



MIAKOM

PRODUCT CATALOG

2020

Dear Colleagues, Partners and Friends!

Thank you for your attention to the latest presentation catalogue by «MIAKOM». In a brief description we have tried to specify basic characteristics of products and the range of engineering-technical and design services offered by MIAKOM. Impressive pace of development empowers «MIAKOM» to remain a market leader in the industry. Due to a wide product range, «MIAKOM» is able to meet all customers' demands delivering various geotechnical solutions.

The primary purpose of our business is a comprehensive and professional support of every business partner. Following the development trends of the industry, MIAKOM provides a quality service ranging from pre-designs to engineering and geotechnical monitoring during site exploitation.

May our striving become a key to your success and your success become a base for a future sustainable partnership with «MIAKOM».

Best regards, «MIAKOM» team

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MIAKOM manufacturing company

Location: Saint Petersburg
Foundation date: 16 February, 2004

Mission Statement:

- ✓ Support of federal and regional projects with high-quality and cost-effective materials of produced in Russia;
- ✓ Design and batch production of innovative construction materials;
- ✓ Scientific and project design support of modern construction methods.

Production equipment:

- ✓ Warp-knitting raschel looms;
- ✓ Weaving machines;
- ✓ Complex lines for production of thermoplastic polymer and copolymer materials by extrusion.

Industrial geography:



Highways



Airports and airfields



Oil and gas industry



Industrial construction



Railways



Sea ports and stations



Mining industry



Reclamation of solid waste sites

Certificates and accreditation:



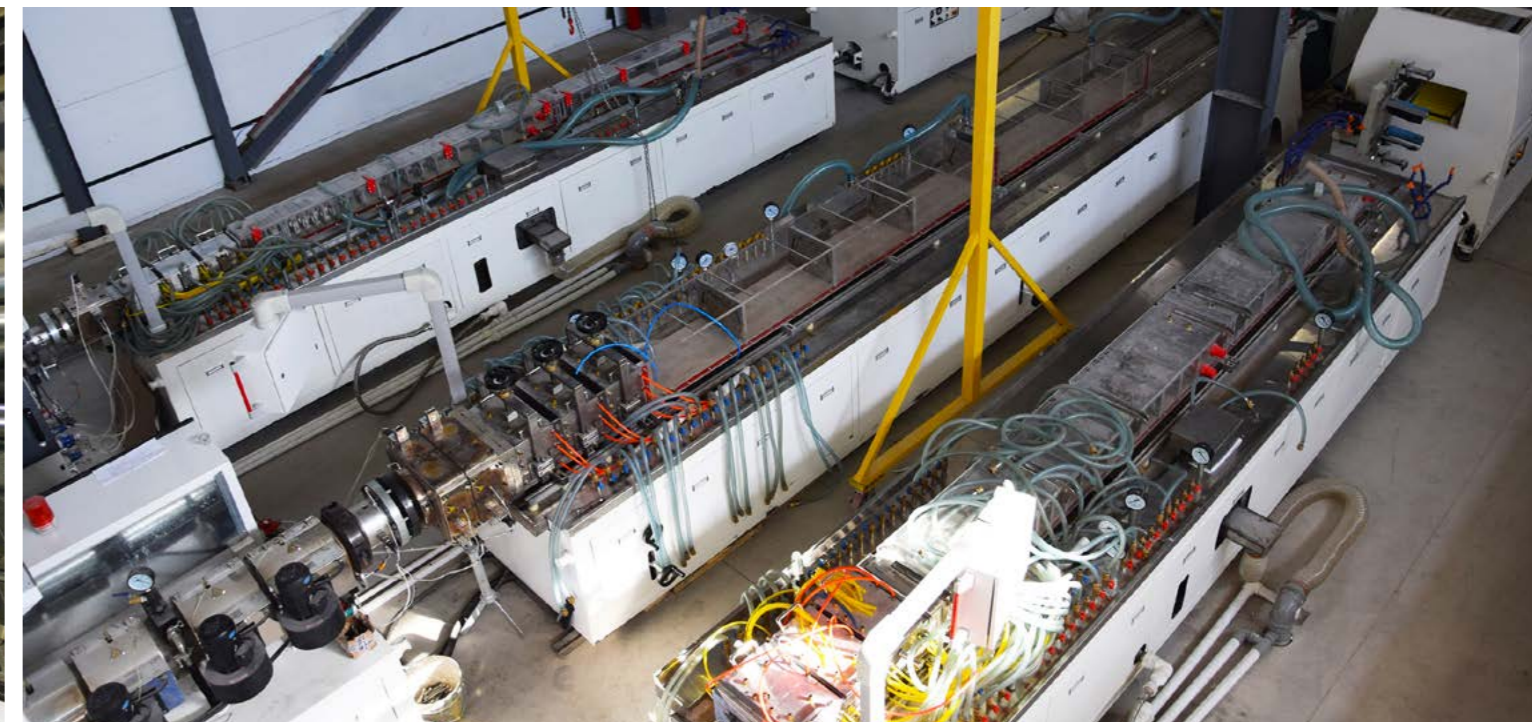
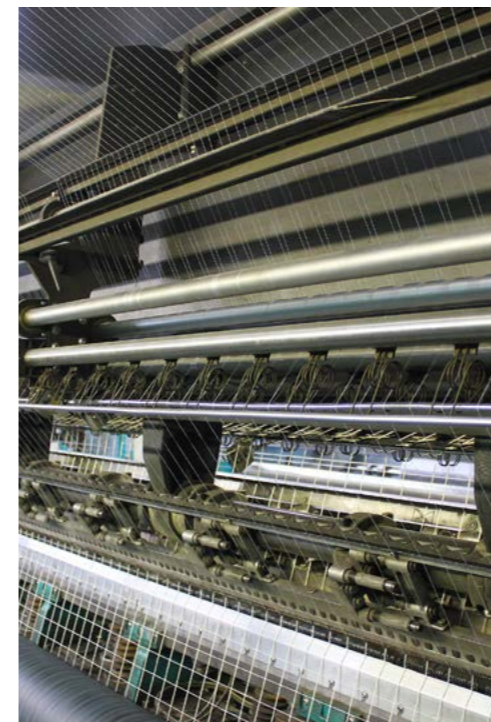
Quality management system:
- ISO 9001;
- ISO 14001;
- ISO 18001.



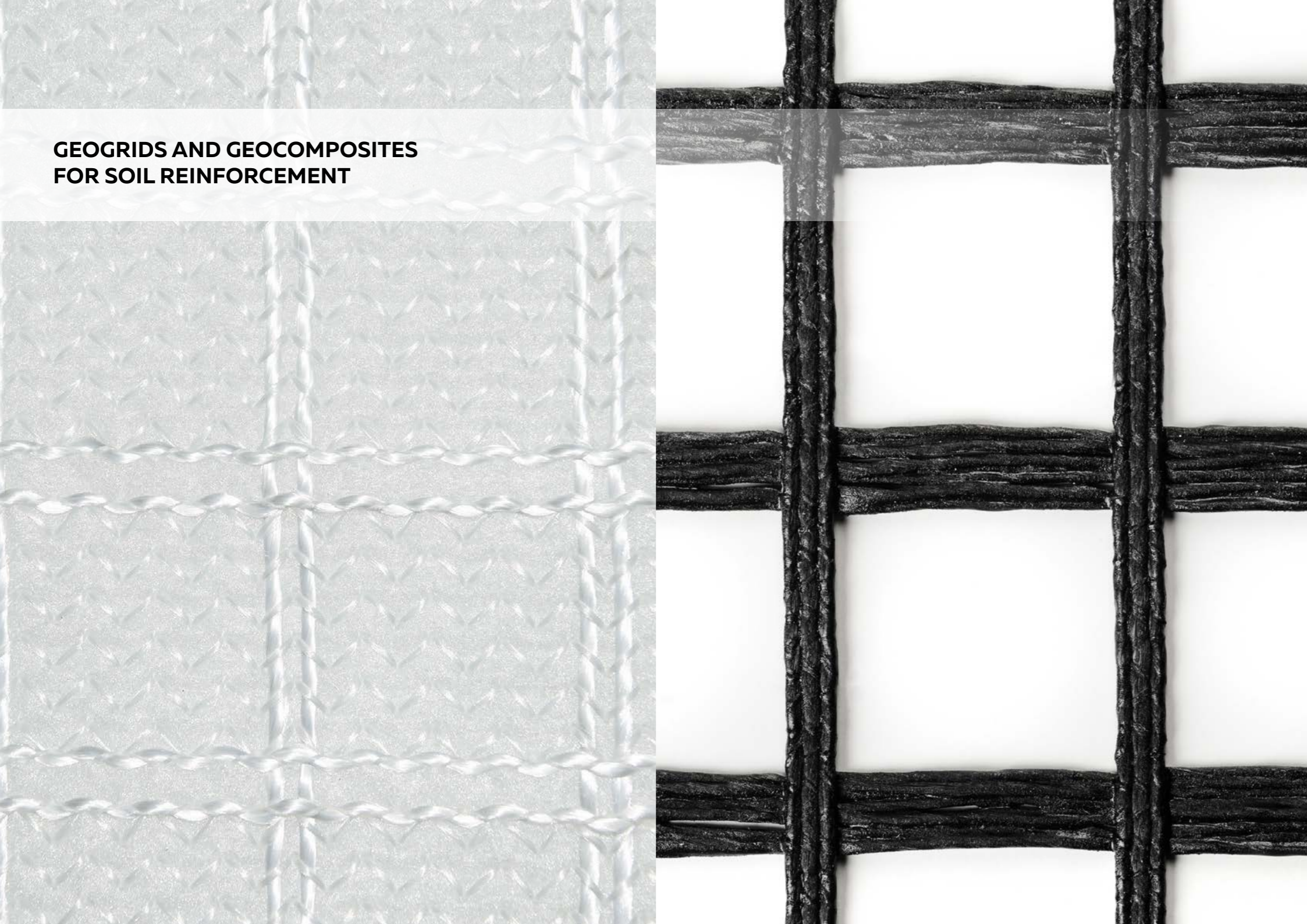
European production control certificates



Voluntary Certification System «Made in Russia»



