



RENO PLUS
Gabion Mattresses

KEY ADVANTAGES

at a glance



→ Quick installation



→ Variable combination solutions



→ Material savings due to reduced
revetment thickness



→ Ecological
system solution

RENO PLUS

Gabion Mattresses



Climate protection and the sustainability of construction practices are also becoming increasingly important for hydraulic works. The preservation of natural mineral resources and the reduction of transportation emissions play a central role within this context.

The inherent necessity to safeguard the precious resource of water, which frequently comes into direct contact with the structures, imposes rigorous technical requirements upon the building products and system solutions. Simultaneously, it demands the utilisation of environmentally-friendly construction materials

The development of RENO PLUS Gabion Mattresses arose as a sustainable and resource-conserving solution to the multifaceted requirements within the realm of riverbank and riverbed protection. Due to savings on materials and transportation, they effectively reduce the ecological impact of riverbank protection measures while simultaneously fostering a near-natural habitat through their full plantability.

PRODUCT DETAILS

and properties

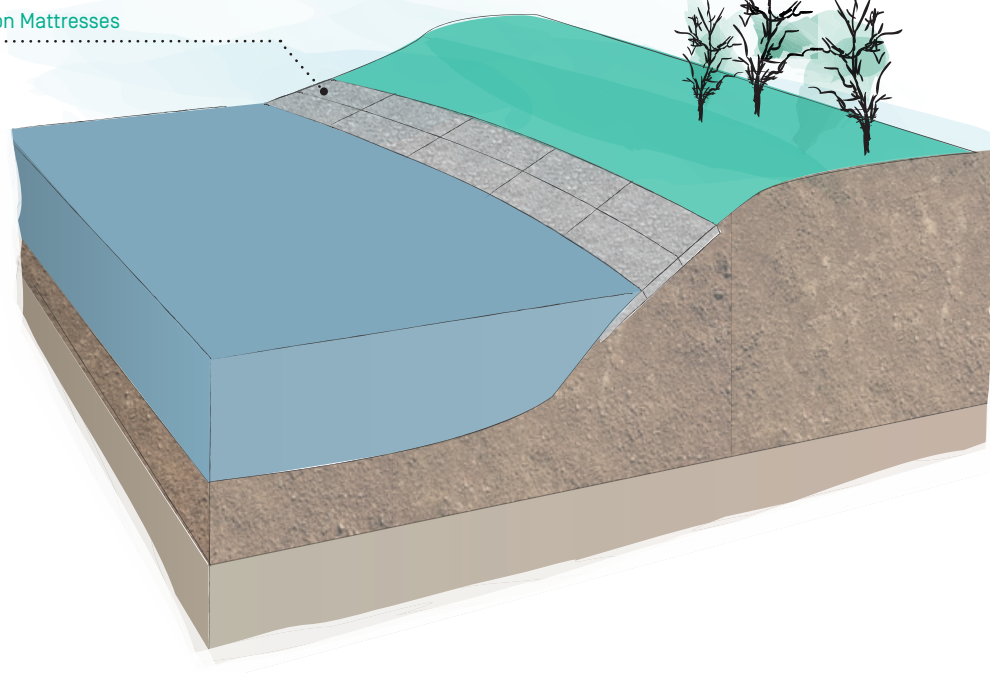
Mattresses are a highly effective method when it comes to ensuring the stability of riverbanks and riverbeds. These products are lightweight steel wire mesh compartmented baskets with a rectangular box shape that can be filled with natural stones once opened. The term "mattress" has become synonymous with these structures, owing to their dimensions of up to 3 x 6 metres and their relatively low height.

The mattresses are flexible and adapt excellently to the irregular courses of riverbanks. By being fully plantable, these mattresses meet all the requirements for creating near-natural riverbank habitats. The diverse plant species that grow on these mattresses, varying in size and type, actively contribute to shading and cooling the surrounding environment, while also absorbing CO₂.

These mattresses offer lasting protection against burrowing animals, making them the ideal choice for safeguarding riverbanks long term.



