MACCAFERRI

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Engineering a Better Solution

Maccaferri's motto is **'Engineering a Better Solution'**; We do not merely supply products, but work in partnership with our clients, offering technical expertise to deliver versatile, cost effective and environmentally sound solutions. We aim to build mutually beneficial relationships with clients through the quality of our service and solutions.

Disclaimer:
For the optimisation and improvement of the technical characteristics of the products, the producer reserves the right to modify standards, characteristics and manufacturing of products without notice. The information contained herein is to the best of our knowledge accurate, but since the circumstances and conditions in which it may be used are beyond our control, we cannot accept liability for any loss or damage however arising which results directly or indirectly from the use of such information nor do we offer any warranty or immunity against patent infringement, Specifiers are requested to check the validity of the specification they are using.
Technical Data Sheets, Installation Guides and more are available at **www.maccaferri.com/uk/documents**. Registration is required and is free of charge.

- RETAINING WALLS & SOIL REINFORCEMENT
- HYDRAULIC WORKS
- ROCKFALL PROTECTION & SNOW BARRIERS
- EROSION CONTROL
- SOIL STABILISATION & PAVEMENTS
- BASAL REINFORCEMENT
- COASTAL PROTECTION, MARINE STRUCTURES & PIPELINE PROTECTION
- DRAINAGE OF STRUCTURES
- SAFETY & NOISE BARRIERS
- LANDSCAPE & ARCHITECTURE
- FENCING & WIRE
- AQUACULTURE NETS/CAGES
- ENVIRONMENT, DEWATERING & LANDFILLS

This brochure may contain products and specifications that may not be available in every market. Please contact your local Maccaferri subsidiary to confirm the range and specifications available in your country. Maccaferri reserves the right to change product specifications without notice.

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MACCAFERRI

PRODUCT GUIDE

MACCAFERRI PRODUCT GUIDE
AN INTRODUCTION

140 years ago we invented the modern gabion and dramatically changed the landscape of civil engineering.

Since these humble beginnings we have diversified significantly.

Today, from more than 20 factories around the world we supply construction materials that retain, protect, reinforce, separate, filter and drain soils.

We do not simply sell products: we strive to be a leading technical reference in the design and supply of solutions to overcome the geotechnical problems facing our clients.

CONTENTS - PRODUCTS

We manufacture and supply high quality durable materials which:

- Enhance the service life of the works
- Reduce environmental impact
- Provide client reassurance

Many of our products are certified by international or local accreditation bodies.

Our engineers, technicians and account managers are available to answer your questions and provide technical support; it is our expertise that differentiates us.

This guide provides a short introduction to the range of Maccaferri products. It includes only a proportion of the full range we offer, so if something seems to be missing, just call!

Detailed technical information, brochures, case histories and more are available from our website **maccaferri.com/uk.**

GABION - WOVEN MESH

With 30 factories worldwide, we are the global leader in gabions. 'Double twist' woven mesh gabions are used for engineering applications where you need high strength with flexibility.

Uses

- Engineered mass gravity retaining walls
- Erosion protection in rivers
- Culverts, portals and wing walls
- Noise bunds

Benefits

- BBA HAPAS Certified up to 120 year life
- UKCA marked
- Accords with EN 10244-2, EN 10223-3 and EN 10218
- Flexible - accepts differential settlement
- Free draining & can accommodate vegetation
- GalMac® Al/Zn galvanised (Class A to EN 10244-2)
- PoliMac® coated mesh for high abrasion and corrosion resistance

Size (m)	Length (m)	Width (m)	Height (m)	No. of cells	Vol of stone (m^3)	Tonnes of stone**
1x1x1	1	1	1	1	1	1.7
1.5x1x1	1.5	1	1	1	1.5	2.6
2x1x1	2	1	1	2	2	3.4
2x1x0.5	2	1	0.5	2	1	1.7
2x0.5x0.5	2	0.5	0.5	2	0.5	0.9
3x1x1	3*	1	1	3	3	5.1
4x1x1	4*	1	1	4	4	6.8

* = Special order. Other sizes available on request
** = Based on 1.7t/m^3 density of stone fill
Tolerance exists on properties

Mesh Type	Length (m)
8x10 - GalMac® coated	2.7mm
8x10 - GalMac® + Polymer coated	3.7mm o/a
Lacing wire (GalMac®/GalMac® + Polymer)	2.2mm/3.2mm

GABION - WELDED MESH

Welded gabions are becoming increasingly fashionable in architecture and landscaping applications. They are available in a variety of wire diameters to suit the required aesthetics.

Uses

- Architectural cladding to walls and buildings
- Landscaping works
- Low-height retaining walls
- Not recommended for rivers / watercourses
- Free standing walls

Benefits

- CE marked
- Accords with EN 10244-2, EN 10223-8 and EN 10218
- GalMac® Al/Zn galvanised (Class A to EN 10244-2)
- Free draining & can accommodate vegetation

Size (m)	Length (m)	Width (m)	Height (m)	No. of cells	Vol. of stone (m^3)	Tonnes of stone**
1x1x1	0.975	0.975	0.975	1	0.93	1.6
1.5x1x1	1.5	0.975	0.975	1	1.43	2.4
2x1x1	1.95	0.975	0.975	2	1.85	3.2
2x1x0.5	1.95	0.975	0.45	2	0.86	1.5

Other sizes available on request, including 4mm face/3mm body units
** = Based on 1.7t/m^3 density of stone fill
Tolerance exists on properties

Mesh Type	Wire diameter
75mmx75mm GalMac® coated	3mm/4mm/5mm
Lacing wire (GalMac®)	2.2mm

A modular gabion-faced soil reinforcement system. Assembled with a gabion fascia unit and an integral factory-fitted soil reinforcement geogrid. It has been used on the tallest reinforced soil structures in the world.