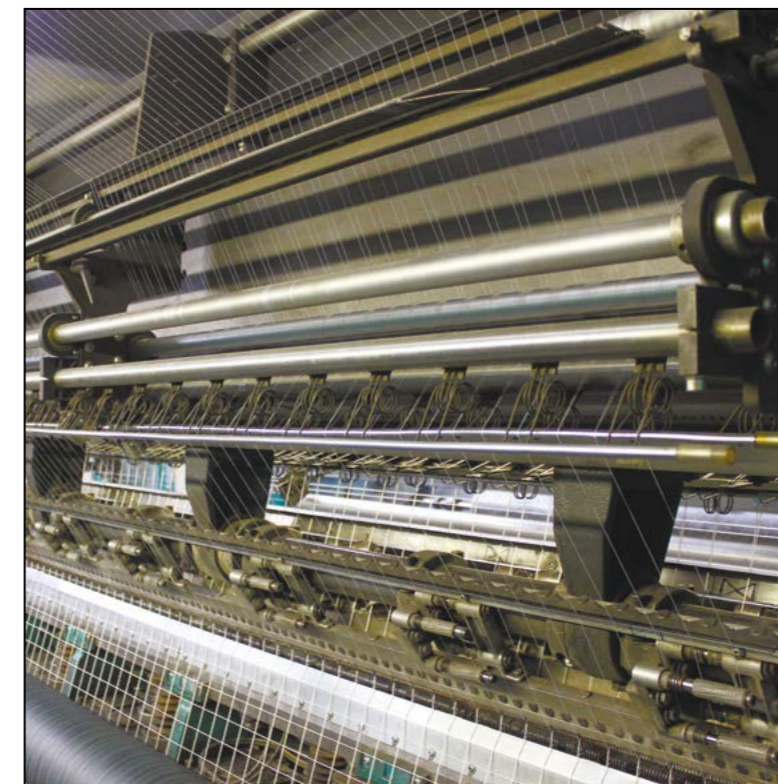
GEOGRIDS AND GEOCOMPOSITES FOR SOIL REINFORCEMENT



ARMOSTAB Geogrids and geocomposites

ARMOSTAB reinforcing geogrid is a grid made of polymer yarns, knitted together, with polymer coating.

ARMOSTAB geocomposites are composite materials consisting of a polymer geogrid with or without polymer coating and non-woven geotextile substrate. Binding method is adhesion or needle punching.



Geogrids and geocomposites are used as reinforcing interlayers to ensure overall durability and stability of various structures:

- ✓ Roads and railways repairing and construction;
- ✓ Embankment on a weak base;
- ✓ Ground supporting structures;
- ✓ Temporary and approach roads, service driveways to pipe-lines and other temporary communication lines;
- ✓ Ice bridges construction;
- ✓ MSW landfill;
- ✓ Soil foundation reinforcement.

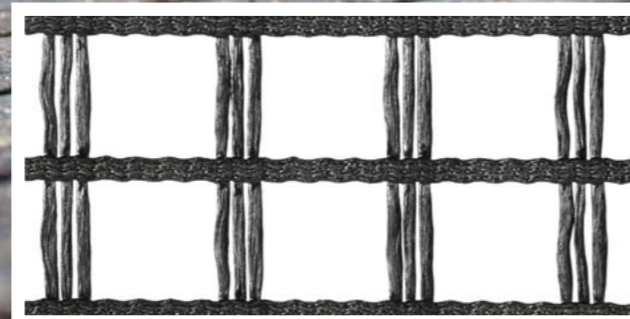
ARMOSTAB AR1P
Uniaxial geogrids

Geogrids are made of polyester yarns by warp-knitting with further polymer coating.



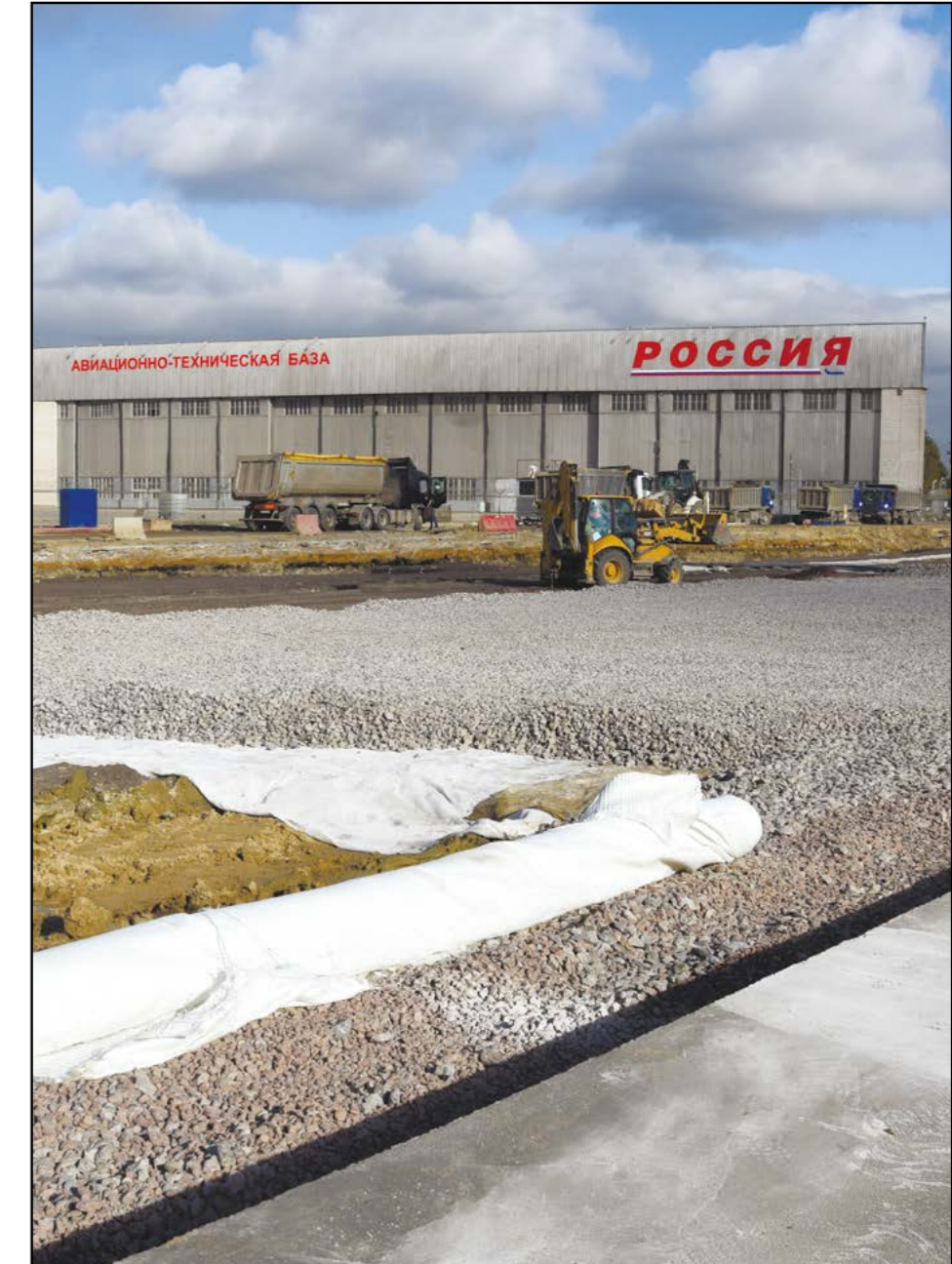
ARMOSTAB AR2P
Biaxial geogrid

Geogrids are made of polyester yarns by warp-knitting with further polymer coating.



ARMOSTAB GRUNT I

Geocomposite consists of polyester geogrid without coating sewn to a non-woven backing. This material can be additionally reinforced by a yarn in W-shape way throughout the entire fabric with 6 mm intervals.



Physical and mechanical properties of ARMOSTAB AR1P reinforcing uniaxial geogrid

Name	50/30	80/30	100/30	150/30	200/30	200/50	300/50	400/50	500/50	600/50	800/50	1000/100
Material	Polyester (PET)											
Coating	Polymer											
Tensile strength, kN/m, no less than: - MD - CMD	50 30	80 30	100 30	150 30	200 30	200 50	300 50	400 50	500 50	600 50	800 50	1000 100
Elongation at maximum load, %, no more than - MD - CMD	13/13											
UV-resistance, %, no less than	90											
Frost-resistance, %, no less than	90											
Cyclic load resistance, %, no less than	90											
Resistance to aggressive environment, %, no less than	90											
Fungi resistance, no more than	PG ₁₁₃											
Durability, no less than	100 years											
Flexibility at low temperatures	Flawless											
Mesh size, mm	10x10; 20x20; 25x25; 30x30; 35x35; 40x40; 50x50; 60x60											
Note – MD and CMD tensile strength can be different and is agreed upon with each customer												

Physical and mechanical properties of ARMOSTAB AR2P reinforcing biaxial geogrid

Name	10/10	20/20	30/30	40/40	50/50	80/80	100/100	200/200	300/300	400/400	500/500
Material	Polyester (PET)										
Coating	Polymer										
Tensile strength, kN/m, no less than: - MD - CMD	10 10	20 20	30 30	40 40	50 50	80 80	100 100	200 200	300 300	400 400	500 500
Elongation at maximum load, %, no more than - MD - CMD	13/13										
UV-resistance, %, no less than	90										
Frost-resistance, %, no less than	90										
Cyclic load resistance, %, no less than	90										
Resistance to aggressive environment, %, no less than	90										
Fungi resistance, no more than	PG ₁₁₃										
Durability, no less than	100 years										
Flexibility at low temperatures	Flawless										
Mesh size, mm	10x10; 20x20; 25x25; 30x30; 35x35; 40x40; 50x50; 60x60										
Note – MD and CMD tensile strength can be different and is agreed upon with each customer											

Physical and mechanical properties of ARMOSTAB GRUNT I reinforcing geocomposite

Name	20/20	50/50	80/30	80/80	100/30	100/100	200/50	200/200	300/50	300/300	400/50	600/50
Material	Polyester (PET)											
Coating	No											
Substrate	Non-woven geotextile (PP or PET)											
Tensile strength, kN/m, no less than:												
- MD	20	50	80	80	100	100	200	200	300	300	400	600
- CMD	20	50	30	80	30	100	50	200	50	300	50	50
Elongation at maximum load, %, no more than	13/13											
- MD												
- CMD												
UV-resistance, %, no less than	90											
Frost-resistance, %, no less than	90											
Cyclic load resistance, %, no less than	90											
Resistance to aggressive environment, %, no less than	90											
Fungi resistance, no more than	PG ₁₃											
Flexibility at low temperatures	Flawless											
Mesh size, mm	10x10; 20x20; 25x25; 30x30; 35x35; 40x40; 50x50; 60x60											
Note – MD and CMD tensile strength can be different and is agreed upon with each customer												

**HIGH-TENSILE GEOTEXTILE
MADE OF POLYMER YARNS**

ARMOSTAB PET

High-tensile geotextile

ARMOSTAB represents geotextile produced by textile technologies (weaving or warp-knitting).