RENO PLUS Gabion Mattresses



High load capacity with low layer thickness

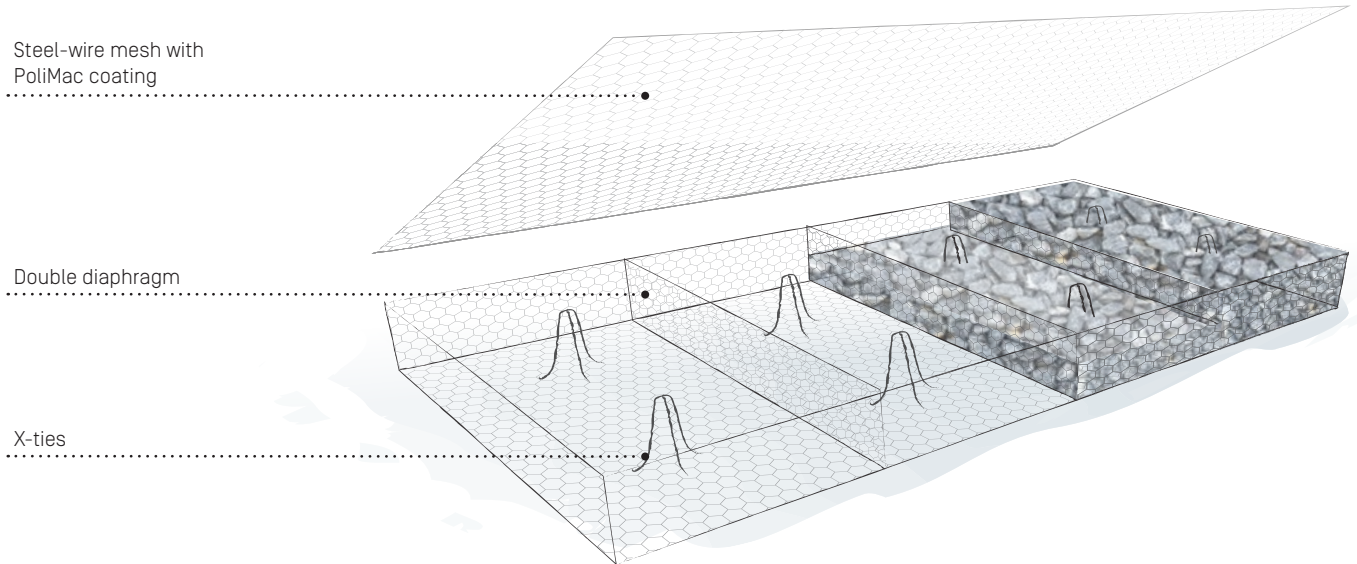
The distinctive design of RENO PLUS Gabion Mattresses, including double partition panels (diaphragms), ensures exceptional positional stability of the rockfill, making them significantly more resilient compared to conventional mattresses. In terms of shear stress absorption alone, it enables riverbank protection that can be achieved with a considerably reduced layer thickness.

The reduced material demands stemming from the decreased layer thickness result in substantial savings: less material transportation, faster mattress filling and installation, shorter operational periods for construction machinery and workers, ultimately culminating in lower expenses for both material and labour.

RENO PLUS Gabion Mattresses exhibit exceptional resilience, enabling them to achieve effective riverbank protection with a layer thickness that is up to 73% less than that required for traditional armourstone-based methods.



System components



PoliMac coating as long-term corrosion protection

RENO PLUS Gabion Mattresses consist of a double twisted hexagonal woven wire mesh with a mesh size of 6 x 8 cm. The woven wire mesh is galvanised and provided with a corrosion-resistant PoliMac PVC coating. According to standard DIN EN 10223-3, this corrosion protection ensures a working life of up to 120 years even in a high-aggressive environment [C4].

Double diaphragm partition panels

The bottom as well as the cell partition panels and side panels consist of a continuous piece of steel wire mesh. The cell partition panels are produced by folding the woven wire mesh up and over, resulting in a doubled structure that enhances both stability and strength. The sturdy and robust double diaphragms effectively prevent any bending or sagging during the installation process and ensure that the cells maintain their dimensional stability even when filled.

Optional lid variants

The steel wire mesh for the lid is supplied in rolls and can be combined with various other products such as coir mats, geomats or rodent protection nets ex works.