Uses

- Soil reinforcement slopes and walls with gabion wall appearance
- Highway/railway retention
- Acoustic, safety and rockfall protection bunds
- River walls

Benefits

- BBA HAPAS Certified - up to 120 year life
- Flexible - accepts differential settlement
- GalMac® Al/Zn and polymer coated
- Easy to construct and often used in conjunction with our geogrids
- Face angle up to vertical (depending on design)
- Pre-fitted components reduce installation time and cost compared to other systems

Size (m)	Tail length (inc. face)	Width (m)	Height (m)	No. of cells	Vol of stone (m^3)	Tonnes of stone**
4x2x1	4*	2	1	2	2	3.4
4x2x0.5	4*	2	0.5	2	1	1.7
4x2x0.8	4*	2	0.8	2	1.28	2.2

* = Other tail lengths available to special order
** = Based on 1.7t/m^3 density of stone fill
Tolerance exists on properties

Mesh Type	Wire diameter
8x10 - GalMac® + Polymer coated	3.7mm o/a
Lacing wire (GalMac® + Polymer)	3.2mm o/a

A soil reinforcement system with a 'green' revegetating face. The units feature a factory-fitted "lost-shutter" system, which supports the face at the designated angle without the need for any external formwork.

Uses

- Soil reinforcement slopes with a 70° vegetated 'green' face
- Highway/railway retention
- Acoustic, safety and rockfall protection bunds

Benefits

- BBA HAPAS Certified - up to120 year life
- Flexible - accepts differential settlement
- GalMac® Al/Zn and polymer coated
- Easy to construct and used in conjunction with our geogrids
- Pre-fitted components (shutter system, geomats, support brackets) reduce installation time and cost compared to other systems
- Carbon savings vs traditional retaining solutions

Size (m)	Tail length (inc. face)	Width (m)	Height (m)	Face angle (Deg°)
3x3x0.76 70°	3*	3*	0.76	70°

* = Other tail lengths, face angles and face widths are available to order
Tolerance exists on properties

Mesh Type	Wire diameter
8x10 - GalMac® + Polymer coated	3.2mm o/a
Lacing wire (GalMac® + Polymer)	3.2mm o/a

MINERAL TERRAMESH®

Mineral Terramesh® is a unique and simple to install soil reinforcement system with a sloping rock face finish. It is ideal for use where a modern, clean-faced aesthetic is preferred. Ideal for when level changes on sites need retaining.

Uses

- Soil reinforcement slopes with a steep face minimises land-loss
- Highway/railway retention
- Reduced carbon foot-print vs traditional solutions

Benefits

- BBA HAPAS Certified - 120 year design life
- Flexible - accept differential settlement
- Rapid assembly vs other systems - preassembled unit with components already factory-fitted
- Simple installation - no bodkins or connections needed between geogrids and fascia
- No external formwork needed - welded pane land bracing struts hold face at correct angle

Size (m)	Tail length (inc. face)	Width (m)	Height (m)	Face Angle (Deg °)
3x3	3*, 4, 5, 6	3	0.65	87°+
			0.64	80°+
			0.76	70° *
			0.73	65°+

Tolerance exists on properties
* = Standard product in UK & IRE
+= Special order only - requires good installation experience

Mesh Type	Wire diameter
8x10 - GalMac® + Polymer coated	3.2mm o/a
Lacing wire (GalMac® + Polymer)	3.2mm o/a

EPD kiwa

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 16/H247

RENO MATTRESS® PLUS

Reno Mattress® Plus is a next-gen, high-performance erosion protection for rivers, streams, and channels. Its thinner units reduce carbon footprint, installation time, and cost compared to traditional mattresses or rip-rap.

Uses

- Preventing river bank erosion
- Anti-scour around bridges/piers/abutments
- Estuary and dam protection
- Flood protection works
- Dock and harbour anti-scour protection

Benefits

- BBA Certified and UKCA marked
- Flexible - accepts differential settlement
- GalMac® Al/Zn and PoliMac® coated mesh for high abrasion and corrosion resistance
- Cost and carbon savings vs rip-rap
- Does not rely on vegetation for long-term performance unlike geomats
- Can accomondate vegetation for a greener solution

Size (m)	Mesh type	Length (m)	Width (m)	Height (m)	No. of cells	Vol of stone (m^3)	Tonnes of stone**
3x2x0.17	6x8	3	2	0.17	3	1.02	1.73
6x2x0.17	6x8	6	2	0.17	6	2.04	3.47
3x2x0.23	6x8	3	2	0.23	3	1.38	2.35
6x2x0.23	6x8	6	2	0.23	6	2.76	4.7
3x2x0.3	6x8	3	2	0.3	3	1.8	3.06
6x2x0.3	6x8	6	2	0.3	6	3.6	6.12
3x2x0.5	8x10	3	2	0.5	3	3	5.1
6x2x0.5	8x10	6	2	0.5	6	6	10.2

** = Based on 1.7t/m^3 density of stone fill
Tolerance exists on properties

Mesh Type	Wire diameter
6x8 - GalMac® + Polymer coated	3.2mm o/a
8x10 - GalMac® + Polymer coated	3.7mm o/a
Lacing wire (GalMac® + Polymer)	3.2mm o/a

EPD kiwa

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 95/3141

CubiMac and RenoMac are gabions and Reno Mattress Plus units, pre-filled with rocks and craned into place using integral lifting details. Designed for easy installation, they are filled in the dry before being lifted into the works.

