



GEOSYNTHETICS

COLBOND

The company

Colbond

Colbond is a leading producer of high-quality synthetic nonwovens for flooring, automotive, and construction applications, and three-dimensional polymeric mats and composites for civil engineering, building and industrial applications. Colbond employs some 650 people worldwide and is headquartered in Arnhem - Netherlands, with production facilities in Emmen and Arnhem (NL), Obernburg (D), and Asheville (NC, USA). Regional sales offices are located all over the world.

The range of speciality geosynthetic products for civil engineering includes Enkamat, Enkadrain, Enkagrid, Colbondrain and Armater. Based on polymer technology, these products are used all over the world for divergent erosion control, drainage, waste containment, and soil improvement purposes.

CE Various Enkadrain, Enkamat W and Enkagrid types are CE-certified by an independent notified body (0799-CPD).

Five decades of experience

Colbond has always focused on innovative solutions for problems as old as the world. The company first introduced geosynthetic materials in civil engineering applications more than five decades ago. Polymer expertise combined with end use know-how and experience made Colbond, pioneer in the early fifties, a valued partner in the branch. The company's products and systems find worldwide recognition, setting a standard in geosynthetics for civil engineering purposes.

Engineering consultancy

Colbond considers engineering consultancy a vital element of its strategy. Therefore, the company's field staff is composed of civil engineers whose specific knowledge of the segments covered by Colbond enables them to give the proper advice and support, from the earliest preparations to the very final stage of a project.

Worldwide network

Colbond has built up an extensive worldwide network with representatives in more than 60 countries. This network allows for supplying immediate local expertise and support as well as tailor-made solutions to the most diverse situations.

Quality standards

Colbond plays an active role in international standardization organizations such as ISO, CEN and various national standardization committees. In addition, the company often develops and tests its products in close cooperation with independent institutes such as the Universities of Technology of Delft (NL), Munich and Münster (D), and EMPA (CH), SKZ (D) and GeoSyntec (USA). Furthermore Colbond contributes funds to multi-client studies at GRI (USA), Oxford University (GB) and CUR, Centre for Civil Engineering Research and Codes (NL). Product certifications have been received from tBU (D).

ISO 9001

The Quality Management System of Colbond, at Arnhem (development and sales) and Obernburg (production), has been approved by Lloyd's Register Quality Assurance Limited for the NEN-EN-ISO 9001:2000 quality management system standard (Certificate No. 935136).

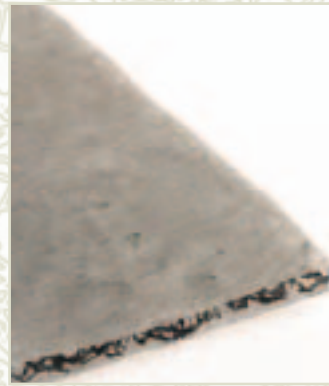


The products



Enkamat®

is a three-dimensional random polyamide matting, available in various thicknesses. The Enkamat range comprises several types, including Enkamat sewed to a reinforcing woven grid or fabric, and Enkamat prefilled with 2 - 6 mm stone chippings bound with bitumen.



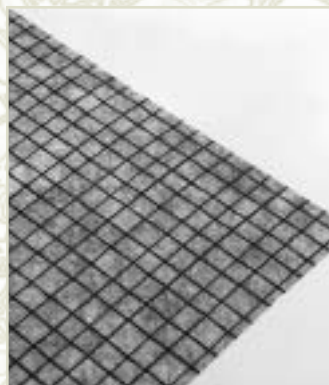
Enkadrain®

is a multilayer geocomposite consisting of a three-dimensional core either connected to one or sandwiched between two nonwoven filter layers. Enkadrain comes in several types, each characterized by a specific combination of core structure, filter layer, and bonding technique. Thickness and deformability are variable.



Enkagrid® PRO and MAX

identifies a product range of geogrids. Made of laser welded bars, Enkagrid comes in two types of geogrids, with uniaxial strength made of PET bars or with biaxial strength made of PP bars.



Enkagrid® TRC

is a multifunctional geogrid constructed from coated Twaron® aramid, embedded in a polyester nonwoven filter layer.



Colbondrain®

is a thin, prefabricated vertical strip drain, with a three-dimensional filament core structure.