X-ties

For enhanced resistance to high shear stress, special vertical connecting elements, known as X-ties, are provided and strategically installed at the centre of the mattresses to ensure a secure and optimal fit of the lid. By providing essential reinforcement, the rockfill is effectively held in place, enabling the mattresses to absorb and effectively dissipate even the most extreme levels of shear stress.



Riverbank and riverbed protection and erosion control:

By absorbing high levels of shear stress, RENO PLUS Gabion Mattresses offer a slender alternative to conventional riverbank revetment or riverbed protection.



Technical details

| Properties | Test standard | Unit | RENO PLUS |
|---------------------------------------|--------------------|-------------------------------------|-------------|
| Steel wire diameter (inside/outside) | EN 10218-2 | mm | 2.20 / 3.20 |
| Edge wire diameter (inside/outside) | EN 10218-2 | mm | 2.70 / 3.70 |
| Galmac C2 coating | EN 10244-2 | Class | A |
| Rated tensile strength | EN 10223-3 | kN/m | 40 |
| Punching shear force wire mesh | EAD 200019-01-0102 | kN | 20 |
| SO ₂ corrosion resistance | ISO 6988 | Cycles | > 28 |
| Salt spray test (5% DBR) | ISO 9227 | h | > 25,000 |
| Resistance to UV rays (@ 2,500 hours) | ISO 4892-3 | % | < 25 |
| Abrasion resistance | EAD 200019-01-0102 | Cycles | > 300 |
| Brittleness temperature | ASTM D746 | °C | < -35 |
| Corrosion spread (@ 2,500 hours) | ASTM A975 | Corrosion length less than one mesh | |

APPLICATIONS

RENO PLUS Gabion Mattresses

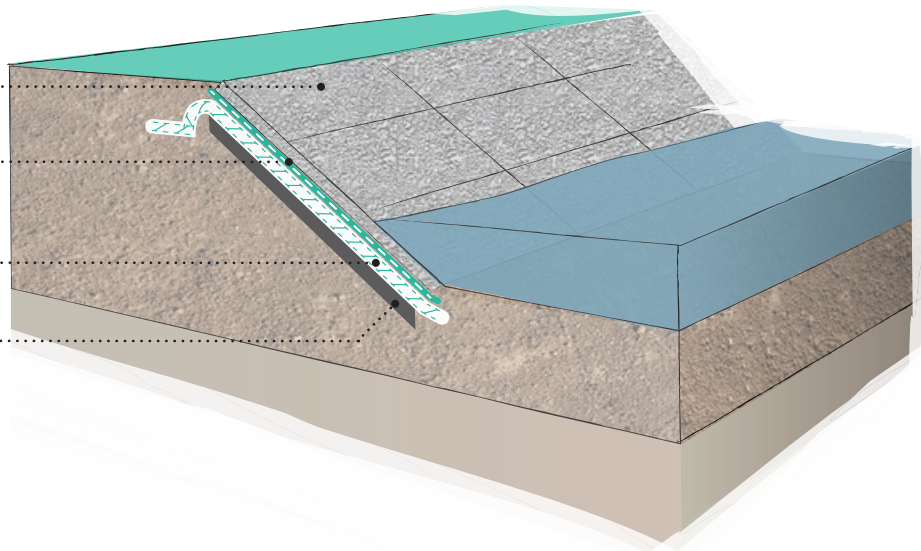
Riverbank protection system
on existing sealing