Uses

- When in-situ filling of gabions and Reno Mattresses is not possible
- Limited or restricted access sites
- Time-limited construction - railway / highway night possession
- Can be placed directly into water - no coffer-dam needed

Benefits

- BBA Certified and UKCA marked
- Flexible - accepts differential settlement
- GalMac® Al/Zn + PoliMac coated mesh for high abrasion and corrosion resistance
- RenoMac has an integral skirt and geotextile ready for placement into watercourses

Product	CubiMac*	RenoMac Plus
Available sizes (m)	1 x 1 x 0.5	6 x 2 x 0.17 / 0.23 / 0.30
	1.5 x 1 x 0.5	
	2 x 1 x 0.5	5 x 2 x 0.17 / 0.23 / 0.30
	1 x 1 x1	
	1.5 x 1 x 1	4 x 2 x 0.17 / 0.23 / 0.30
	2 x 1 x 1	
Mesh Type	8x10 Mesh 4.4mm o/a dia.	6x8 Mesh 3.2mm o/a dia.

* GalMac Zn/Al galvanised 3.9mm o/a dia. wire mesh CubiRoc gabion units available to special order
Tolerance exists on properties

Durable mesh prevents burrowing animals from damaging embankments, earthworks, and dykes. Supplied in rolls for quick installation, it is pinned to slopes for protection of geotechnical assets.

Uses

- Available with optional 3D geomat to prevent soil loss and rapidly re-establish vegetation
- Used on railway embankments and cuttings to prevent establishment of animal burrows which can facilitate water ingress and geotechitcal instability

Benefits

- Independent studies show RenoMesh prevents burrowing unlike polymer geogrids which can be gnawed through
- Mesh is BBA Certified and has Environmental Product Declaration
- Double Twish mesh construction does not unravel like single twist / chain link meshes
- Easy to install

Product*	RenoMesh
Tensile strength (kN/m)	37
Nominal Punching (kN)	43
Roll length (m)	25
Roll width (m)	4
Roll weight (kg)	140 approx.

* = Intermediate strengths available to special order
Tolerance exists on properties

ROAD MESH™

Road Mesh™ reinforces asphalt roads and overlays and extends the fatigue life. Installed within the upper-bound layers of the asphalt, it structurally reinforces the pavement, reducing rutting, shoving and reflective cracking.

Uses

- Reduces rutting, pot-holes and shoving in asphalt roads and runways
- Structural reinforcement of asphalt layers
- Limits reflective cracking in overlays
- New-build and resurfacing works
- Reinforces surfacing in high load zones; junctions, crawler lanes etc.

Benefits

- Steel wire mesh with transverse bars provides tensile strength at low strain
- Excellent aggregate interlock to optimise load transfer and shear resistance
- Increases fatigue life of the whole pavement, not just the surfacing
- GalMac® Al/Zn galvanised (Class A to EN 10244-2)

Product	Roll length (m)	Roll width (m)
Type LB2G Omega	25 or 50	2,3 or 4
Type LBG Omega	25 or 50	2,3 or 4

Tolerance exists on properties

Product	Mesh type	Mesh wire dia (mm)	Transverse rod dia (mm)	UTS (kN/m) Long./Transv.
Type LB2G Omega	8x10	2.2	3.9	32/32
Type LBG Omega	8x10	2.4	4.9	40/50

Tolerance exists on properties

MACTEX® C7

MacTex® C7 is used in asphalt pavements. It provides reinforcement, stress relief and a moisture barrier between the overlay and existing pavement.

Uses

- Highways, airports, industrial roads
- Highly trafficked areas and/or high axle loads
- In conjuction with overlays to reduce reflective cracking

Benefits

- Extends fatigue life; reduces carbon carbon footprint, maintenance and whole life cost
- Can reduce road construction thickness
- Prevents surface water ingress into road structure
- Reduces differential settlement and rutting
- Geocomposite of high strength glass-fibre geogrid with a textile to absorb the bitumen bond-coat

Product	5S	10S
Tensile strength - Longitudinal (kN/m)	55	110
Strain at Tch - MD (%)	3.0 (±0.5)	3.0 (±0.5)
Tensile strength, Tch - CMD (kN/m)	50	100
Strain at Tch - CMD (%)	3.0 (±0.5)	2.5 (±0.5)
Mass/unit area (g/m²)	380	600
Mesh aperture (mm)+	25x25	25x25
Roll length (m)	100	100
Roll width (m)	5.10	5.10

Tolerance exists on properties

MacTex C7 is known as a "SAMI", A Stress Absorbing Membrane Interlayer

MACTEX® H

MacTex® H is a non-woven geotextile, manufactured from needle punched and thermocalendared polypropylene filaments. It is a good quality general purpose geotextile, ideal for use in many construction applications.

Uses

- Separation of good quality soils from poor quality materials
- Filtration layer beneath rip-rap or Reno Mattresses within water/channelling works
- Used in conjunction with geogrids, on site haul-roads and access tracks

Benefits

- Good puncture resistance
- Long design life
- CE marked

Product*	500	1000	1500	2000	H2800	H3500	4000
Tensile strength - Longitudinal (kN/m)	5	8	13.5	16.5	21	24	26
Tensile strength - Transverse (kN/m)	7	9	13.5	16.5	21	24	26
CBR static puncture resistance (N)	1100	1500	2200	2750	3400	3900	4400
Permeability normal to plane (l/(m² sec))	115	110	80	70	55	50	40
Mass per unit (g/m²)	90	110	170	210	270	300	330
Dynamic puncture resistance (mm)	35	35	25	19	13	12	11
Roll sizes	4.5x100	4.5x100	5.85x100	5.85x100	2x100	2x100	5.85x100
	5.85x100	5.85 x 100			5.85x100	5.85x100	
Roll weight (kg)	42	50	102	125	144	60	195
	55	69			159	178	
Roll diameter (m)	0.28	0.3	0.37	0.38	0.44	0.46	0.48

* Intermediate grades available to order
Tolerance exists on properties

MACTEX® W1

A woven geotextile manufactured from weaving UV stabilised polypropylene yarns to provide a bi-directional geotextile for simultaneous soil stabilisation and separation functions.

