



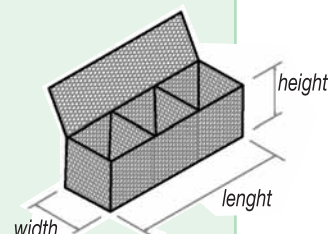
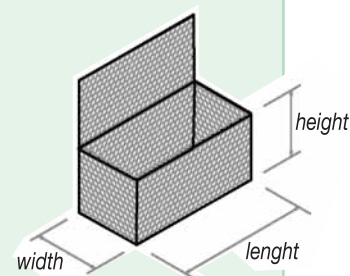
Retaining walls and river training works with double twisted wire mesh gabions filled with stones eventually combined with plants for the realizations of bioengineering Techniques.

GABIONS WITHOUT DIAPHRAGMS

Sizes			Mesh type		
Lenght (m)	Width (m)	Height (m)	8 x 10		6 x 8
2	1	0,50	Zinc or Galfan coated Ø 2,7 mm Ø 3,0 mm	Galfan and Plastic coated Øint 2,7 mm Øext 3,7 mm	Zinc or Galfan coated Ø 2,7 mm
3	1	0,50			
4	1	0,50			
1,5	1	1			
2	1	1			
3	1	1			
4	1	1			

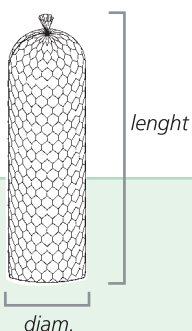
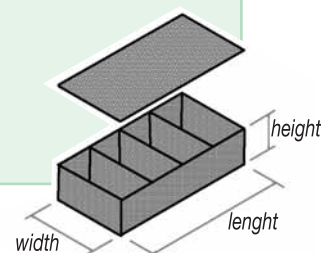
GABIONS WITH DIAPHRAGMS

Sizes				Mesh type		
Lenght (m)	Width (m)	Height (m)	Diaphragms (n)	8 x 10		6 x 8
2	1	0,50	1	Zinc or Galfan coated Ø 2,7 mm Ø 3,0 mm	Galfan and Plastic coated Øint 2,7 mm Øext 3,7 mm	Zinc or Galfan coated Ø 2,7 mm
3	1	0,50	2			
4	1	0,50	3			
2	1	1	1			
3	1	1	2			
4	1	1	3			



JUMBO GABIONS

Sizes				Mesh type	
Lenght (m)	Width (m)	Height (m)	Diaphragms (n)	8 x 10	
3	2	0,50	2	Zinc or Galfan coated Ø 2,7 mm Ø 3,0 mm	Galfan and Plastic coated Øint 2,7 mm Øext 3,7 mm
4	2	0,50	3		
5	2	0,50	4		
6	2	0,50	5		
3	2	1	2		
4	2	1	3		



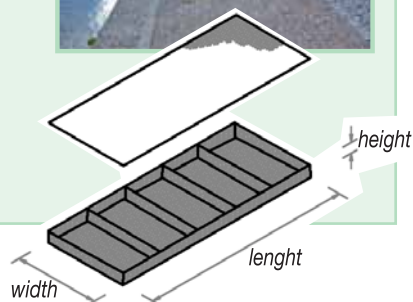
SACK GABIONS

Sizes			Mesh type	
Lenght (m)	Diameter (m)	Volume (m³)	8 x 10	
2	0,65	0,65	Zinc or Galfan coated Ø 2,7 mm Ø 3,0 mm	Galfan and Plastic coated Øint 2,7 mm Øext 3,7 mm
2	0,95	1,40		

Eco compatible Materials

RENO® MATTRESSES

Sizes		Mesh type		
Lenght (m)	Width (m)	6 x 8		
		Thickness (m)	Wire	
3	2	0,17 0,23 0,30	Zinc or Galfan coated Ø 2,2 mm	Galfan and Plastic coated Øint 2,2 mm Øext 3,2 mm
4	2			
5	2			
6	2			



Flexible bank protection with double twisted wire mesh mattresses having a large plan area/thickness ratio. The base, sides, ends and diaphragms, normally at one metre centres, are formed from a single panel of mesh. Bioengineering techniques are developed by combining suitable soil and plants with the fill.

STEELGRID® STEEL GEOCOMPOSITE

Type	Lenght (m)	Width (m)	Longitudinal rope spacing (m)	Transversal rope spacing (m)
STEELGRID - MO (300)	25.0 50.0	3.00	3,00	—
STEELGRID - MO (150)	25.0 50.0	3.00	1.50	—
STEELGRID - BO (150)	24.5 45.0	3.00	1.50	1.50
STEELGRID - BO (200)	25.0 44.5	3.00	1.50	2.00
STEELGRID - BO (300)	24.5 46.0	3.00	3.00	3.00



The **Steelgrid®** mesh is a woven geocomposite made by steel wire and ropes assembled together during hexagonal double twisted wire mesh production.