RENO PLUS Gabion Mattress

Protective non-woven fabric,
e.g. BETEX TP

CONCRETE CANVAS mat
as resistance to root penetration

Asphalt sealing

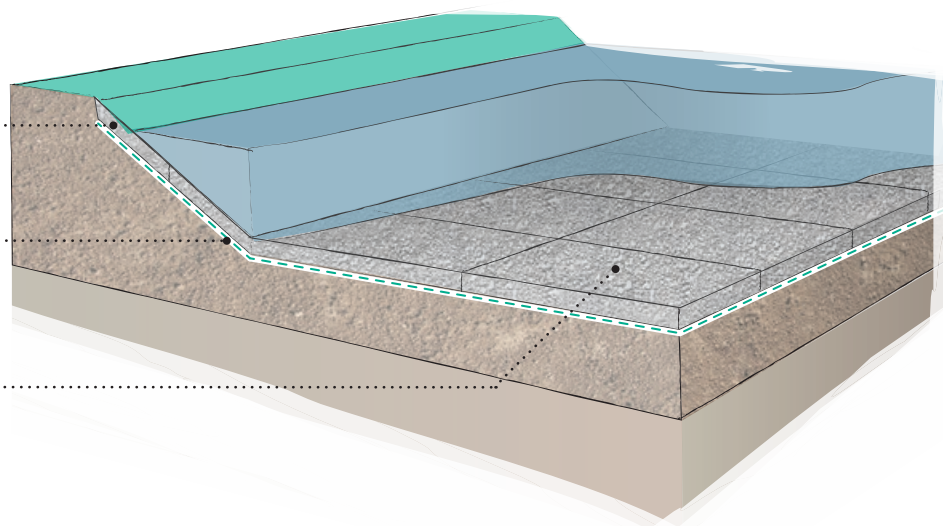


Slope and riverbed protection, e.g. against screw turbulence

RENO PLUS Gabion Mattress

Filtering non-woven fabric,
e.g. BETEX TP or a non-woven
fabric for hydraulic works

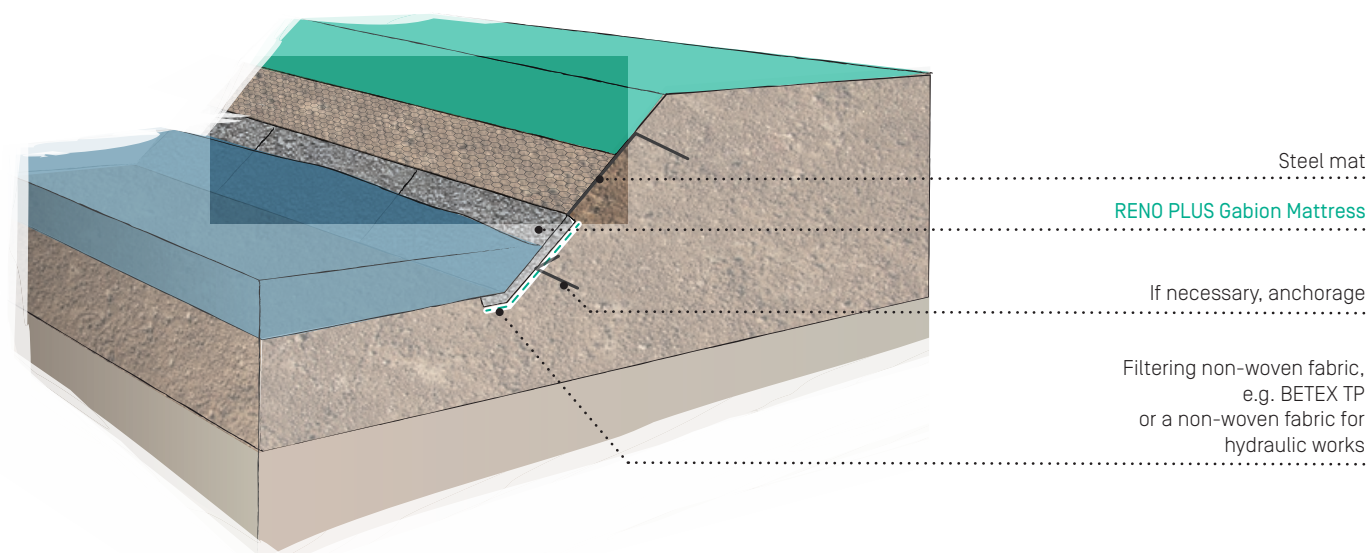
RENO PLUS Gabion Mattress
pre-filled in the bed area, if
necessary, and pre-assembled
with a non-woven fabric