Uses

- Road base (subgrade) stabilisation
- Access over soft/wet ground
- Haul roads within mines, wind farms, agriculture, forestry and military
- Working platforms for piling rigs and cranes

Benefits

- Reduces the thickness of granular materials needed for the same fatigue life
- Reduced differential settlement and rutting vs un-stabilised road
- Reduced rutting and maintenance of tracks
- CE marked

Product*	5S	6S	8S
NTS - Longitudinal (kN/m)	≥50	60	80
Typical strain @ NTS - Longitudinal (%)	≤11%	11%	11%
Tensile strength @ 5% strain - Longitudinal (kN/m)	27	31	39
NTS - Transverse (kN/m)	≥50	60	80
Typical strain @ NTS - Transverse (%)	≤8%	8%	9%
Tensile strength @ 5% strain - Transverse (kN/m)	38	45	53
CBR static puncture resistance (kN)	6	8	12
Mass/unit area (g/m²)	250	290	400
Roll length (m)	100m		
Roll width (m)	5.2m		
Roll weight (kg)	135	155	215

NTS: Nominal tensile strength
* Other strengths available to special order
Tolerance exists on properties

MACTEX® W2

A woven geotextile manufactured from weaving high tenacity polyester yarns to provide a geotextile for simultaneous soil stabilisation and separation functions. It offers short term soil reinforcement functionality.

Uses

- Embankment basal reinforcement
- Soft ground stabilisation where a high strength, low strain geotextile is needed
- Void spanning over old mine workings or natural voids

Benefits

- CE marked
- Short to medium term applications

Product*	10	20	30	40	60	10S	12S	20S
Tensile strength - Longit. (kN/m)	110	220	330	440	660	110	130	220
Strain @ max load - Longit.	10%	10%	11%	12%	11%	10%	10%	10%
Tensile strength - Transv. (kN/m)	55	55	55	55	55	110	130	220
Strain @ max load - Transv.	10%	10%	11%	11%	10%	9%	10%	10%
Roll length (m)	100	100	100	100	50	100	100	100
Roll width (m)	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Roll weight (kg)	150	234	306	385	575	210	260	365

* Intermediate strengths available to special order up to 1350 kN/m
Tolerance exists on properties

PARALINK®

ParaLink® is a unique high performance geogrid for embankment stabilisation and ground improvement. It consists of high tenacity polyester fibres, protected within a tough polyethylene coating.

Uses

- Embankment basal reinforcement
- Piled embankments (reduces pile requirements)
- Void spanning; old mine workings or natural voids
- Tall 'mega-structure' soil reinforcement in conjunction with Terramesh®/Green Terramesh®

Benefits

- BBA Certified (up to120 year life)
- UKCA marked
- Superior long-term design strength
- (LTDS) vs other geogrids and geotextiles
- Made in Britain; lower freight carbon foot-print
- Can accommodate high-pH fills (>9) – ideal for lime/cement treated fills

Product*	400	600	800	1000	1200	1600
UTS - Longitudinal (kN/m)	412	612	826	1038	1236	1648
Nominal strain @Tch	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%
Roll length (m)	150	100	50	50	50	50
Roll width (m)	4.5	4.5	4.5	4.5	4.5	4.5
Roll diameter (kg)	0.75	0.7	0.5	0.5	0.5	0.55
Roll weight (kg)	750	750	550	660	790	980

* = Intermediate strengths available to special order
Tolerance exists on properties

ParaGrid® is a versatile, high quality geogrid for soil reinforcement and stabilisation works. It consists of high tenacity polyester fibres, protected within a tough polyethylene coating.

Uses

- Engineered retaining walls
- Reinforced soil slopes
- Wrapped face structures, or can be used in conjunction with our Terramesh® and Green Terramesh® soil reinforcement systems

Benefits

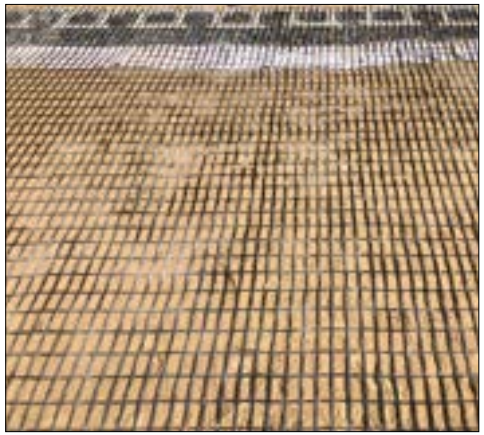
- BBA HAPAS Certified (Up to120 year life)
- UKCA marked
- Superior long-term design strength (LTDS) vs other geogrids
- Can accommodate high-pH fills (>9) – ideal for lime/cement treated fills
- Made in Britain; lower freight carbon foot-print
- Can accommodate high-pH fills (>9) – ideal for lime/cement treated fills

Product*	50/05	80/05	100/05	120/05	150/05	200/05
UTS - Longitudinal (kN/m)	57	86	106	125	160	212
UTS - Transverse (kN/m)	6	6	6	6	6	6
Nominal strain @Tch	9%	9%	9%	9%	9%	9%
Roll length (m)	100	80	80	50	50	50
Roll width (m)	3.9	3.9	3.9	3.9	3.9	3.9
Roll diameter (m)	0.41	0.45	0.45	0.34	0.36	0.40
Roll weight (kg)	105	108	140	99	211	147

* = Intermediate strengths available to special order
Tolerance exists on properties

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 16/H249

A high-performance woven geogrid for soil reinforcement and stabilisation works. It consists of high tenacity polyester fibres protected by a polymer sheathing.