Rockfall protection netting made from double twisted wire normally used in combination with wire rope cable and steel anchors.



DOUBLE TWISTED NETTING ROLLS

Sizes		Mesh type			
Rolls Lenght (m)	Rolls Height (m)	8 x 10		6 x 8	
25	2 - 4	Zinc or Galfan coated Ø 2,7 mm Ø 3,0 mm	Galfan and Plastic coated Øint 2,7 mm Øext 3,7 mm	Zinc or Galfan coated Ø 2,2 mm Ø 2,7 mm	Galfan and Plastic coated Øint 2,2 mm Øext 3,2 mm
50					
100					

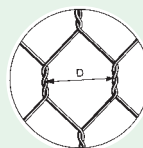
TOLERANCES

Type	Lenght	Width	Height
Gabions	± 5 %	± 5 %	± 5 %
Reno® mattresses	± 3 %	± 3 %	± 2,5 cm
Terramesh® Units	± 5 %	± 5 %	± 5 %
Sarmac® mattresses	0 +50%	0 +50%	± 2,5 cm
Double twist netting rolls	0 / + 1 %	± D	—
MacMat®	0 / + 1 %	± D	*
Road Mesh®	± 1 %	± D	—
Biomac®	± 1 %	± 5 %	—

*Not lower than the nominal thickness

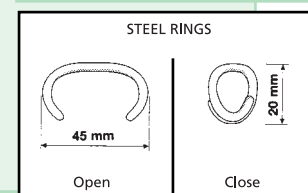
MESH SIZE

Mesh	D (mm)	Tolerances+
8 x 10	80	16 %
6 x 8	60	- 4 %

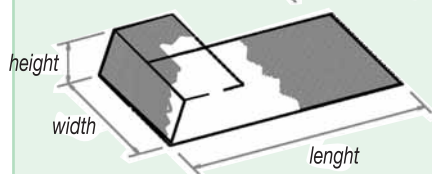
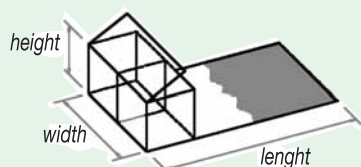


WIRE DIAMETER TOLLERANCES

Ø mm	2,0	2,2	2,4	2,7	3,0	3,4	3,9
± mm	0,05	0,06	0,06	0,06	0,07	0,07	0,07



Pneumatic closing tool and steel rings for lacing operation on double twisted wire mesh products. (Rings supplied in both zinc or Galfan coated and stainless steel type in boxes of 1600).



Reinforced soil structures with Terramesh® System made from double twisted wire mesh units with a stone or vegetated face.

TERRAMESH® SYSTEM Mesh size 8 x 10

Galfan and Plastic coated wire Ø int. 2,7 mm - Ø ext. 3,7 mm

Lenght (m)	Width (m)	Height (m)
3,00	3,00	0,80 - 1,00
4,00	3,00	0,80 - 1,00
5,00	3,00	0,80 - 1,00
6,00	3,00	0,80 - 1,00

GREEN TERRAMESH® - SOIL TYPE (*)

Galfan and Plastic coated wire Ø i. 2,7 mm - Ø e. 3,7 mm **Green**
Ø i. 2,2 mm - Ø e. 3,2 mm **Green Light**

Lenght (m)	Width (m)	Height (m)
3,00	3,00	0,58 - 0,73
4,00	3,00	0,58 - 0,73
5,00	3,00	0,58 - 0,73
6,00	3,00	0,58 - 0,73

(*) Standard inclination of front face 65°
Fine retention woven polyester fabric combined with a micro-nonwoven polypropylene

GREEN TERRAMESH® - WATER TYPE (**)

Galfan and Plastic coated wire Ø i. 2,7 mm - Ø e. 3,7 mm **Green**
Ø i. 2,2 mm - Ø e. 3,2 mm **Green Light**

Lenght (m)	Width (m)	Height (m)
3,00	3,00	0,57 (45°) - 0,73 (65°)
4,00	3,00	0,57 (45°) - 0,73 (65°)
5,00	3,00	0,57 (45°) - 0,73 (65°)
6,00	3,00	0,57 (45°) - 0,73 (65°)