ARMOSTAB PET is a high-tensile polymer woven geotextile made of high-modulus polyester yarns.

Geotextile is used:

- ✓ To reinforce weak soil during construction of highways, railways, oil and gas stations, airfields, parking spaces, high load corridors, building sites;
- ✓ To separate structural layers and subgrades in highway construction;
- ✓ To reinforce soil during hydraulic engineering, constructing levees, moles and breakwaters;
- ✓ Reinforcing domestic and industrial waste landfills;
- ✓ Separation of layers for reinforcing main railway roadbed;
- ✓ Ground supporting constructions.

**Physical and mechanical properties of ARMOSTAB PET high-tensile woven geotextile**

Name	100/50	200/50	400/50	600/50	800/100	1000/100	1200/100	1400/100	1600/100
Raw material	Polyester (PET)								
Mass per unit area, g/m ² , no less than	250	450	710	1050	1600	1900	2150	2600	2900
Tensile strength, kN/m, no less than									
- MD	100	200	400	600	800	1000	1200	1400	1600
- CMD	50	50	50	50	100	100	100	100	100
Elongation at maximum load, %, no more than									
- MD	13								
- CMD	13								
Static puncture (CBR test), kN, no less than	5								
Cone drop test, mm, no more than	30								
Filtration coefficient under 2,0 kPa, m/day, no less than	20								
Water permeability, l/(m ² s), no less than	2,5								
UV-resistance, %, no less than	90								
Frost-resistance, %, no less than	90								
Cyclic load resistance, %, no less than	90								
Resistance to aggressive environment, %, no less than	90								
Fungi resistance, no more than	PG ₁₁₃								
Flexibility at low temperatures	Flawless								
Note – MD and CMD tensile strength can be different and is agreed upon with each customer									



**REINFORCING ASPHALT
GEOGRIDS AND GEOCOMPOSITES**

ARMOSTAB ASPHALT

Geogrids are made of polyester yarns by warp-knitting with further bituminous coating.

ARMOSTAB ASPHALT P

Geocomposite consists of polyester geogrid with bituminous coating which is sewn to non-woven backing.

GEO BZ

Geogrids are made of basalt roving by warp-knitting with further bituminous coating.

GEO ST

Geogrids are made of fiberglass roving by warp-knitting with further bituminous coating.

GEO ST P

Geocomposite consists of the geogrid GEO ST sewn to non-woven backing, with further bituminous coating.



Physical and mechanical properties of ARMOSTAB ASPHALT reinforcing asphalt geogrids
and ARMOSTAB ASPHALT P reinforcing asphalt geocomposites

Name	ARMOSTAB ASPHALT			ARMOSTAB ASPHALT P		
	50/50	80/80	100/100	50/50	80/80	100/100
Raw material	Polyester (PET)					
Coating	Bitumen-acrylic					
Mass per unit area, g/m ² , no less than	Of the backing			25		
Tensile strength, kN/m, no less than: - MD - CMD	50 50	80 80	100 100	50 50	80 80	100 100
Elongation at maximum load, %, no more than - MD - CMD	13/13					
UV-resistance, %, no less than	90					
Frost-resistance, %, no less than	90					
Heat-resistance, %, no less than	90					
Resistance to aggressive environment, %, no less than	80					
Fungi resistance, no more than	PG ₁₁₃					
Flexibility at low temperatures	Flawless					
Note – MD and CMD tensile strength can be different and is agreed upon with each customer						

Physical and mechanical properties of GEO ST reinforcing geogrid

Name	50/50	80/80	100/100	120/120
Material	Fiberglass roving			
Coating	Polymer			
Tensile strength, kN/m, no less than: - MD - CMD	50 50	80 80	100 100	120 120
Elongation at maximum load, %, no more than - MD - CMD	3/3			
Note – MD and CMD tensile strength can be different and is agreed upon with each customer				

Physical and mechanical properties of GEO BZ reinforcing geogrid

Name	50/50	80/80	100/100	120/120
Material	Basalt roving			
Coating	Polymer			
Tensile strength, kN/m, no less than: - MD - CMD	50 50	80 80	100 100	120 120
Elongation at maximum load, %, no more than - MD - CMD	4/4			
Note – MD and CMD tensile strength can be different and is agreed upon with each customer				



**THREE-DIMENSIONAL CELLULAR
GEOGRID**

GEOKARKAS
Three-dimensional geocell

Cellular polymer material is formed by two ultrasonically-welded stipes. GEOKARKAS comes as a folded module. When expanded during installation, GEOKARKAS turns into a three-dimensional cellular construction and can be filled with soil and other inert material.

Based on the cell size, there are different types of GEOKARKAS geocell: PG 20, PG 30 и PG 40, where 20, 30 and 40 is a nominal length of cell diagonal in centimeters.

Stripe thickness for GEOKARKAS ranges from 1,2mm to 2mm. The geocell is aimed for dimensional soil reinforcement to create a stable layer of "subgrade soil in the geogrid" and increases significantly physical and mechanical properties of the structure: stiffness, durability, distributing capability, dynamic load resistance, surface erosion, exposure to unbalanced deformation.





Application area:

- ✓ Reinforcement of the pavement layers;
- ✓ Reinforcement and erosion protection of slopes and embankments;
- ✓ Construction of supporting walls in road, hydraulic engineering and other building areas;
- ✓ Soil reinforcement during landscaping and planting.

Geometric parameters of geocells

Type	Height, (h), mm	Length of one module, folded/extended (Ao/A), mm, with band thickness			Width of one module, folded/extended (Bo/B) mm	Cell number, along width/length	Cell diagonal, folded/extended (bo/b), mm	Geocell weight with perforation/without perforation, kg, with band thickness			Module area (S), m ²
		1,80 mm	1,50 mm	1,35 mm				1,80 mm	1,50 mm	1,35 mm	
PG 20.05	50	108/6480	90/6480	81/6480	3500/2500	10/30	340/250	14,7/13,2	11,5/10,0	10,4/9,0	16,20
PG 20.75	75	108/6480	90/6480	81/6480	3500/2500	10/30	340/250	22,1/19,8	17,3/14,7	15,5/13,5	16,20
PG 20.10	100	108/6480	90/6480	81/6480	3500/2500	10/30	340/250	29,5/26,5	23,0/20,0	20,7/18,0	16,20
PG 20.15	150	108/6480	90/6480	81/6480	3500/2500	10/30	340/250	44,2/39,7	34,5/29,5	31,0/26,0	16,20
PG 20.20	200	108/6480	90/6480	81/6480	3500/2500	10/30	340/250	59,0/53,0	46,0/40,0	41,4/35,0	16,20
PG 30.05	50	72/5600	60/5600	54/5600	4500/3300	10/20	440/330	13,0/11,7	9,3/8,6	8,0/7,3	18,48
PG 30.75	75	72/5600	60/5600	54/5600	4500/3300	10/20	440/330	19,4/17,5	14,0/13,0	12,0/11,0	18,48
PG 30.10	100	72/5600	60/5600	54/5600	4500/3300	10/20	440/330	26,0/23,5	18,6/17,3	16,0/14,6	18,48
PG 30.15	150	72/5600	60/5600	54/5600	4500/3300	10/20	440/330	38,8/35,0	28,0/26,0	24,2/22,0	18,48
PG 30.20	200	72/5600	60/5600	54/5600	4500/3300	10/20	440/330	51,8/46,5	36,5/34,5	32,2/29,3	18,48
PG 40.05	50	72/8940	60/8940	54/8940	3500/2400	5/20	680/480	9,8/8,8	7,5/6,5	6,3/5,7	21,45
PG 40.75	75	72/8940	60/8940	54/8940	3500/2400	5/20	680/480	14,7/13,2	11,2/9,8	9,5/8,5	21,45
PG 40.10	100	72/8940	60/8940	54/8940	3500/2400	5/20	680/480	19,6/17,5	15,0/13,0	12,7/11,4	21,45
PG 40.15	150	72/8940	60/8940	54/8940	3500/2400	5/20	680/480	29,4/26,5	22,4/19,5	19,0/17,0	21,45
PG 40.20	200	72/8940	60/8940	54/8940	3500/2400	5/20	680/480	39,2/35,2	30,0/26,0	25,3/22,7	21,45

Note – By agreement with the consumer, it is possible to produce geocells of other sizes and with physical and mechanical characteristics in accordance with the standard, technical regulation documents and design documentation.

EROSION CONTROL GEOMATS

STABIMAT SMT

Three-dimensional erosion control geomat is produced from extruded polypropylene monofilaments. Geomats are made from thermally bonded polymer monofilaments obtained by extrusion. Depending on the type, geomats may contain additional reinforcing elements: polyester geogrids or non-woven geotextile. All the components are thermally joined.

STABIMAT SMT-K

Three-dimensional erosion control composite is produced from extruded polypropylene monofilaments and reinforced by a polyester geogrid with polymer coating.