Armater®

is a honeycomb type geocomposite made of alternately linked polyester nonwoven strips.

The application areas

Erosion control



Bank protection

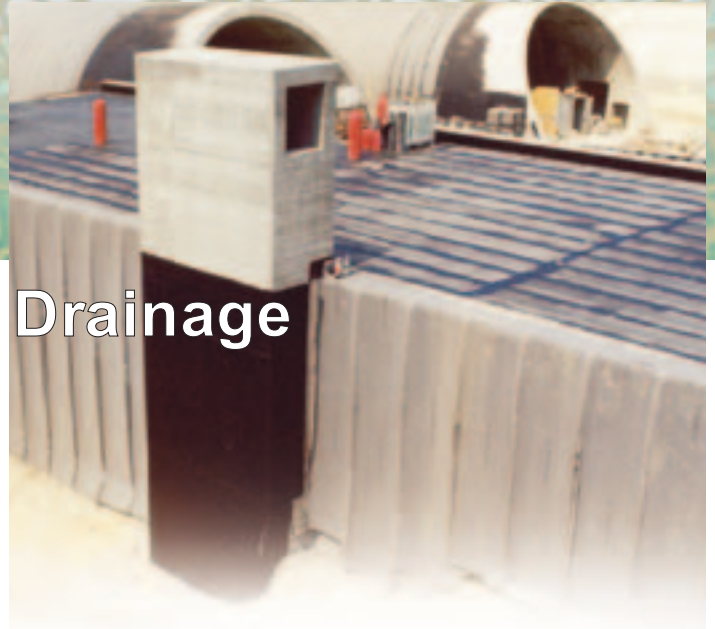
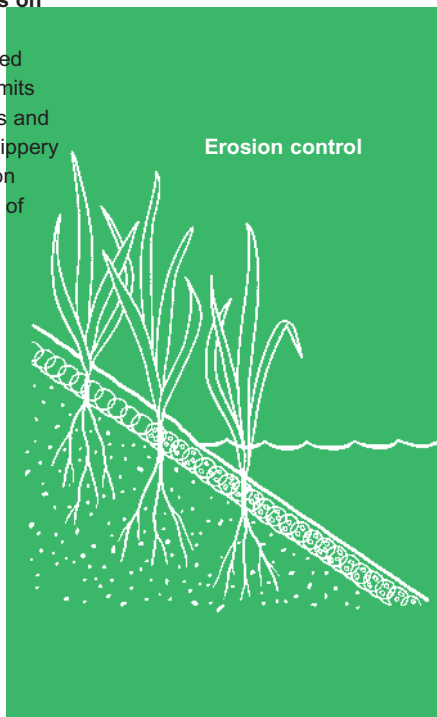
Enkamat and Enkamat A, the latter of which comes prefilled with bitumen-bound stone chippings, permit vegetation on banks and control erosion in a natural way.

Slope protection

Enkamat prevents erosion and therefore helps nature to establish a natural, vegetative protection on slopes. Armater permits topsoil to stabilize on barren slopes.

Stabilization of soil layers on steep slopes

Enkamat W, a grid-reinforced heavy-duty composite, permits stabilization of steep slopes and is suitable for the use on slippery liners that require vegetation cover on a reinforced layer of soil.



Drainage

Vertical drainage of underground structures

The composite material Enkadrain protects waterproof concrete coatings from damage, filters percolating water, and transports it to the collector drain. Enkadrain is used around cellars, on the backing of concrete retaining walls, in tunnels etc.

Road edge drainage and slope stabilization

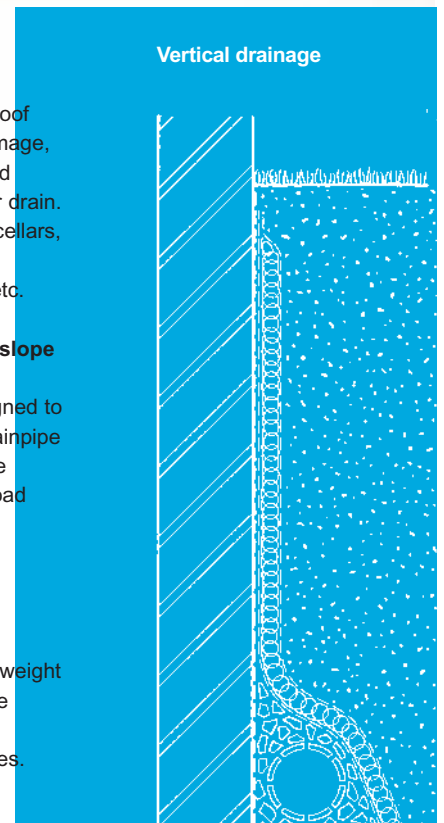
Enkadrain Findrain is designed to suit a range of collector drainpipe sizes, making it an effective drainage screen besides road subbases and slopes.