Uses

- Engineered retaining walls
- Reinforced soil slopes
- Wrapped face structures, or can be used in conjunction with our Terramesh® family soil reinforcement systems

Benefits

- BBA HAPAS Certified (Up to120 year life)
- Favourable partial factors of safety in design = efficient structures
- UKCA marked

Product*	350	550	900	1150	1400	2000
UTS - Longitudinal (kN/m)	30	50	80	100	120	175
UTS - Transverse (kN/m)	20					
Nominal strain @Tch	7%	7%	7%	7.5%	7.5%	8%
Roll length (m)	100					
Roll width (m)	5.20					

* = Intermediate strengths available to special order
Tolerance exists on properties

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 23/H7046

MACGRID® EG

MacGrid® EG geogrids are used for soil stabilisation within highway, railway and access track construction. Made from punched and extruded polypropylene, MacGrid® EG is used in the granular construction layers.

Uses

- Road base (subgrade) stabilisation
- Access over soft/wet ground
- Rail track bed stabilisation
- Haul roads within mines, wind farms, agriculture, forestry and military sites

Benefits

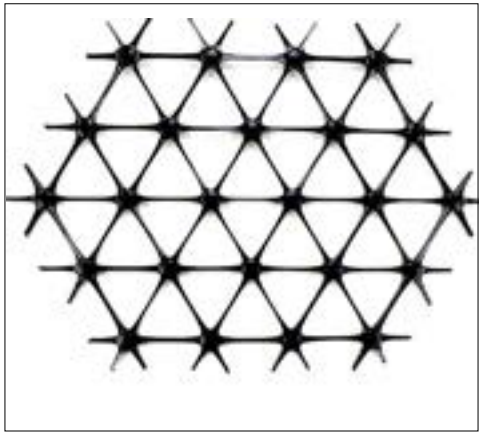
- Reduces the thickness of granular materials needed for the same fatigue life
- Lower carbon footprint as less quarried materials are imported
- Reduced differential settlement and rutting vs un-stabilised roads
- Reduced rutting and maintenance of tracks
- Increased fatigue life of tracks

Product	20 S	30 S	40 S
MATS - Longitudinal (kN/m)	20	30	40
Typical strain @ MATS - Longitudinal (%)	13%	13%	13%
Tensile strength @ 5% strain - Longit. (kN/m)	14	21	28
MATS - Transverse (kN/m)	20	30	40
Typical strain @ MATS - Transverse (%)	10%	10%	10%
Tensile strength @ 5% strain - Transverse (kN/m)	14	21	28
Mesh aperture (mm)*	38x38mm		
Roll length (m)	50m		
Roll width (m)	3.95m		
Roll weight (kg)	48	68	95

MATS: Minimum Average Tensile Strength
* Larger apertures (e.g. for railway ballast stabilisation) available to special order
Tolerance exists on properties

MACGRID® EG-T

MacGrid® EG-T geogrids stabilize soil in highway, railway, and access track construction, reducing granular layer thickness, cutting carbon footprint, and extending road life.



Uses

- Road base (subgrade) stabilisation
- Access over soft/wet ground
- Working platforms
- Rail track bed stabilisation
- Haul roads within mines, wind farms, agriculture, forestry and military sites

Benefits

- Reduces the thickness of granular materials needed for the same fatigue life
- Lower carbon footprint as less quarried materials are imported
- Reduced differential settlement and rutting vs un-stabilised roads
- Reduced rutting and maintenance of tracks
- Triangular shape of extruded grids provides effective interlock with granular construction material

Product	285	315	390
MATS - Radial stiffness (@ 0.5% strain (kN/m)	360	390	480
MATS - Radial stiffness (@ 2% strain (kN/m)	250	290	360
Radial secant stiffness ratio	0.80		
Junction strength efficiency (%)	100		
Geogrid shape	Triangular shape		
Heaxgon pitch (mm)	80		
Roll lenght (m)	75	50	50
Roll width (m)	3.90		

MATS: Minimum Average Tensile Strength
* Larger apertures (e.g. for railway ballast stabilisation) available to special order
Tolerance exists on properties

PARADRAIN®

ParaDrain® is a high-performance geogrid that reinforces soil and provides drainage, promoting sustainability by allowing the reuse of marginal fills instead of using quarried materials.

Uses

- In time-sensitive earthworks construction using marginal fills
- As easy to use as other geogrids
- Within reinforced soil where marginal fills are to be used as a structural material
- Reinforcing shallow clay based slopes and swales

Benefits

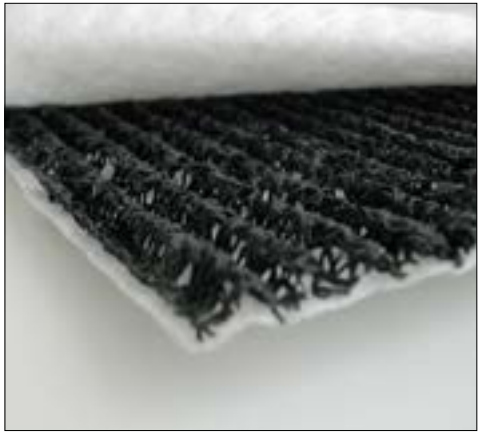
- Speeds up earthworks construction time due to earlier soil strength gain
- Reduces the time for soil pore water pressure dissipation to within the construction phase
- Reduces marginal fills to landfill and the quarring/importing of granular materials

Product*	50/05	100/05	150/05	200/05
UTS - Longitudinal (kN/m)	57	106	160	212
UTS - Transverse (kN/m)	6	6	6	6
Nominal strain @Tch	9%	9%	9%	9%
Roll length (m)	50	50	50	50
Roll width (m)	3.9	3.9	3.9	3.9

* = Intermediate strengths available to special order
Tolerance exists on properties
Upper textile is woven PP geotextile. Lower textile is non-woven PP geotextile.