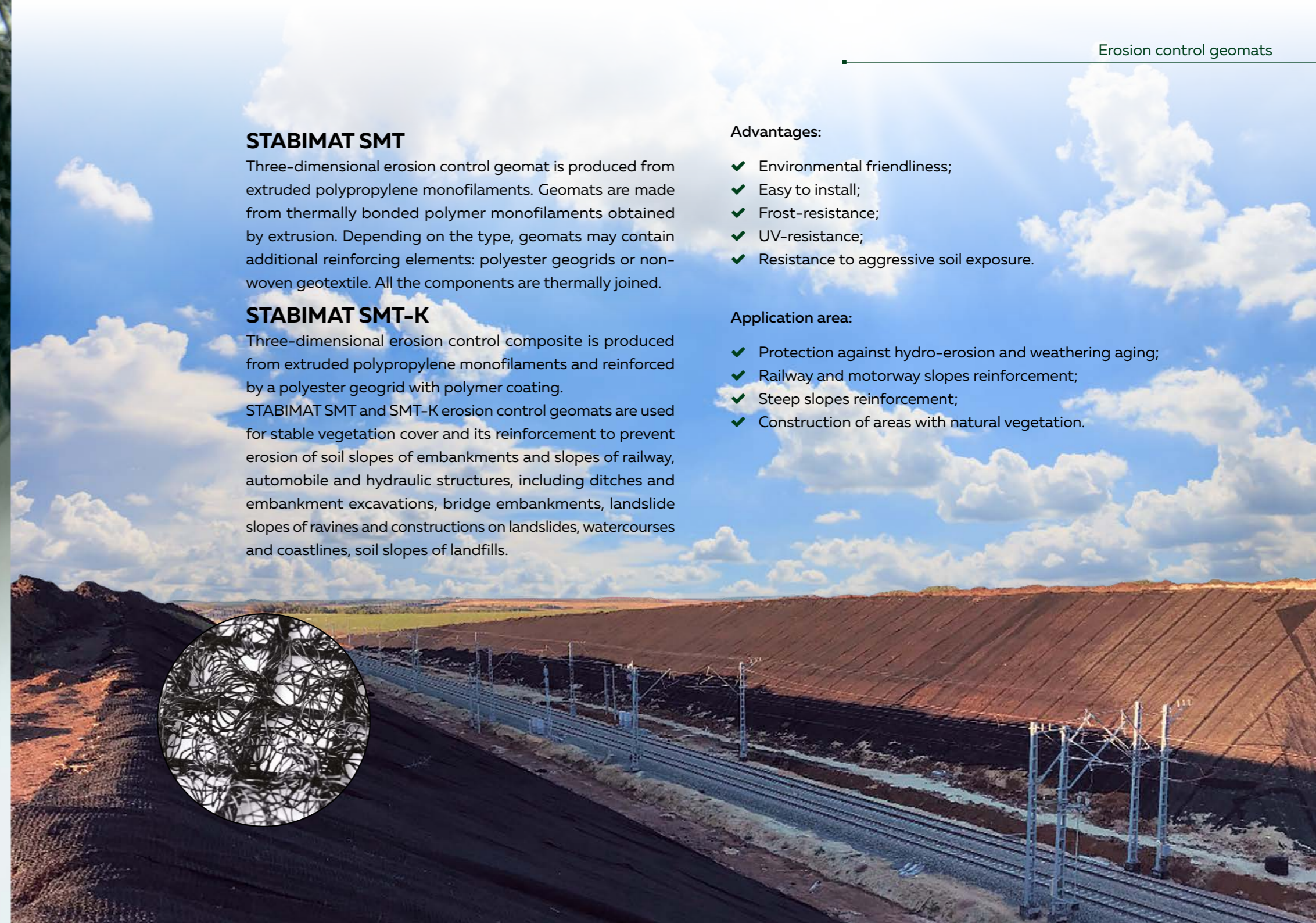
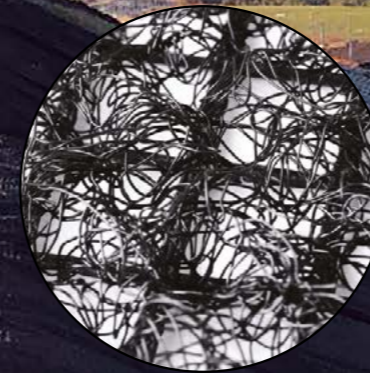
STABIMAT SMT and SMT-K erosion control geomats are used for stable vegetation cover and its reinforcement to prevent erosion of soil slopes of embankments and slopes of railway, automobile and hydraulic structures, including ditches and embankment excavations, bridge embankments, landslide slopes of ravines and constructions on landslides, watercourses and coastlines, soil slopes of landfills.

Advantages:

- ✓ Environmental friendliness;
- ✓ Easy to install;
- ✓ Frost-resistance;
- ✓ UV-resistance;
- ✓ Resistance to aggressive soil exposure.

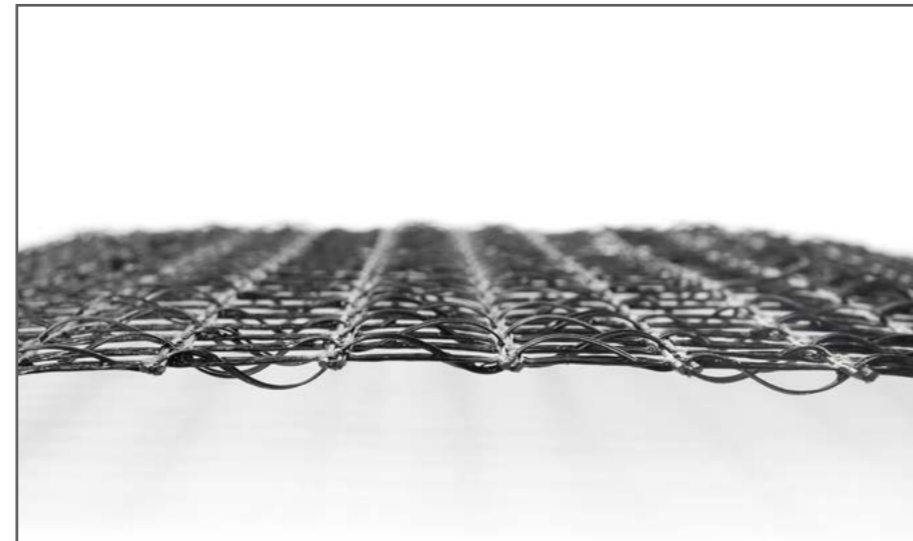
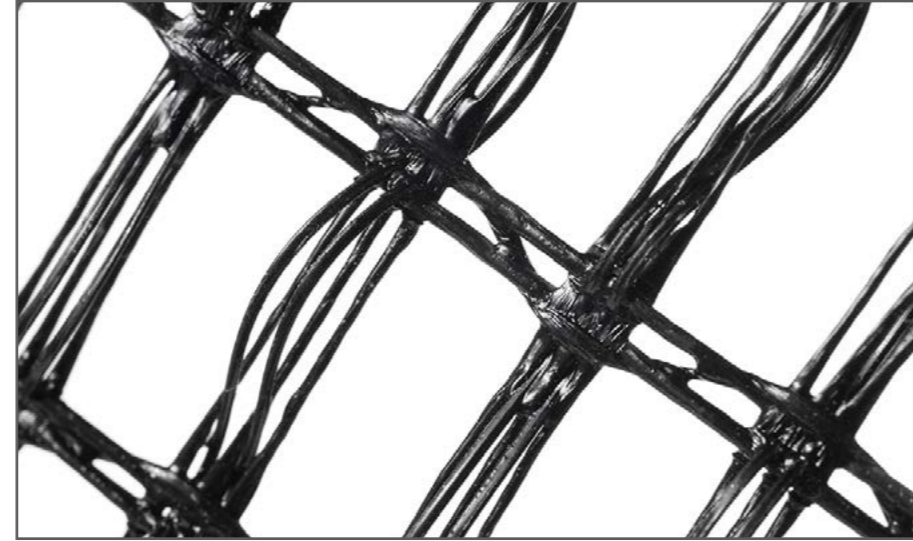
Application area:

- ✓ Protection against hydro-erosion and weathering aging;
- ✓ Railway and motorway slopes reinforcement;
- ✓ Steep slopes reinforcement;
- ✓ Construction of areas with natural vegetation.



ARMOSTAB 3D

Reinforcing geogrid is made of polyester yarns, with further polymer coating. The geogrid has a specific sinusoidal form of ribs in transverse direction.

**Physical and mechanical properties of STABIMAT SMT erosion control geomat**

Name	300	350	400	450	500	550	600	650	700	750	800
Raw material	Polypropylene (PP)										
Mass per unit area, g/m ² , no less than	300	350	400	450	500	550	600	650	700	750	800
Nominal thickness under pressure 2 kPa, mm	12 (± 2) 15 (± 2) 18 (± 2)										
MD tensile strength, kN/m, no less than: - MD - CMD	1,0 (- 0,3)	1,1 (- 0,3)	1,2 (- 0,3)	1,3 (- 0,3)	1,4 (- 0,3)	1,5 (- 0,3)	1,6 (- 0,3)	1,7 (- 0,3)	1,8 (- 0,3)	1,9 (- 0,3)	2,0 (- 0,3)
Elongation at maximum load, %, no more than: - MD - CMD	25										
Frost-resistance, %, no less than	90										
Fungi resistance, no more than	90										
UV-resistance, %, no less than	PG ₁₁₃										
Microorganism resistance, %, no less than	90										
Oxidation stability, %, no less than	50										

Note – MD and CMD tensile strength can be different and is agreed upon with each customer

Physical and mechanical properties of STABIMAT SMT-K erosion control geomat

Name	300	350	400	450	500	550	600	650	700	750	800	
Raw material of the geomat	Polypropylene (PP)											
Reinforcing element	Geogrid											
Raw material of the geogrid	Polyester (PET)											
Mass per unit area, g/m ² , no less than:	10/10	340	390	440	490	540	590	640	690	740	790	840
	20/20	380	430	480	530	580	630	680	730	780	830	880
	30/30	420	470	520	570	620	670	720	770	820	870	920
	40/40	460	510	560	610	660	710	760	810	860	910	960
	50/50	500	550	600	650	700	750	800	850	900	950	1000
Nominal thickness under pressure 2 kPa, mm	12 (± 2) 15 (± 2) 18 (± 2)											
MD/CMD tensile strength, kN/m, no less than:	10/10 20/20 30/30 40/40 50/50	10 / 10 20 / 20 30 / 30 40 / 40 50 / 50										
MD/CMD elongation at maximum load, %, no less than:	13/13											
UV-resistance, %, no less than	90											
Frost-resistance, %, no less than	90											
Resistance to aggressive environment, %, no less than	90											
Fungi resistance, no more	PG ₁₁₃											
Microorganism resistance, %, no less than	90											
Hydrolysis resistance, %, no less than	80											
Durability, no less than	50 years											
Note – MD and CMD tensile strength can be different and is agreed upon with each customer												

Physical and mechanical properties of ARMOSTAB 3D erosion control geomat

Name	20/10	30/15	35/20	40/15	60/15	80/30	100/30	120/30
Raw material	Polyester (PET)							
Coating	Polymer							
Tensile strength, kN/m, no less than: - MD - CMD	20 10	30 15	35 20	40 15	60 15	80 30	100 30	120 30
Elongation at maximum load, %, no more than: - MD - CMD	13							
UV-resistance, %, no less than	90							
Frost-resistance, %, no less than	90							
Resistance to aggressive environment, %, no less than	90							
Microorganism resistance, %, no less than	90							
Note – MD and CMD tensile strength can be different and is agreed upon with each customer								



DRAINAGE GEOCOMPOSITES

Drainage geocomposites are classified as combined geosynthetic materials and consist of a drainage core and a filter attached to one or both sides of the drainage core.