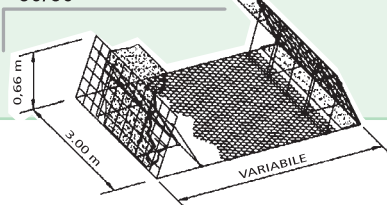
(**) Standard inclination of front face 45° and 65°
Fine retention by polypropylene Geomat

DUNA SYSTEM® Bifacial inclined Mesh size 8 x 10

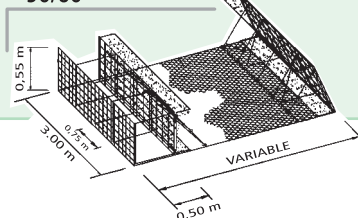
Plastic coated wire Ø i. 2,2 mm - Ø e. 3,2 mm

Type	Height (m)	Base (m)
60/60	3,30	4,76
90/60	3,30	3,53

60/60



90/60



Reinforced structures for safety and /or noise barriers with Duna System®



Flexible pavement reinforcement made from double twisted wire mesh incorporating transverse steel reinforcing rods (Road-Mesh® type).

ROAD MESH®

Type	Mesh type	Wire diameter		Lenght (m)	Height (m)
		Wire (mm)	Transversal reinforcement (mm)		
L	8 X 10	2,4	4,4	25	2-4
LB	8 X 10	2,4	4,9	25	2-4

Ecocompatible Materials

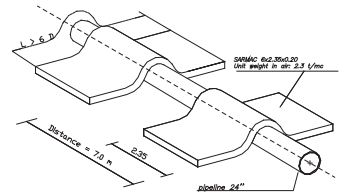
SARMAC® MATTRESSES

Type	Standard Sizes (*)					Weight (**)		Lift loops (n)
	Lenght (m)	Width (m)	Thickness (m)	Surface area (m²)	Volume (m³)	In air (t)	In water (t)	
Base and Easy	4	2,35	0,20	9,40	1,88	4,3	2,4	6
	5	2,35	0,20	11,75	2,35	5,4	3,0	6
	6	2,35	0,20	14,10	2,62	6,5	3,6	8
	4	2,35	0,25	9,40	2,35	5,4	3,0	6
	5	2,35	0,25	11,75	2,94	6,7	3,8	6
	6	2,35	0,25	14,10	3,52	8,1	4,5	8
	4	2,35	0,30	9,40	2,82	6,5	3,6	6
	5	2,35	0,30	11,75	3,52	8,1	4,5	6
Light	6	2,35	0,30	14,10	4,23	9,7	5,5	8
	4	2,35	0,12	9,40	1,13	2,6	1,4	6 (***)
	5	2,35	0,12	11,75	1,41	3,2	1,8	8 (***)
	6	2,35	0,12	14,10	1,69	3,9	2,2	18 (***)

(*) Double layer units which come in different dimensions are available upon inquiry
 (**) The weight of each unit has been calculated assuming a specific weight equal to 2.3 t/m³
 (***) For easier lifting operations the mattresses can be provided with lateral loops



Submarine pipeline stabilisation and protection with a bituminous mattress Sarmac externally coated with a geotextile.



WIRAND® - STEEL WIRE FIBRES DRAWN WIRE

Standard size

	Diameter Ø (mm)	Lenght (mm)	Aspect ratio
WIRAND FF3	0,75	50	67
WIRAND FF1	1,00	50	50
WIRAND FF3Z*	0,75	50	67
WIRAND FF1Z*	1,00	50	50
WIRAND FS1	0,55	37	67
WIRAND FS7	0,55	33	60
WIRAND FS4N	0,60	33	55
WIRAND FS9	0,75	37	49
WIRAND FS3N	0,75	33	44

* Zinc coated fibres



Rigid concrete pavement and tunnel reinforcement with steel wire fibres.

MACMAT® - GEOMATS

Type	Polymer	Thickness (mm)	Reinforcement	Longitudinal strenght (kN / m)	Lenght (m)	Width (m)
R1 6822GN*	PP	12	double twisted wire mesh	35	25,00	2,00
R1 8127GN**		12		43		
R1 6822G0**		12		35		
R1 8127G0**		12		43		
R1 080		12-16	Coated polyester woven geogrid	80	25,00	2,00-4,30
R1 110		12-17		110		
R1 150		12-16		150		
R1 200		12-16		200		

* with wire mesh type 6x8 Ø 2,2 mm
 ** with wire mesh type 8x10 Ø 2,7 mm

• Double twisted wire mesh plastic coated

more grades and types available on request

CELLULOSE FIBRES

Standard Size

	Diameter Ø (micron)	Lenght (mm)
ULTRA FIBER 500	16	2,1

FIBROMAC® POLYPROPYLENE FIBRES

Standard Size

	Diameter Ø (micron)	Lenght (mm)
FIBROMAC® FR	18	6
FIBROMAC® 12	32	12
FIBROMAC® 18	32	18

BIOMAC® - BIOMATS

Fibres type	Lenght (m)	Height (m)
Biomac® SS	25,00	2,00
Biomac® SC		
Biomac® CC		

Rolls in varying mixtures of fully biodegradables fibres of coir and biionets are available on request.