MACDRAIN®

A drainage geocomposite designed to replace gravel drains. It is available in a multitude of combinations of drainage cores protected on one or both sides by geotextiles and/or a geomembrane to suit the task.



Uses

- Removes excess water from soils
- Replaces gravel drains behind retaining walls and tunnels
- Trench drains for highways and railways
- Gas drainage or leachate detection in landfills or mines

Benefits

- Reliable lab-tested long-term drainage performance
- Customisable to suit client needs
- Reduces gravel quarrying and transportation: lower carbon footprint
- Simple to install

Product	M1121		M1201		W1041		W1061		W1101		TD100	TD200
Thickness at 2kPa	14.0		20.0		4.1		6.1		10.0		11	11
Mass per unit area (g/m²)	840		950		560		670		1240		800	800
In plane flow MD (l/(m.s))												
Gradient i=	0.03	1.00	0.03	1.00	0.03	1.00	0.03	1.00	0.03	1.00	1.00	1.00
20kPa (Soft/Soft)	-	2.50	-	4.80	-	0.65	-	1.50	-	3.90	2.05	2.05
20kPa (Rigid/Soft)	0.38	2.80	0.70	5.20	0.20	0.80	0.20	1.60	0.57	4.10	-	-
50kPa (Rigid/Soft)	0.12	1.00	0.28	2.40	-	-	-	-	-	-	-	-
100kPa (Rigid/Soft)	0.03	0.30	0.07	0.80	0.12	0.60	0.15	1.10	0.43	3.10	-	-
200kPa (Rigid/Soft)	-	-	-	-	0.09	0.40	0.10	0.80	-	-	-	-
400kPa (Rigid/Soft)	-	-	-	-	-	-	-	-	0.25	1.90	-	-
Roll width (m)	2		2		4.3		4.2		4.15		1	2
Roll length (m)	35		28		100		75		50		35-50	35-50

Tolerance exists on properties
Intermediate grades are available across the range of products
MacDrain® TD is suitable for trench drains. It has a geotextile pocket in which a perforated pipe can be placed. Pipe not included with MacDrain® TD

MACLINE® GCL

MacLine® GCL is a geocomposite of a layer of bentonite encapsulated between two geotextiles to form a liner for numerous fluid containment applications.

Uses

- Attenuation pond lining
- Lagoons and landfill impermeabilisation
- Waterproofing of drainage ditches and watercourses

Benefits

- CE marked
- High internal shear resistance for steeper slope applications
- Self-seals if locally punctured

Product	GCL W10	GCL W15	GCL W20	GCL W30
Bentonite mass @ 12% moisture content (g/m^2)	4000	4500	5000	6000
Thickness (mm)	6	6.5	7	7.8
Permeability (m/s)	$1.5x10^{-11}$	$1.5x10^{-11}$	$1.5x10^{-11}$	$1.5x10^{-11}$
Weight (g/m^2)	4300	4800	5300	6300
Roll width (m)	5	5	5	5
Roll length (m)	40	40	40	40

Tolerance exists on properties
Upper textile is woven PP geotextile. Lower textile is non-woven PP geotextile.

MACLINE®

MacLine® geomembranes are used to provide impermeable and waterproofing to surfaces. MacLine® is unrolled and adjacent rolls/panels are heat welded together on site.

Uses

- Storm water retention ponds
- Landfill linings
- Landfill and waste capping
- Contaminated material containment
- Canalisation of watercourses
- In leachate lagoons

Benefits

- Supplied in large rolls (5 -8m width)
- Thickness from 0.5 to 3mm
- Available with different surface textures/ roughness to increase friction interface with materials above/below the liner or on slopes
- HDPE MacLine is most common due to its chemical resistance, durability, and low cost

Thickness	1.0 mm			1.5 mm			2.0 mm			3.0 mm		
Type	SDH	RDH	TDH	SDH	RDH	TDH	SDH	RDH	TDH	SDH	RDH	TDH
	Smooth	Rough	Textured	Smooth	Rough	Textured	Smooth	Rough	Textured	Smooth	Rough	Textured
Tensile strength @ break (N/mm)	32	30	-	48	45	18	64	60	24	96	90	36
Elongation @ break (%)	800	750	-	800	750	150	800	750	150	800	750	150
Static CBR (kN)	3.2	3.0	-	4.5	4.0	3.5	5.5	5.0	4.5	7.0	>6.0	6.5

Tolerance exists on properties
Full Technical details available from Maccaferri
Other thicknesses available – please contact Maccaferri

MACWALL

MacWall is a segmental retaining wall combining the aesthetics of a blockwork wall, with the reassurance of geogrid soil reinforcement. The blocks have an attractive split face.

Uses

- Retaining walls in housing, retail and institutional developments
- Highway retaining walls

Benefits

- Available in a range of colours
- Mortarless and simple to construct
- Can incorporate curves and corners
- Granular backfill to geogrids simplifies construction
- Geogrid soil reinforcement strengths and lengths are determined through design
- BBA certified block available on request

Product	Vertica Block	Vertica Corner	Vertica Cap
Size (mm) L x D x H	457 x 280 x 200	457 x 228 x 200	438/303 x 254 x 100
Mass per block (kg)	37.7	42	20
Face angle of wall	4°	4°	N/A
M^2 per pack	4.10	N/A	N/A
No. per m^2	10.9 blocks/m^2	N/A	2.7 caps/Lm
Units per pack (No.)	45	40	48
Weight per pack (tonnes)	1.79	2.0	0.94

Tolerance exists on properties

BIOMAC® & COIR LOGS

Biomac® is a biodegradable erosion protection blanket made from natural fibres. When secured to the soil slope, it offers immediate erosion protection to the soil during the establishment phase of seeding and planting.