Drainage core provides stable water-permeability, while the filter prevents the core against clogging with soil grains.





MIADRAIN-X

MIADRAIN-X is a drainage geocomposite made of extruded polypropylene monofilaments forming W-shaped parallel channels combined with one or two non-woven geotextile.

MIADRAIN-X application:

- ✓ Slope drainage engineering;
- ✓ Construction of solid waste landfills;
- ✓ Flat drainage during building and reconstruction of railways and motorways, airfields and airports;
- ✓ Drainage engineering in weakened and frost heaving highways.

Technical characteristics of MIADRAIN – X geocomposite

Name	400	450	500	550	600	650	700	750	800
Raw material of the core	Polypropylene (PP)								
Reinforcing element	Nonwoven geotextile								
Number of layers, pcs.	2								
Mass per unit area of the geotextile, g/m ² , ± 10 %	150								
Mass per unit area of the geomat, g/m ² , no less than	670	720	770	820	870	920	970	1020	1070
Nominal geomat thickness under pressure 2 kPa, mm	8 (± 2)								
Tensile strength, kN/m, no less than: - MD - CMD	8 / 8								
Elongation at maximum load, %, no more than - MD - CMD	100 / 100								
Static puncture (CBR test), kN, no less than	1,0								
Dynamic perforation resistance, mm, no more than	20								
Filtration coefficient under 2,0 kPa, m/day, no less than	20								
Opening size O ₉₀ , mkm, no less than	60								
UV-resistance, %, no less than	90								
Frost-resistance, %, no less than	90								
Resistance to aggressive environment, %, no less than	90								
Fungi resistance, no more than	PG ₁₁₃								
Microorganism-resistance, %, no less than	90								
Mechanical damage resistance, %, no less than	80								
Cyclic load resistance, %, no less than	80								
Note – MD and CMD tensile strength can be different and is agreed upon with each customer									



**«GEOShakht»
MINING GRID**

«GEOShakht» Mining grid

Mining grids are produced from polyester yarns or fiberglass roving by warp-knitting, with further impregnation with the non-flammable polymer coating. Subsequently, they are connected into a closed system intended for sidewalls and a roof of underground excavations in coal, metal and mineral mines.

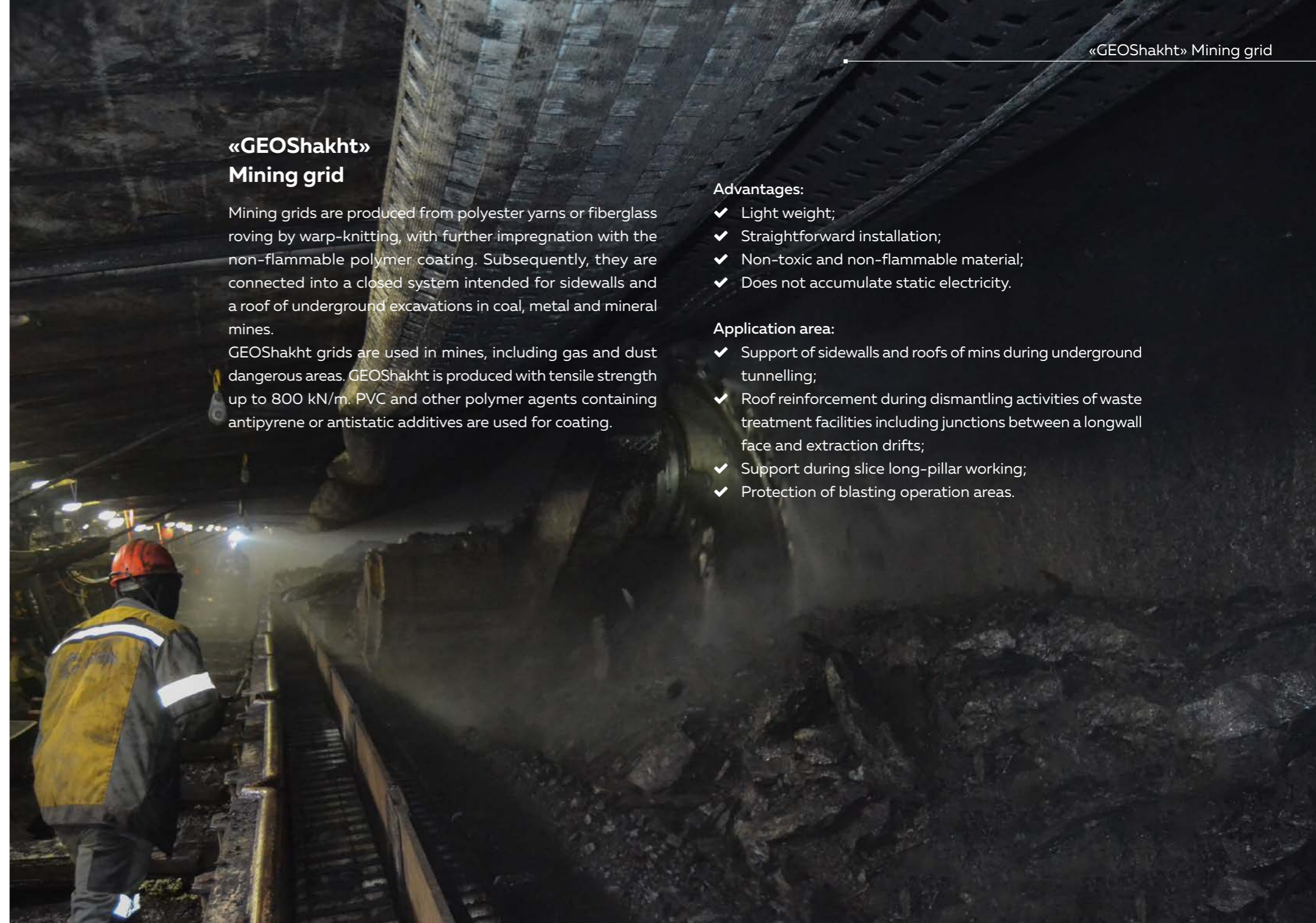
GEOShakht grids are used in mines, including gas and dust dangerous areas. GEOShakht is produced with tensile strength up to 800 kN/m. PVC and other polymer agents containing antipyrene or antistatic additives are used for coating.

Advantages:

- ✓ Light weight;
- ✓ Straightforward installation;
- ✓ Non-toxic and non-flammable material;
- ✓ Does not accumulate static electricity.

Application area:

- ✓ Support of sidewalls and roofs of mins during underground tunnelling;
- ✓ Roof reinforcement during dismantling activities of waste treatment facilities including junctions between a longwall face and extraction drifts;
- ✓ Support during slice long-pillar working;
- ✓ Protection of blasting operation areas.



Technical characteristics of «GEOShakht» mining grid

Name	40/40	50/50	60/60	80/80	200/200	300/300	400/400	600/600	800/800
Impregnation	Plastisol								
Mesh size, mm	from 10x10 to 100x100				from 10 to 80		from 10 to 50		
Surface density, g/m ² , not less	330	380	450	600	1400	2100	2800	3700	4200
Tensile strength, kN/m, no less: - MD - CMD	40 40	50 50	60 60	80 80	200 200	300 300	400 400	600 600	800 800
Relative elongation at break, %, not more - MD - CMD	12/12								
Notes: - Grids can be produced with other characteristics; - Grids can be produced with various roll length.									

**«MIATUBES»
GEOTUBES**



MIATUBES
Geotubes

MIATUBES are closed high-tensile woven geosynthetic filtering tubes of industrial use. MIATUBES geotubes and geocontainers are produced by sewing together woven filtering fabrics made of polypropylene or polyester into a closed flexible geosynthetic sheet with specified dimension (with feeding pipes, fastening loops and, if necessary, mounting loops). MIATUBES are sewn together by high-tensile polymer fibers by double stitches.

Geosynthetic tubes and flexible containers

MIATUBES are applied for:

- ✓ Dewatering natural and industrial hydraulic fluids (slurry, sludge, bottom sediments and others);
- ✓ Purification of solutions, process and sewage water from particulate matter and impurities;
- ✓ Engineering underwater soil (protecting or bearing) structures, on flooded areas and land;
- ✓ Storage of dry and dewatered minerals and other materials.

Example of MIATUBE filling



Physical and mechanical properties of MIATUBE geotubes

Geofabric raw material for sewing**	Polypropylene (PP) or polyester (PET)
Raw material	Polypropylene (PP)
Geotube perimeter (cross-section) *, P, m	3,7; 4,8; 5,0; 7,4; 9,8; 10,0; 14,1; 19,4; 24,8
Geotube length in empty state*, L, m	4,8; 7,4; 9,8; 10,0; 11,1; 12,3; 14,8; 15,0; 16,4; 18,5; 19,8; 20,0; 22,2; 24,8; 25,0; 25,9; 29,6; 30,0; 33,1; 33,3; 35,0; 37,0; 40,0; 40,7; 44,4; 45,0; 48,1; 49,8; 50,0; 55,0; 55,5; 59,2; 60,0
MD/CMD tensile strength, kN/m, no less than:	For geocontainers: 33/33 (PP), 50/50 (PP) или 100/100 (PET) For geotube: 50/50 (PP), 80/80 (PP), 100/100 (PP or PET), 150/150 (PP or PET), 175/175 (PP) or 200/200 (PET)
Resistance to aggressive environment, %, no less than	90
Resistance to UV exposure, %, no less	90
Resistance to multiple freezing and defrosting, %, not less	90
Flexibility at low temperatures	Provided
Fungi resistance	PG ₁₁₃
Biological impact resistance	Non-biodegradable

Notes:

* By customer approval or design requirements, geotubes are available in other type and size. Size of geocontainers is not defined and can be agreed with a customer.

** Various materials are available for double-layer geomembrane consisting of two different geofabrics, one of the fabrics can be nonwoven.