Erosion control and re-vegetation blankets in natural fibres.



Slope and bank protection with geomats with geomats (Macmat® type) eventually reinforced during production with double twisted wire mesh or geogrids.



Filtration, separation, drainage and consolidation of earthworks using non-woven and woven Terram® geotextiles.

TERRAM® - THERMALLY BONDED NON WOVENS

Polymers: polypropylene (PP) / Polyethylene (PE)

Type	500	700	1000	1500	2000	3000	4000	4500
Tensile strength (kN/m)	3	6	8	12,5	14,5	18	22	29
Elongation (%)	35	25	28	30	30	33	33	33
CBR puncture resistance (N)	525	1050	1500	2250	2750	3250	4300	5000
Trapezoidal tear resistance (N)	175	225	300	475	575	700	900	1000
Pore size AOS O ₉₀ (µm)	300	180	150	125	110	100	85	75
Permeability 5 cm head (l/sqm/sec)	150	130	100	75	65	55	45	20
Mass per unit area (gr/m ²)	65	90	125	180	215	260	335	400
Roll width (m)	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5
Roll lenght (m)	200	150	100	100	100	100	50	50
Roll weight (kg)	65	66	65	90	105	125	95	95

intermediate grades and types available on request

Filtration, drainage of subsoil water or landfill leachates, with MacDrain® geocomposites



MACTEX W1 WOVEN GEOTEXTILES

Type	2S	3S	4S	5S	6S	8S	10S
Polymer Polypropylene (PP)							
Tensile strength (kN/m)							
- lenght direction	27	31	43	48	63	83	108
- cross direction	28	33	42	50	61	81	104
Elongation (%)							
- lenght direction	13	16	17	18	17	18	20
- cross direction	12	9	10	9	10	10	10
CBR puncture resistance (kN)	3,0	3,5	5,0	5,0	8,0	10,0	10,5
Cone drop test (mm)	14	11	12	10	10	7,5	1,1
Pore size AOS O ₉₀ (µm)	220	270	230	240	230	175	205
Permeability (Normal to plane) (m/sec)	0.015	0.016	0.021	0.018	0.014	0.022	0.033
Roll width (m)	from 4,0 to 5,3						
Roll lenght (m)	200	200	200	200	200	200	200

more grades and types available on request

MACDRAIN® - DRAINAGE GEOCOMPOSITES

Structure		High density Polyethylene										
Construction core		100 % Polyolefine (PE and/or PP)										
Filter non wovens												
Filtering geotextile		2	2	2	2	2	1	1	1	1	1	1
Film extruded sheet									Polyethylene			
Type "N"		1451	1051	1551	1651	1081	1450	1550	1080	145M	155M	165M
Water flow (l/m x sec) hidraulic gradient = 1	20 KPa	0,60	0,70	1,15	1,60	1,90	1,25	1,60	2,10	0,60	1,15	1,60
	100 KPa	0,45	0,66	0,75	1,35	1,85	0,90	1,25	1,95	0,43	0,90	1,35
	200 KPa	0,35	0,47	0,70	1,20	1,80	0,80	1,10	1,90	0,35	0,74	1,20
Filter pore size AOS O ₉₀ (mm)		0,09	0,15	0,09	0,09	0,15	0,09	0,09	0,15	0,09	0,09	0,09
Filter permeability - 10 cm head (l/m ² sec)		100										
Geocomposite mass unit area (gr/m ²)		700	770	850	1050	1500	600	750	1350	800	950	1150
Geocomposites thickness (mm)		4,7	5,0	5,7	6,5	8	4,5	5,5	8	4,7	5,7	6,5
Roll width (m)		2 - 4										
Roll legth (m)		25 / 50 / 100										

more grades and types available on request

Eco compatible Materials

MACGRID® - WOVEN GEOGRIDS

Polymer	High tenacity polyester yarns core with a protective polymeric coating								
Type	WG3	WG3S	WG4	WG5	WG5S	WG6	WG8	WG11	WG20
Tensile strenght (kN/m)									
- lenght direction	40	40	45	60	60	70	90	130	200
- cross direction	25	40	25	35	60	35	35	35	20
Tolerance	-5	-5	-5	-5	-5	-5	-10	-20	-20
	-5	-5	-5	-15	-5	-15	-15	-15	-15
Elongation (%)									
- lenght direction	10	10	10	10	10	10	10	10	10
- cross direction	12	12	12	12	12	12	12	12	12
Mesh size (mm)	20x20 - 25x25 - 35x35								
Roll width (m)	from 3,60 to 5,30								
Roll lenght (m)	100	100	100	100	100	100	100	100	100

more grades and types available on request



Soil reinforcement and consolidation using woven geogrids made with high tenacity polyester encased (MACGRID WG®).