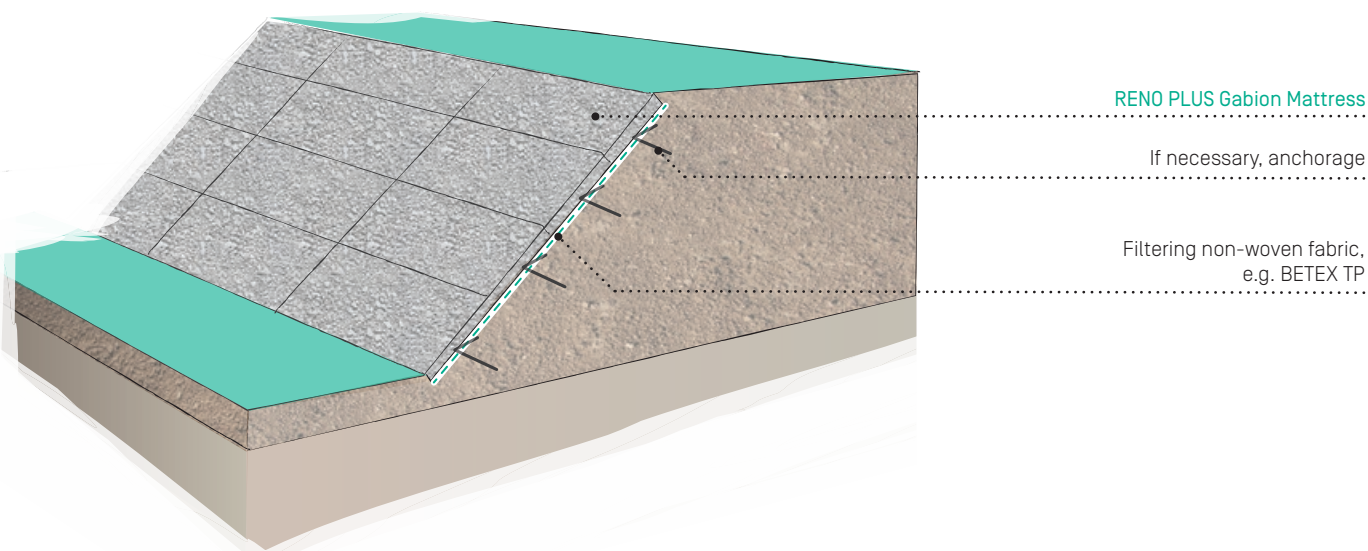
RENO PLUS Gabion Mattresses are primarily used for hydraulic works to ensure riverbank and riverbed protection and as channel linings for erosion control with high flow rates and/or pronounced bed loads. The mattresses are also ideal for use in areas at high risk of erosion and underwash.

Further applications include surface erosion control in loose rock formations and as a lining solution for cleanliness areas in conjunction with underlying fouling protection.

Suspended revetment



Slope protection or erosion control (gradient > 1:1.5)



Dimensioning of RENO PLUS Gabion Mattresses

RENO PLUS Gabion Mattresses are available in three thicknesses – 0.17 m, 0.23 m and 0.30 m – to meet varying riverbank protection requirements. The thickness of the mattress is based on the flow cross-section and the expected maximum flow velocity or on the associated shear stress. The expected bed load is also taken into account.

| RENO PLUS Type | Max. shear stress (N/m ²) | Max. flow velocity (m/s) |
|----------------|---------------------------------------|--------------------------|
| 0.17 m | 371 – 445 | 5.5 – 6.0 |
| 0.23 m | 445 – 534 | 6.0 – 6.5 |
| 0.30 m | 532 – 637 | 6.5 – 7.0 |

We are happy to supply current data sheets, specifications, certificates and technical verifications on request.

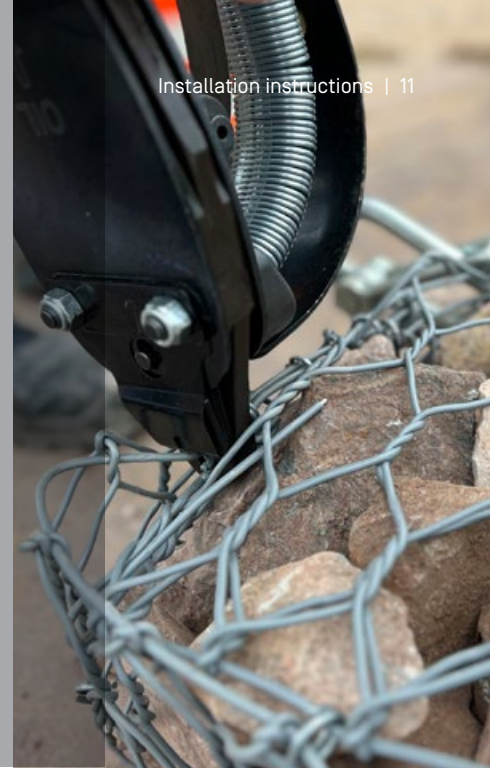
Telephone: +49 (0) 911 642 00 – 0, Fax: +49 (0) 911 642 00 – 90