Uses

- Protects vulnerable soil slopes at risk of surface erosion
- Encourages new plant growth
- Coir logs used in low-flow streams and channels to protect river banks at the water line

Benefits

- 1-2 year functional life depending on exposure
- Coir logs provide a hospitable environment in which to establish vegetation

Product	Biomac® C	Biomac® CJ	Coir Log
Fibre content	Coir	Coir/Jute	Coir
Containment scrim net	Lightweight polymer scrim	Woven jute nets	PE netting**
Tensile strength - Longit. (kN/m)	3.7	4.7	N/A
Weight (g/m^2)	350	450	30kg/3m long log
Thickness	10	12	300mm (diameter)
Roll length (m)	35	35	3
Roll width (m)	2.4	2.4	Density 110kg/m^3

Tolerance exists on properties
** Coir net is also available upon request
Nominal weight - natural product can vary

MACMAT®

MacMat® is a 3-dimensional polymeric mat, placed on vulnerable soil surfaces to prevent erosion and encourage vegetation establishment. Available in a variety of thicknesses and strengths to suit the end-use.

Uses

- Provides immediate erosion control from rain splash and water run-off
- Erosion control within watercourses
- A grip layer to retain soil on bare surfaces

Benefits

- >90% void volume: enables good soil retention
- Flexible to suit soil profile
- Provides root reinforcement to plants during establishment
- Increases shear resistance of soil slopes and surfaces
- Limits soil washing off slopes into watercourses
- Available with integral reinforcement for use with soil nails, crest anchors etc.

Product*	12.1	13.1	18.1	19.1**
Polymer	PP	PP	PP	PP
Weight (g/m²)	280	490	350	550
Thickness (mm)	12	13	18	19
Structure type	open	open	open	open
Void volume	>90%	>90%	>90%	>90%
Roll length (m)	50	50	50	45
Roll width (m)*	4.2	4.2	4.2	4.2
Roll weight (kg)	60	105	74	105

Tolerance exists on properties
* Other widths available to special order
** Standard product in UK/IRE

MACMAT® R

MacMat® R is a longer term 3D erosion prevention mat manufactured from polypropylene monofilaments, reinforced by either steel wire woven mesh or polymeric geogrid reinforcement.

Uses

- Protect vulnerable soil slopes at risk of aggressive surface erosion
- Protect channel banks and watercourses
- Punch resistance and tensile strength enable its use with soil nailing to provide a slope stabilisation system

Benefits

- >90% void volume: ideal to establish vegetation
- ETA approved and CE marked
- Strengths from 37-200kN/m
- High puncture resistance and tensile strength
- Available in green (black and brown mats to order)

Product	R1 8127G0	R1 055	R1 110	R1 200
Geomat polymer	PP	PP	PP	PP
Reinforcement (woven)	Steel mesh 8x10	Woven PET geogrid	Woven PET geogrid	Woven PET geogrid
Reinforcement coating	GalMac® + Polymer	Polymeric	Polymeric	Polymeric
Tensile strength - Longit. (kN/m)	50	55	110	200
Void volume	>90%	>90%	>90%	>90%
Weight (g/m²)	2130	700	820	1000
Thickness (mm)	16	15	15	15
Roll length (m)	25	40	40	40
Roll width (m)	2	4.35	4.35	4.35

Tolerance exists on properties
Steel mesh within MacMat® R is BBA Certified for design life up to 120 years.

ROCKFALL NETTING

Rockfall Netting (DT Mesh) is the entry point to our MacRO systems range of meshes for rockfall mitigation and natural hazard protection, selected based on the site and client needs.

Uses

- Rockfall protection drapery mesh for rock slopes
- Suitable for draped netting applications
- Flexible facing for soil nailed slopes

Benefits

- BBA Certified - (up to 120 year design life)
- UKCA marked
- Different levels of corrosion protection are available to suit different environmental conditions: GalMac or GalMac+ PoliMac coating
- Unique double twist configuration does not unravel in the event of wire breakage
- Small aperture size for excellent containment of debris
- No overlapping of vertical joints required

Product	6x8 Type Mesh*	8x10 Type Mesh+
Steel wire diameter (mm)	2.20/3.20	2.70/3.70
Selvedge wire diameter (mm)	2.70/3.70	3.40/4.40
GalMac coating (class)	A	A
Tensile strength - Longit. (kN/m)	37	50
Punching resistance (kN)	43	65
Roll length (m)	25/50/100	25/50
Roll width (m)	2*/3/4	2*/3/4

Tolerance exists on properties

*Standard products available in the UK/IRE, other available to order
+Special order only

STEELGRID®

The Steelgrid® HR System combines steel wire mesh and wire rope geocomposite with anchor plates and connectors for rockfall mitigation and slope consolidation.

Uses

- High tensile strength rockfall protection drapery mesh for rock slopes
- Suitable for stabilised netting applications
- High tensile strength facing for soil nailed slopes

Benefits

- BBA Certified (up to 120 year design life)
- UKCA/CE marked
- Different levels of corrosion protection are available to suit different environmental conditions
- Unique double twist configuration does not unravel in the event of wire breakage
- Low strain, high strength composite netting
- No overlapping of vertical joints required

Product	HR30	HR30-P	HR50	HR50-P	HR100	HR100-P
Coating	GalMac Class A	GalMac Class A + PoliMac	GalMac Class A	GalMac Class A + PoliMac	GalMac Class A	GalMac Class A + PoliMac
Tensile strength - Longit. (kN/m)	180	120	130	90	83	75
Punch Resistance (kN)	155	135	125	110	90	80
Roll length (m)	25/40					
Roll width (m)	3.05					

Tolerance exists on properties

MACARMOUR®

MacArmour® is a composite of double twisted steel wire hexagonal mesh with high tensile strength steel cables, woven into the mesh both in longitudinal and transversal direction, during the manufacturing process.