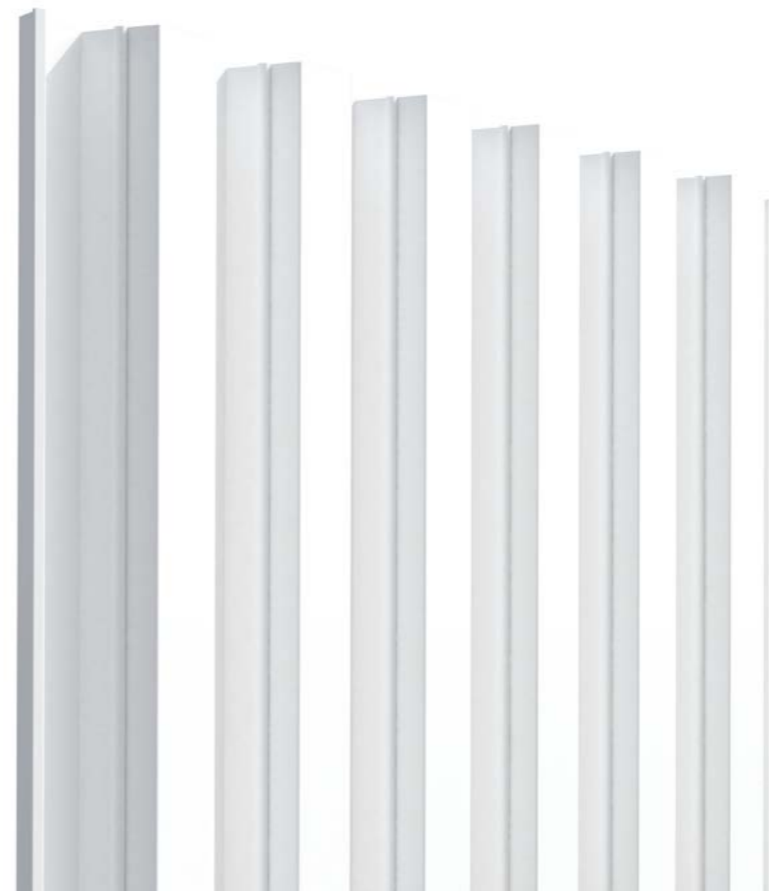
GSH PVC LARSEN SHEET PILES



GSH PVC Larsen sheet piles

PVC Larsen sheet piles is U-shaped profile with interlocking edges (joints). Profiles, interlocked with each other, create a sealed wall which is installed into soil.

Interlocking edges provide construction reliability on break and deformation. Geopiles are manufactured from unplasticized rigid impact-proof polyvinylchloride, which is resistant to aggressive environment.



ADVANTAGES



High durability



Environmental friendly



Light-weighted structure



Temperature drop resistance



Aggressive environment resistance



Prime-cost reduction

Application area:

Transport engineering

- ✓ Reservoirs for subsoil water;
- ✓ Highways;
- ✓ Railways;
- ✓ Bridge abutment;
- ✓ Ramps;
- ✓ Tunnels.

Hydraulic engineering

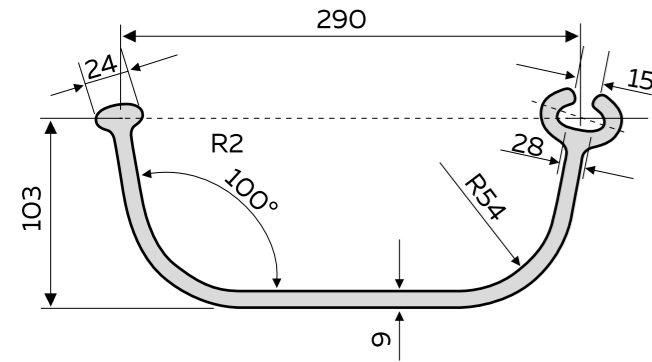
- ✓ Cost-protecting structures;
- ✓ Berthing structures;
- ✓ Dock structures;
- ✓ Ant filtering pools;
- ✓ In port industrial parks.

Water ways engineering

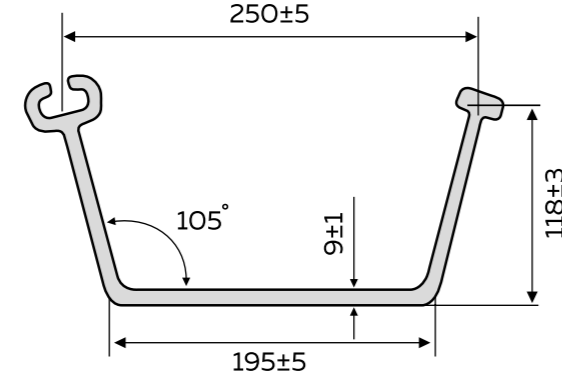
- ✓ Widening water ways;
- ✓ Cost fortification.

TYPES OF PVC LARSEN SHEET PILES

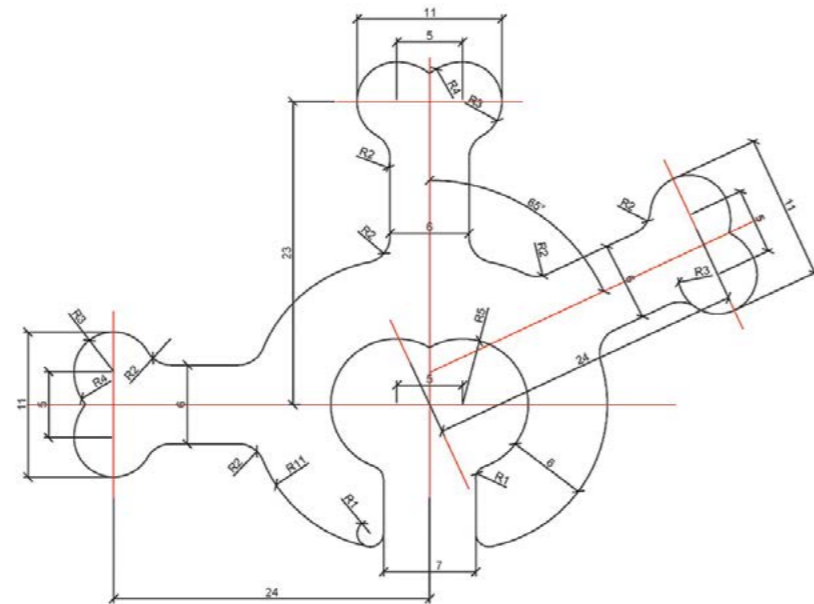
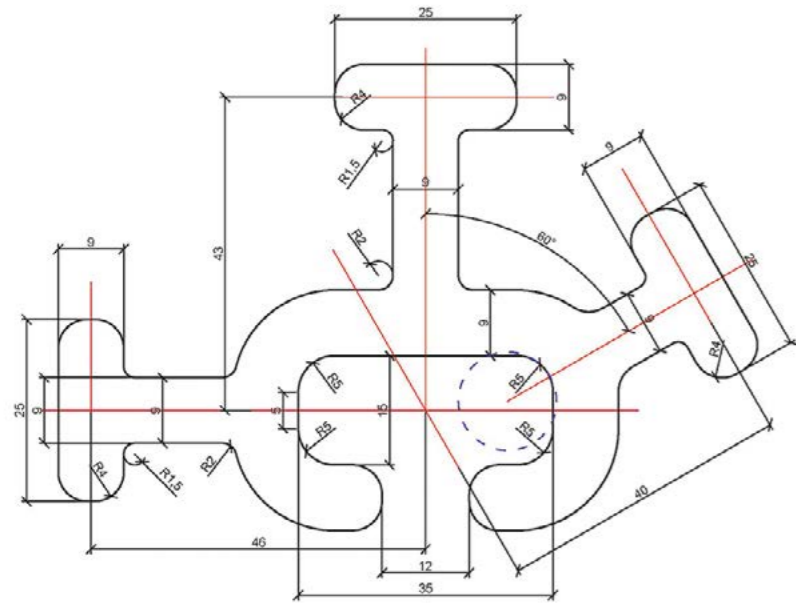
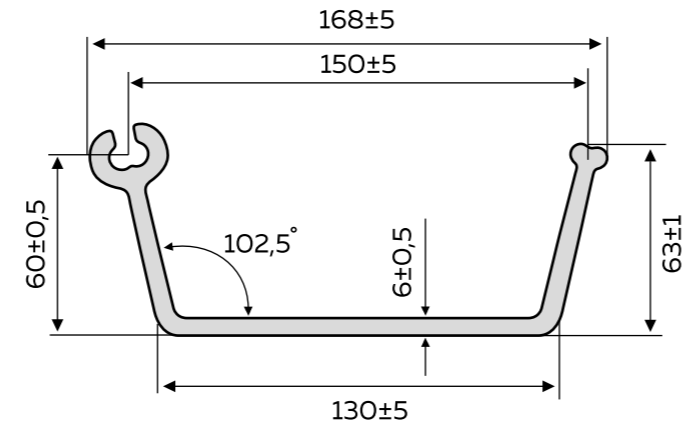
GSH 600



GSH 500



GSH 300



Technical characteristics of GSH PVC Larsen sheet pile

one element	Name	GSH 300	GSH 500
	Width (on joint centers), mm	150	250
Depth, mm	60	120	
Thickness, mm	6	9	
Weight 1 p.m., kg	2,10	7,32	
Cross-section area, cm ²	17,0	49,0	
Inertia moment Ix, cm ⁴	90,47	1012,07	
Resistance moment, Wx, cm ³	19,54	133,35	
for 1 p.m.	Weight 1 p.m., kg	15,3	29,2
	Cross-section area, cm ²	113,73	196,0
	Inertia moment Ix, cm ⁴	2016,2	12390,9
	Resistance moment, Wx, cm ³	322,0	1050,0
Density, g/cm ³	1,65		
Bending strength, MPa	54,2		
Modulus of flexibility, MPa	3652		
Modulus of tension, MPa	2740,0		
Charpy impact strength, kJ/m ²	136,0		
Maximum banding moment, kN/m (1 p.m. of a wall)	17,4	56,9	
Notes - RAL colors at the request of a customer			



A noise barrier is an artificial barrier installed between a noise source and protected object serving as a noise reducer.

A noise barrier is a prefabricated structure consisting of bearing supporting racks and various types of acoustic panels mounted between them.

Noise barriers of 100 mm wide are produced from a composite material and interlock with each other by groove-and-tongue joint. Front side of the panel (turned to noise) is made in two variants: solid and perforated. Noise-absorbing material like mineral wool is inserted inside the panel.