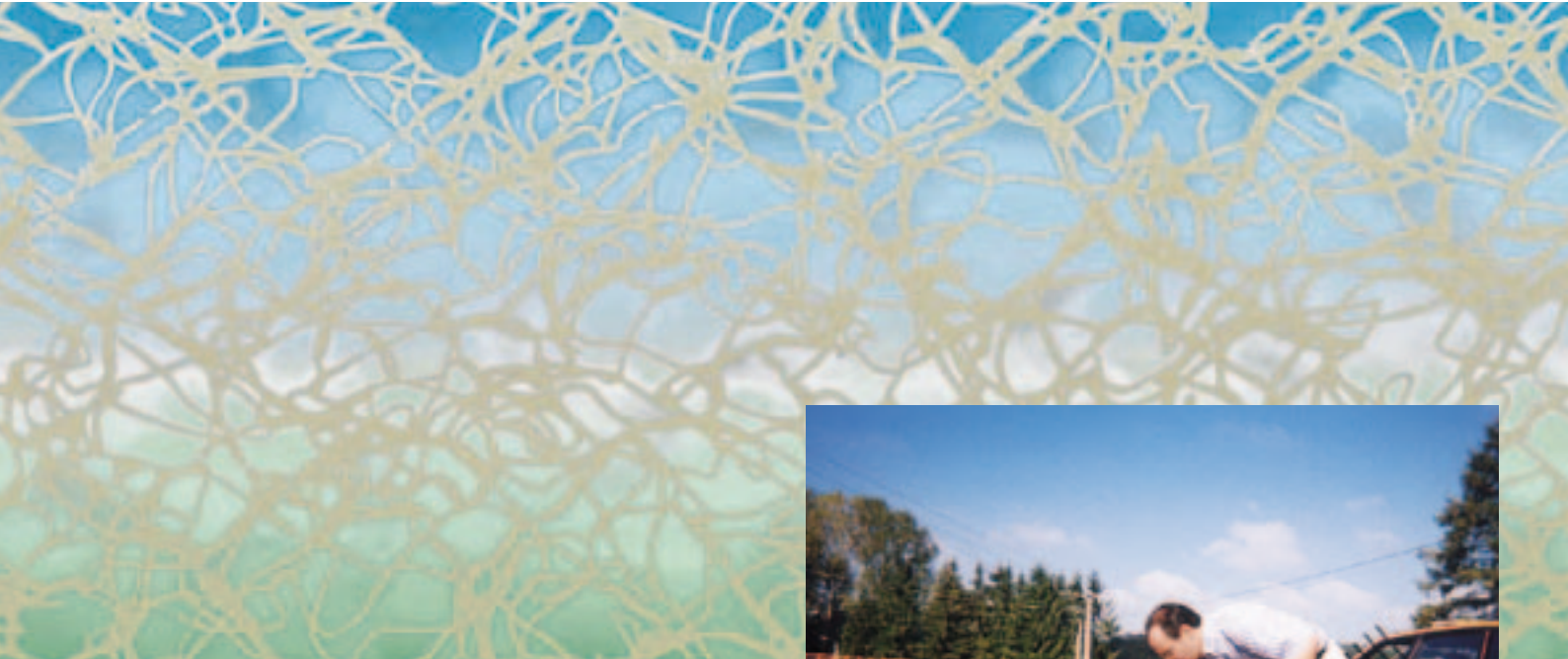
Lost shuttering

With its high resistance to infiltration by cement milk, Enkadrain CK forms a lightweight lost shuttering and drainage system, also featuring high flexibility at low temperatures.

Horizontal drainage

Enkadrain provides efficient drainage of the soil layer in roof gardens and makes for an excellent performance under paved areas such as parking roofs.





Waste containment



Water drainage

Enkadrain Wide is used as drainage mat between the soil cover and the lining material of landfill cappings.