Uses

- High tensile strength rockfall protection drapery mesh for rock slopes
- High tensile strength facing for soil nailed slopes
- Suitable for stabilised netting applications in close proximity to infrastructure

Benefits

- BBA Certified (up to 120 year design life)
- UKCA/CE marked
- Different levels of corrosion protection are available to suit different environmental conditions
- Low strain, high strength composite netting
- No overlapping of vertical joints required
- Extremely low deformation under load

Product	30x30/2,7/8/G	30x30/2,7/6/P	60x60/2,7/8/G	60x60/2,7/6/P
Mesh type	8x10	8x10	8x10	8x10
Mesh width (mm)	80	80	80	80
Coating	GalMac®	PoliMac®	GalMac®	PoliMac®
Tensile strength - Longit. (kN/m)	170 ± 15	105 ± 10	100 ± 10	65 ± 5
Punch Resistance (kN/m)	280 ± 10	155 ± 8	185 ± 10	122 ± 17
Tensile strenght - Trans. (kN/m)	170 ± 15	105 ± 10	100 ± 10	65 ± 5
Roll length (m)	25/40	25/40	25/40	25/40
Roll width (m)	3.10	3.10	2.75	2.75

Tolerance exists on properties

Other strengths/configurations available

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 95/3141

MACMAT® HS

MacMat® HS is the next-generation of high performance geomats, combining a 3D geomat reinforced with our Steelgrid HR system in one product.

Uses

- High tensile strength facing for soil nailed slopes
- Suitable for stabilised netting applications in close proximity to infrastructure

Benefits

- BBA Certified (up to 120 year design life)
- UKCA/CE marked
- Different levels of corrosion protection are available to suit different environmental conditions
- Unique double twist configuration does not unravel in the event of wire breakage
- Low strain, high strength composite netting
- Integral 3D erosion protection matting for two functions but only one installation

Product	HS30 Galv	HS30 PMC	HS100 Galv	HS100 PMC
Geomat polymer	PP	PP	PP	PP
Mesh type	8x10	8x10	8x10	8x10
Reinforcement coating	GalMac®	PoliMac®	GalMac®	PoliMac®
Tensile strength - Longit. (kN/m)	180 ± 10	120 ± 10	83 ± 5	75 ± 5
Ultimate punching force (kN)	155 ± 12	135 ± 12	125 ± 12	80 ± 10
Void Index (%)	>90			
Thickness (mm)	12			
Roll length (m)	25			
Roll width (m)	1.80	1.80	1.95	1.95

Tolerance exists on properties

Other strengths available

ROCKFALL BARRIER

Installed beneath hazardous areas prone to rockfalls, Rockfall Dynamic Barriers (or "catch fences") are designed to catch and contain falling rocks and boulders before they impact roads, railways, properties/assets.

Uses

- Used when meshing the hazardous slope is too expensive/extensive
- Protecting highways/railways in hazardous regions
- Protecting developments near unstable slopes
- Mine & quarry haul rods

Benefits

- Supplied in a complete kit of parts for easy ordering
- Includes numerous features to make them safer, easier and quicker to install
- Available with Class A Zn/Al10% galvanising for longer life
- Marketing leading deformation and residual height after impact

Product	RB 35	RB 100	RB 750	RB 1500
Energy Absorption	38 kJ	111 kJ	774 kJ	1637 kJ
Certified Height	1.36 / 1.85	Cat. 0*	Cat. 2*	Cat. 4*
Residual height after impact**	>83.8 %	>80.5 % Cat. A	>58.0 % Cat. A	>61.4 % Cat. A
Maximum elongation @ impact	1.57 m	2.10 m	4.21 m	5.80 m

CE Certified in Accordance with EAD 340059-00-0196
Range from 35kJ to 9000kJ – intermediate capacities available
*According to EAD 340059-00-0106 (ex ETAG 027)
** As % of original nominal height

DEBRIS FLOW BARRIER

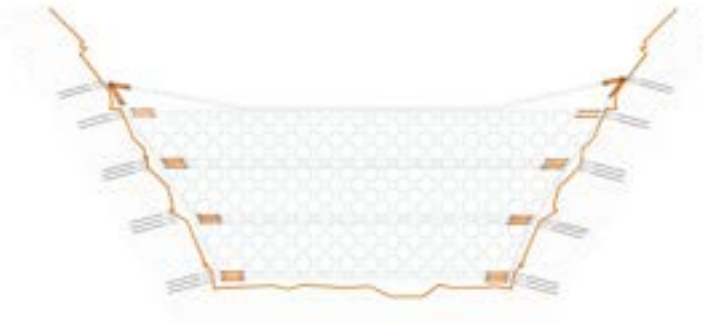
Debris flows and shallow landslides are highly mobile liquified landslides of mud, rocks, water and other debris. The flows are channeled by the topography.

Uses

- Positioned within the channel/gulley or chute
- Where vegetation is sparse on vulnerable hillsides
- Where infrastructure is impacted by landslides
- Where shallow landslips/landslides could occur

Benefits

- Customised solution for each project; width/height/debris volume
- Supplied in a complete kit of parts for easy ordering and quicker installation
- Upon impact, the Debris Flow Barrier progressively deforms and absorbs the flow energy



Maccaferri Debris Flow Barriers offer strength and performance without the aesthetic intrusion of other debris flow systems.