ADVANTAGES



Straightforward installation



Maintainability



Easy maintenance



Vandal-proof



Aesthetic appearance



Pollution resistant



Resistant to corrosion



Isolation index
38 dB



BARRIERS CHARACTERISTICS



Geometry characteristics of the panels

- Wall assembled height – 6 m
- Panel length – up to 5 m
- Panel height - 44,2-250 mm
- Panel width – 100 mm
- Panel wall thickness – 1-4mm
- Canopy angle of slope – a multiple 12°



Physical and mechanical properties

- Material: PVC composite
- Density, g/cm³: not less than 1,3
- Temperature ratio of linear expansion, C⁻¹: 50x10⁻⁶
- Operating temperature range: from -50 to +60°C
- Filling material: mineral cotton
- Filling material density, kg/m³: 65-120

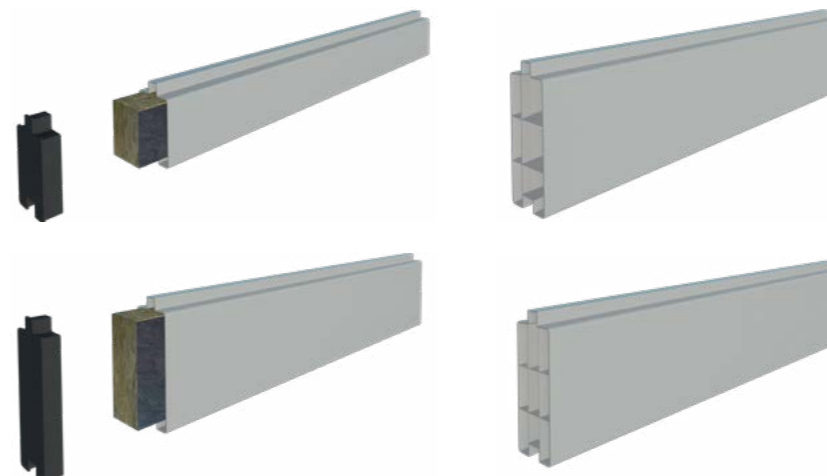


Acoustic properties

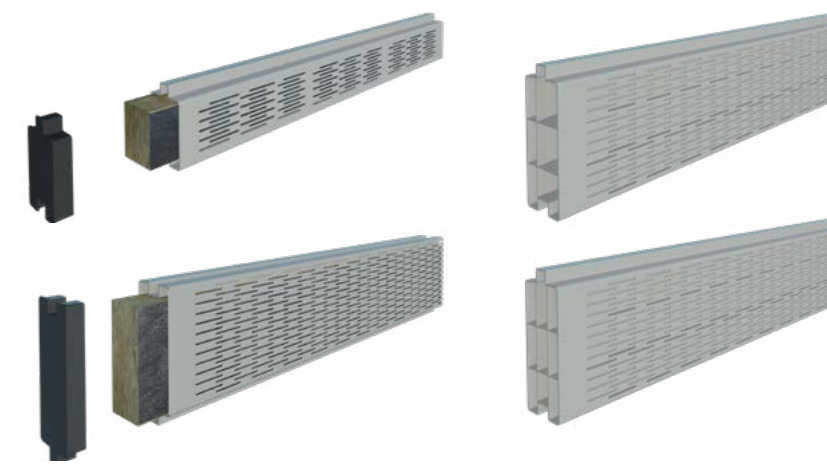
- Acoustic reduction factor: to 0,9
- Airborne noise isolation index, dB: to 38
- (*- reflector panels with the filler)

TYPES OF BARRIERS

Sound-reflecting



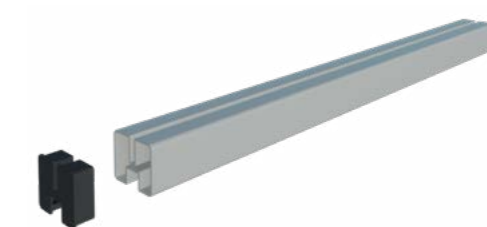
Sound-absorbing



Top and bottom parts of barrier installation



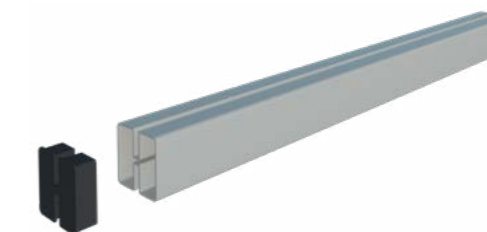
Translucent elements fixing



Bottom part installation



Corner installation

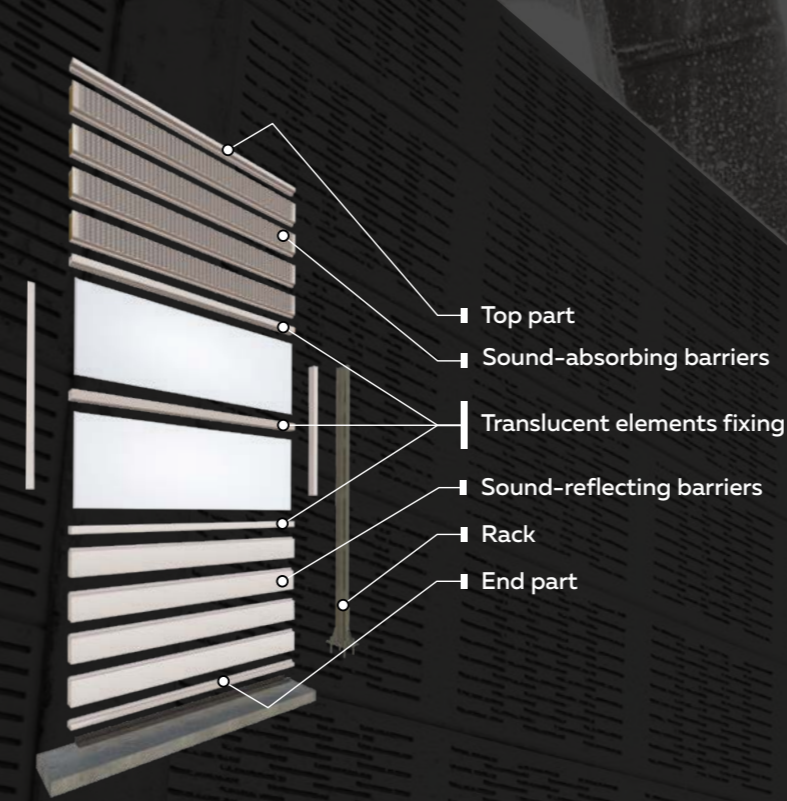


Technical characteristics of barriers

Name	Barrier drawing	Barrier height (without tongue), mm	Functions
PO-1		125	Reflection
PO-2		250	Reflection
POU-2.2		250	Reflection; Reinforced structure
POU-2.3		250	Reflection; Reinforced structure
PP-1N		125	Absorption
PP-2N		250	Absorption
PPU-2.2N		250	Absorption; Reinforced structure
PPU-2.3N		250	Absorption; Reinforced structure

Name	Barrier drawing	Barrier height (without tongue), mm	Functions
POS-2		250	Reflection; Reinforced structure; Prefabricated structure – quick removal and replacement of front parts
PPS-2N		250	Absorption; Reinforced structure Prefabricated structure – quick removal and replacement of front parts
PO-3		81	Translucent elements fixing (end panel)
POU-3.1		69,5	Translucent elements fixing (end panel); Reinforced structure
POU-3.2		69,5	Translucent elements fixing + переход к верхней ориентации панелей (end panel)
PO-4		96	Translucent elements fixing (medium panel)
POU-4.1		86	Translucent elements fixing (medium panel)
PO-5		58,5	Top and bottom parts of screen installation
PO-6		58,5	Bottom course installation
PO-7		50	Corner installation
POU-7.1		44,2	Corner installation; Reinforced structure

NOISE BARRIER INSTALLATION



Noise barriers assembling does not require special lifting devices and equipment, as the weight of assembled parts does not exceed 20 kg. Installation of the barriers is performed by a sequenced mounting from the bottom to top into pre-installed racks. Fixing of barriers can be carried out without any additional means or with the help of fastening angles.



SCREEN TYPES



**Type 1 – straight wall
with translucent elements**

Rack spacing L is normally accepted 3 or 4 m, screen height – from 2 to 6 m.



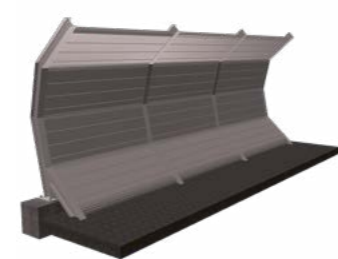
**Type 4 – angular wall
with translucent elements**

Rack spacing L is normally accepted 3 or 4 m, screen height – from 2 to 6 m.



Type 2 – angular wall

Rack spacing L is normally accepted 3 or 4 m, screen height – from 2 to 5 m.