Gas venting

The easy-to-install, lightweight Enkadrain Wide drainage mats form a reliable continuous gas venting layer, maximizing landfill storage volume.

Leakage detection

The Enkadrain core forms a unique detection layer, allowing accurate location of leakages when the primary seal is punctured.

Erosion prevention

Enkamat helps establishing vegetation on the slopes enclosing landfills.

Sliding prevention

Enkamat W enables the construction of safe, steep slopes in landfill cappings by increasing the friction between the composite and the soil.

Soil reinforcement

By installing Enkagrid, large deformations in the internal structure of new sections within a landfill are prevented. Enkagrid is used to reinforce external bunds, or to reinforce the slopes of landfills or capping cover layers.

Soil improvement



Soil reinforcement

Enkagrid PRO is used to reinforce earth fill structures, either as slope or base reinforcement of embankments.

Enkagrid MAX is used as subbase reinforcement and for soil stabilization.

Vertical drainage

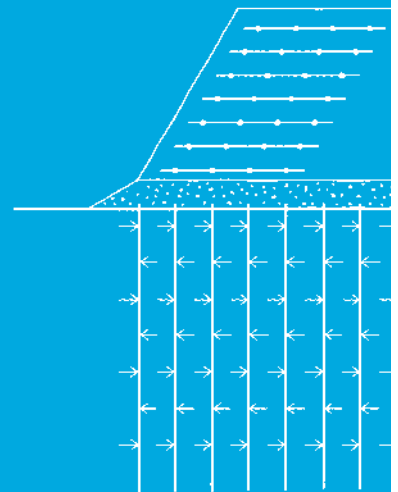
Colbondrain accelerates consolidation of cohesive soil by offering a highly permeable drainage path for excess pore water.



Waste containment



Soil reinforcement



Soil stabilization

Enkagrid TRC provides reinforcement, separation and filtration of the road sub-base. Enkagrid TRC exhibits equal strength in both longitudinal and transverse direction.

