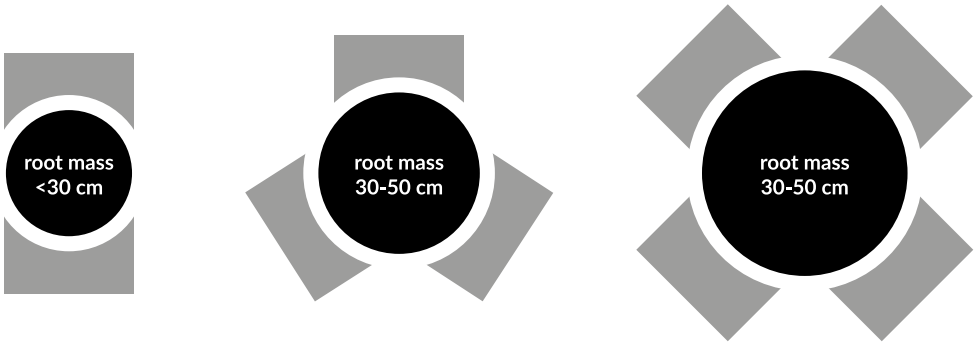
TECHNICAL PARAMETERS:

Name of indicator	Unit of measurement	Size of indicator
Superabsorbent polymer		
Composition	-	cross-linked potassium salt of acrylic acid/acrylamide.
Grain size distribution	mm	0,2 - 4,0
Appearance	-	loose white granules
Volumetric density	g/cm^3	0,6 - 0,8
Solubility	-	it does not dissolve in water, in contact with water solutions it swells in the form of a gel.
pH ($1g/H_2O$)	-	7,0 - 8,0
Toxicology/ ecology	-	According to the OECD tests – it is not toxic for the plants, soil organisms and groundwater
Non-woven fabric		
Surface mass	g/m^2	140 ± 15
Thickness	mm	2,5 ± 10%
Mat (internal structure)		
Surface mass	g/m^2	630 (±63)
Thickness	mm	20 (±4)

CERTIFICATE PZH - PZH/HT 2625/2012 Patent - PL 211198, EP 2560472

Usage of MAT PROFI 20x34x4

Diameter of the root mass	<30 cm	30-50 cm	50-80 cm	over 80 cm
Radius of the root mass	<15 cm	15-25 cm	25-40 cm	over 50 cm
Perimeter of the root mass	<94 cm	94-157 cm	157-251 cm	over 314 cm
Number of pieces:	**2-3 pcs.**	**3-4 pcs.**	**4-5 pcs.**	**More than 5 pcs.**



*Hydrobox should be in contact with the root mass on about half of the perimeter.

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www.profi.hydrobox.pl

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