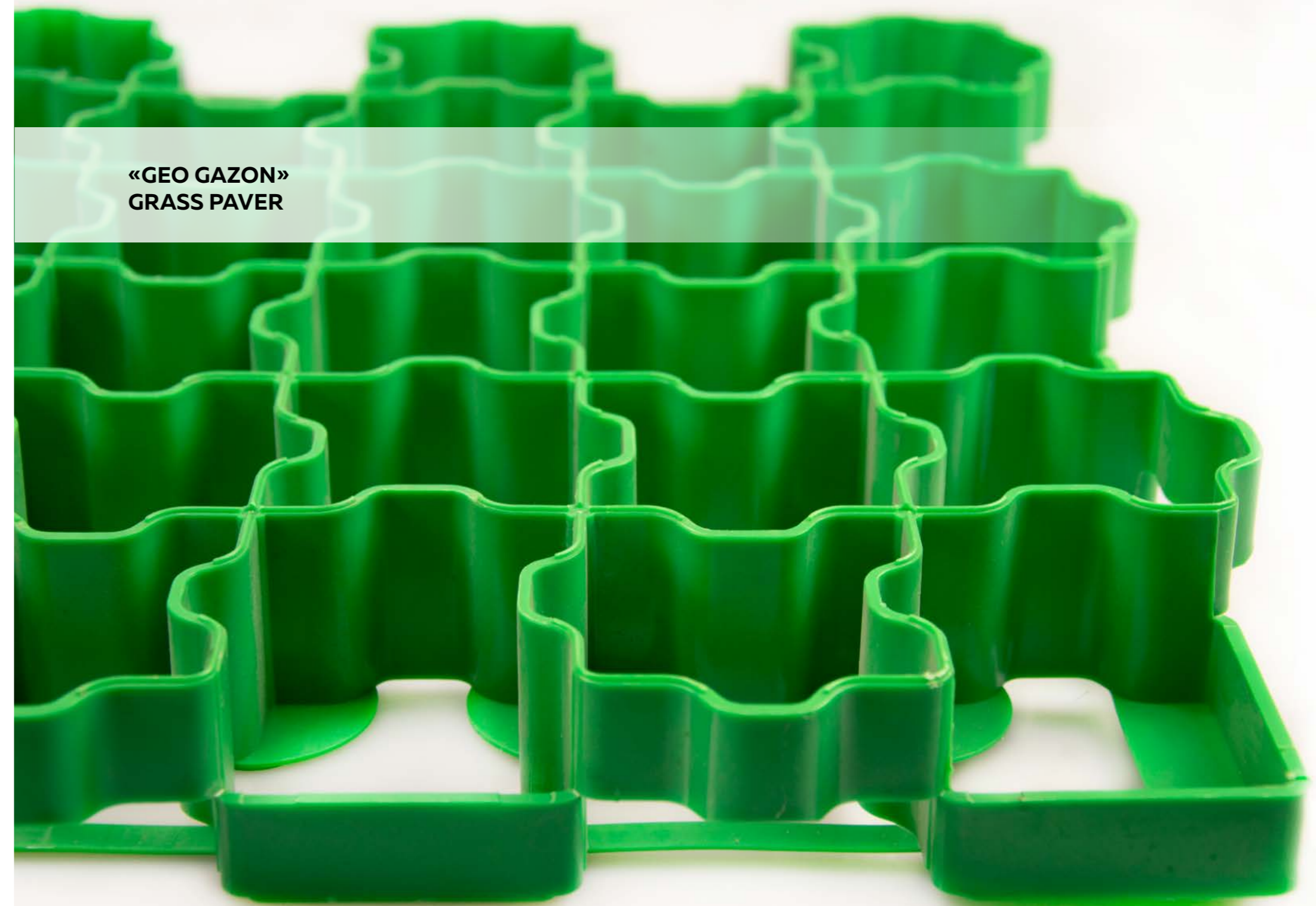
Type 5 – shaped wall

Rack spacing L is normally accepted 3 or 4 m, screen height – from 2 to 6 m.



**Type 3 – angular wall
with translucent elements**

Rack spacing L is normally accepted 3 or 4 m, screen height – from 2 to 5 m.



**«GEO GAZON»
GRASS PAVER**

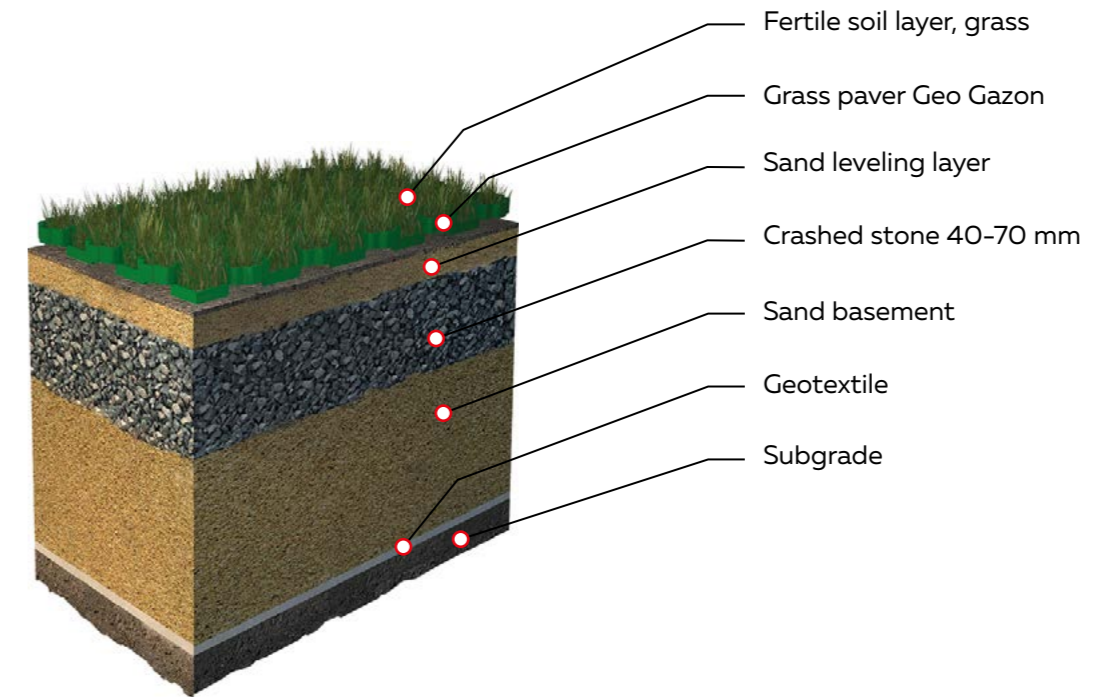
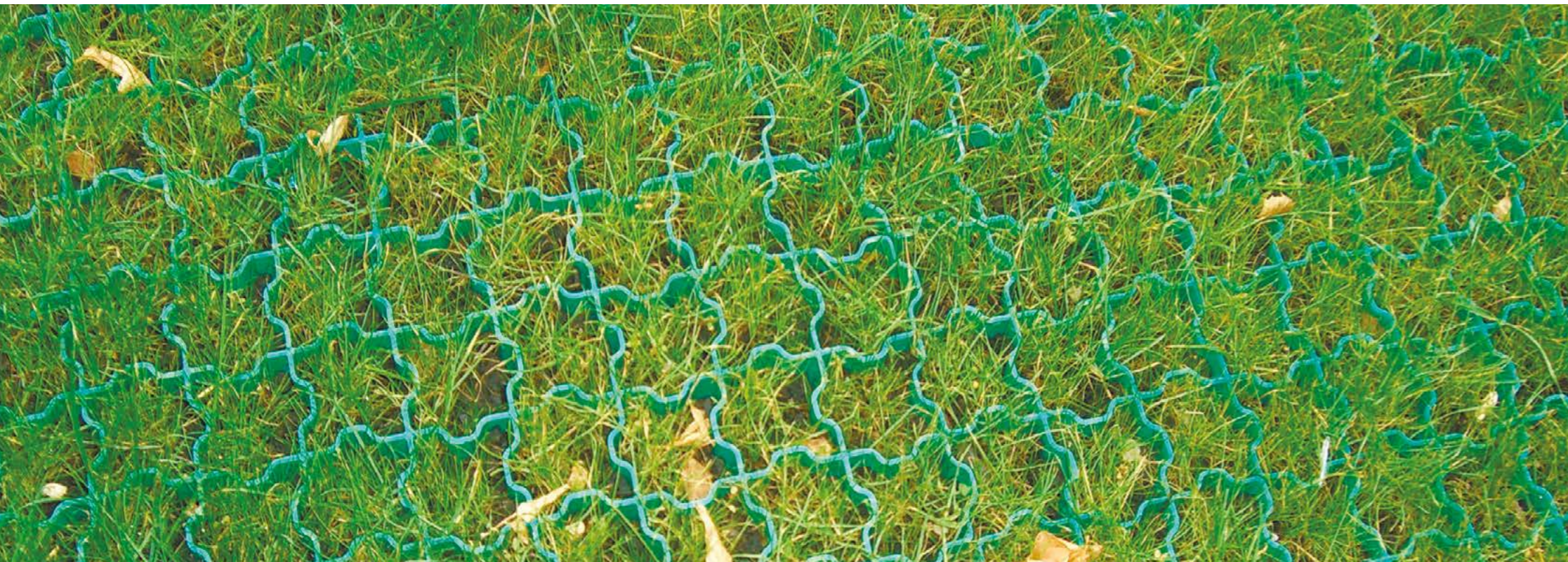
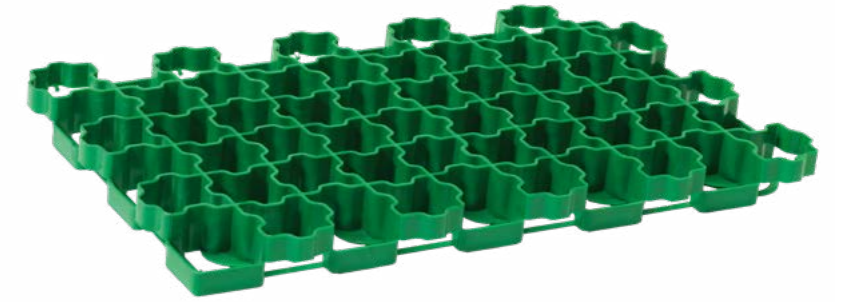
**«GEO Gazon»
Grass paver**

GEO Gazon is a strong three-dimensional water-permeable cellular construction combined into sections and expanded on-site with interlocking system to form a unique structure. The main aim of grass pavers is to protect vegetation cover from mechanical damage and erosion. GEO Gazon protects grass and root system from damage and prevents wheel

tracking. It can be perfectly used as an alternative to asphalt covering or paving slab. GEO Gazon is produced from highly compressed polyethylene, which is neutral to the environment and cannot be influenced by ultraviolet radiation. GEO Gazon shows stability under sharp temperature changes and can be recycled.

Advantages of «GEO Gazon» grass pavers:

- ✓ Allow rainfall to seep into the ground;
- ✓ Affords soil stabilization and erosion protection;
- ✓ Conserve soil fauna;
- ✓ Create optimal conditions for vegetation growth;
- ✓ Protect the surface from damage;
- ✓ Easy to install and handle;
- ✓ Various filling types;
- ✓ Easy to transport;
- ✓ Durable module connection;
- ✓ Optimal load distribution.



Technical characteristics of GEO Gazon grass paver

Name	«GEO Gazon» reinforced	«GEO Gazon» Light	«GEO Gazon»
Module length, mm	640		
Module width, mm	395		
Module height, mm	5	5	4
Wall thickness of a module, mm	3,5±0,5	3±0,5	2,5±0,5
Module weight, g	1350	1100	900
Maximum load, kN/m	2100	1500	1100
Module number for 1 m ² , pcs.	4		
Color	green/black		
Material	(HDPE) High density polyethylene		



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