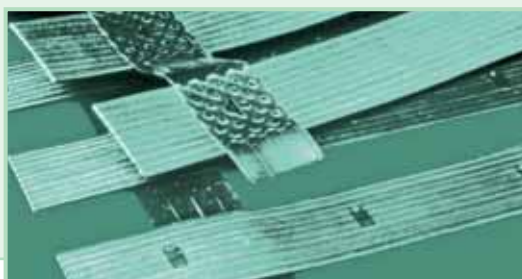
Soil reinforcement and consolidation with strip bonded geogrids in polyester fibers coated in polietilene (Paragrid® and Paralink®).

PARAGRID® - STRIP BONDED GEOGRIDS

Polimer	Polyester filament fibre with polyethylene sheath							
Type	30/05	40/05	50/05	60/05	65/05	70/05	80/05	90/05
Tensile strenght (kN/m)								
- lenght direction	30	40	50	60	65	70	80	90
- cross direction	5	5	5	5	5	5	5	5
Elongation (%)	12	12	12	12	12	12	12	12
Roll width (m)	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9
Roll lenght (m)	100	100	100	90	90	90	80	50
Roll weight (kg)	73	76	79	83	86	89	93	98
Type	100/05	110/05	125/05	150/05	175/05	180/05	200/05	
Tensile strenght (kN/m)								
- lenght direction	100	110	125	150	175	180	200	
- cross direction	5	5	5	5	5	5	5	
Elongation (%)	12	12	12	12	12	12	12	
Roll width (m)	3,9	3,9	3,9	3,9	3,9	3,9	3,9	
Roll lenght (m)	80	50	50	50	50	50	50	
Roll weight (kg)	103	110	116	130	143	146	156	

PARALINK® BONDED GRIDS

Construction	Polyester filament fibre with polyethylene sheath												
Type	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1350
Tensile strenght (kN/m) - longitudinal	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1350
Elongation (%)	12	12	12	12	12	12	12	12	12	12	12	12	12
Roll width (m)	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5
Roll lenght (m)	200	200	150	130	100	50	50	50	50	50	50	50	50
Roll weight (kg)	330	410	510	630	770	470	530	590	650	710	760	860	890





Macline® Geosynthetic clay liner
(with natural sodium bentonite) for
waterproofing of landfills, channel linings
and basins.

MACLINE® GCL - GEOSYNTHETIC CLAY LINERS

Type	Mass per unit area (gr/m ²)	Dry thickness at 2Kpa (mm)	Permeability (m/sec)	Suggest max angle	Lenght (m)	Width (m)
N10	4500	5,5-6	5 x 10 ⁻¹¹	50°	44	4,50
N20	5100	6-7	5 x 10 ⁻¹¹	50°	44	4,50
NL10	4600	5,5-6	5 x 10 ⁻¹³	50°	44	4,50
NL20	5200	6-7	5 x 10 ⁻¹³	50°	44	4,50

more grades and types available on request

MACLINE® - SYNTHETIC HDPE GEOMEMBRANE

Type surficial aspect	SDH smooth/smooth				RMH/RDH smooth/rough rough/rough		
Density (g/cm ³)	> 0,94	> 0,94	> 0,94	> 0,94	> 0,94	> 0,94	> 0,94
Thickness (mm)	1	1,5	2	2,5	1,5	2	2,5
Tensile strength at yeld (MPa)	17	17	17	17	17	17	17
Elongation at yeld (%)	> 9	> 9	> 9	> 9	> 9	> 9	> 9
Tensile strength at break (MPa)	27	27	27	27	27	27	27
Elongation at break (%)	> 700	> 700	> 700	> 700	> 700	> 700	> 700
Tear strength resistance (N)	133	200	267	334	200	267	334
Carbon black content	2-3	2-3	2-3	2-3	2-3	2-3	2-3
Rolls width (m)	from 5,10 to 11,60						
Rolls length (m)	Variable according to the lengh						

more grades and types available on request

Bureau Veritas Certified Quality System Company with
SINCERT's and UKAS's accreditation



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