Vertical drainage

Worldwide network

Country	Firm, place	Phone	Fax
Andorra	Saptec, Andorra la Vella	(+376) 805 920	(+376) 805 925
Australia	Ten Cate Nicolon Australia Pty Ltd, Sydney	(+61) 2 9609 3844	(+61) 2 9609 3866
Belgium	Tecmat N.V., Alleur Montauban N.V., Nieuwkerken-Waas	(+32) 4 2390700 (+32) 3 7779695	(+32) 4 2474626 (+32) 3 7779743
Brunei	Chrisphilip Sdn. Bhd., Bandar Seri Begawan	(+673) 2 652561	(+673) 2 652563
Bulgaria	Orkikem, Sofia	(+359) 2 9805481	(+359) 2 9885839
China	Akzo Nobel China bv, Shanghai	(+86) 21 6354 88 48	(+86) 21 6354 8845
Cyprus	Tsircon Co. Ltd., Nicosia	(+357) 2 2487029	(+357) 2 2487716
Denmark	Byggros A/S, Holbæk	(+45) 5948 9000	(+45) 5948 9005
Egypt	Geos, Cairo	(+20) 2 243 52 63	(+20) 2 2918236
Finland	Kaitos Oy, Espoo	(+358) 9 3507060	(+358) 9 509 9205
France	Colbond Geosynthetics Sarl, Saint Denis la Plaine	(+33) 1 49462430	(+33) 1 49462435
French Guyana	Ets Serge Ampigny, Lamentin	(+596) 504949	(+596) 500195
Germany	Colbond Geosynthetics GmbH, Obernburg	(+49) 6022 812020	(+49) 6022 812800
Greece	Polykem SA, Athens	(+30) 21 08161857	(+30) 21 0816 1131
Hong Kong	Spray Engineering Corp., Hong Kong	(+852) 25757871	(+852) 28382615
Hungary	Geofólia Kft., Veszprém	(+36) 88 563710	(+36) 88 563711
India	Z-Tech (India) Pte. Ltd., New Delhi	(+91) 11 26275261	(+91) 11 26275262
Indian Ocean Islands	Omniplast, Sainte-Marie, Réunion	(+262) 534131	(+262) 531524
Indonesia	P.T. Tetrasa Geosinindo, Jakarta Maccaferri Asia, Jakarta	(+62) 21 633 0150 (+62) 21 750 6555	(+62) 21 633 6706 (+62) 21 750 6553
Iran	Iran Bana Arian Co., Teheran	(+98) 21 877 9440	(+98) 21 8771457
Ireland	Lining Services Ltd. Waterford	(+353) 51 294090	(+353) 51 294091
Israel	Admir Technologies Ltd., Yehud	(+972) 3 5366646	(+972) 3 5368088
Italy	Harpo Seic, Trieste	(+39) 0403186611	(+39) 0403186666
Japan	Maeda Kosen Co., Ltd, Fukui	(+81) 6 6201 0313	(+81) 6 6201 0668
Kuwait	Al Bahar & Bardawill Specialties Co. W.L.L., Safat	(+965) 481 2144	(+965) 483 6193
Latvia	OK Buvmateriali, Riga	(+37) 1 7365636	(+37) 1 7365626
Luxembourg	Polyma S.A., Mondercange	(+352) 26 55 3535	(+352) 26 55 3500
Malaysia	Maccaferri Malaysia Sdn. Bhd., Selangor	(+60) 3 7955 7800	(+60) 3 7955 7801
Martinique	Ets Serge Ampigny, Lamentin	(+596) 504949	(+596) 500195
The Netherlands	Colbond bv, Arnhem	(+31) 26 3664600	(+31) 26 3665812
Nepal	Maccaferri PVT. LTD., Kathmandu	(+977) 1 414271	(+977) 1 420049
New Zealand	Maccaferri NZ Ltd., Auckland	(+64) 9 6346495	(+64) 9 6346492
Norway	Geonor A/S, Oslo	(+47) 67159280	(+47) 67145846
Oman	Suhail & Saud Bahwan, Muscat	(+968) 771 0983	(+968) 771 5755
Philippines	Maccaferri Philippines, Quezon City	(+63) 2 813 0211	(+63) 2 813 7366
Portugal	Arco Portuguesa, Lisboa	(+351) 21 8823700	(+351) 21 8823709
Qatar	Al Obeidly & Gulf Etermit, Doha	(+974) 4325 111	(+974) 4367 217
Russia	K. Scherbina, Wuppertal (D)	(+49) 177 8323365	(+49) 202 4966796
Saudi Arabia	Trading & Development Partnership, Riyadh	(+966) 1 4194444	(+966) 1 4193058
Singapore	Geocom Engineering, Singapore Colbond, Signapore	(+65) 9797 3827 (+65) 6258 1333	(+65) 6745 8972 (+65) 6259 8607
South Africa	Kaytech Geotechnical & Industrial Fabrics, Pinetown	(+27) 31 717 2300	(+27) 31 702 3173
South Korea	Korea C & S Co. Ltd., Seoul	(+82) 2 467 8740	(+82) 2 467 8778
Spain	Terratest Tecnicas Especiales (T.M.A), S.A. Madrid	(+34) 91 423 7562	(+34) 91 423 7501
Sweden	bg Byggros ab, Malmö AB Periskopet, Stockholm	(+46) 40 43 66 30 (+46) 8 673 55 22	(+46) 40 43 66 36 (+46) 8 673 2040
Switzerland	Schoellkopf AG, Zürich Bossard & Staerkle AG, Zug	(+41) 1 3121616 (+41) 41 7691240	(+41) 1 3121626 (+41) 41 7614569
Thailand	Maccaferri Thailand Ltd.	(+66) 2 717 0207	(+66) 2 717 0208
Turkey	Imtek Ltd., Istanbul	(+90) 216 3863274	(+90) 216 3586737
United Kingdom	Maccaferri Ltd., Oxford	(+44) 1865 770 555	(+44) 1865 774 550
U.A.E.	Mirjana Engineering Supplies, Abu Dhabi Trace Co. Ltd., Abu Dhabi	(+971) 2 6336516 (+971) 2 677 4991	(+971) 2 6336806 (+971) 2 6772776
U.S.A.	Colbond Inc., Enka, N.C.	(+1) 828 665 5050	(+1) 828 665 5009
Vietnam	Maccaferri Asia	(+60) 3 7955 7800	(+60) 3 7955 7801

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COLBOND

In case no contact can be made with one of the aforementioned offices, or if your country is not shown, please contact our headquarters in the Netherlands.