Internet: www.beco-bermueller.com, E-mail: info@beco-bermueller.com

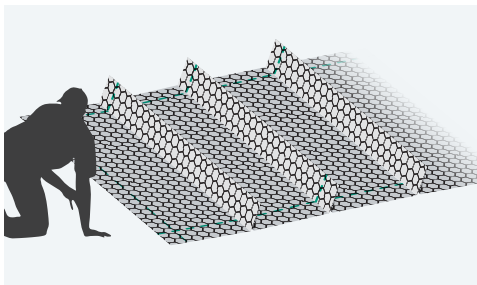


INSTALLATION INSTRUCTIONS

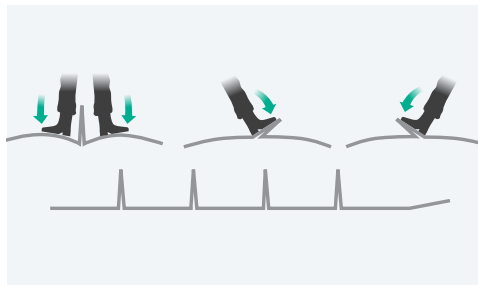
RENO PLUS Gabion Mattresses



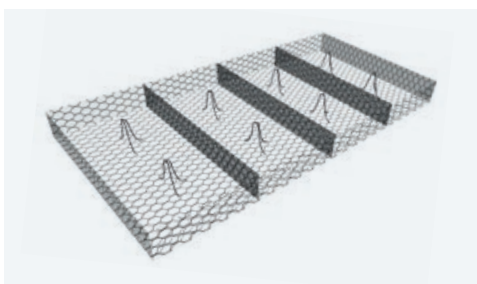
Installation of RENO PLUS Gabion Mattresses



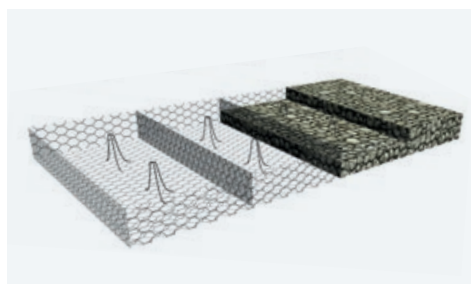
1. Folding the elements



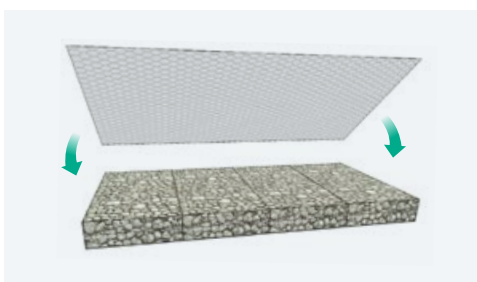
2. Folding up the diaphragms



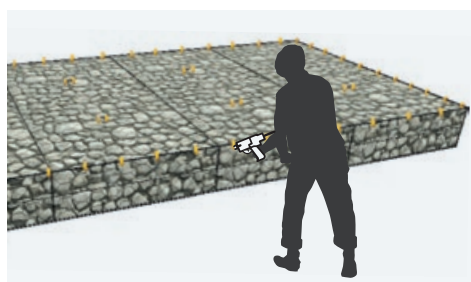
3. Positioning the X-ties



4. Filling the cells



5. Closing the lid



6. Fixing the lid and X-ties

To be taken into account:

As standard, it is crucial to prevent any mixing with the soil material of the underlying subsoil. To guarantee effective separation and filtration, it is advisable to position a suitable non-woven fabric, such as the mechanically-bonded non-woven fabric BETEX TP, beneath the mattress.

From slope gradients $> 1:1.5$, it might be necessary to fix the mattresses to the slope surface.

SUSTAINABILITY

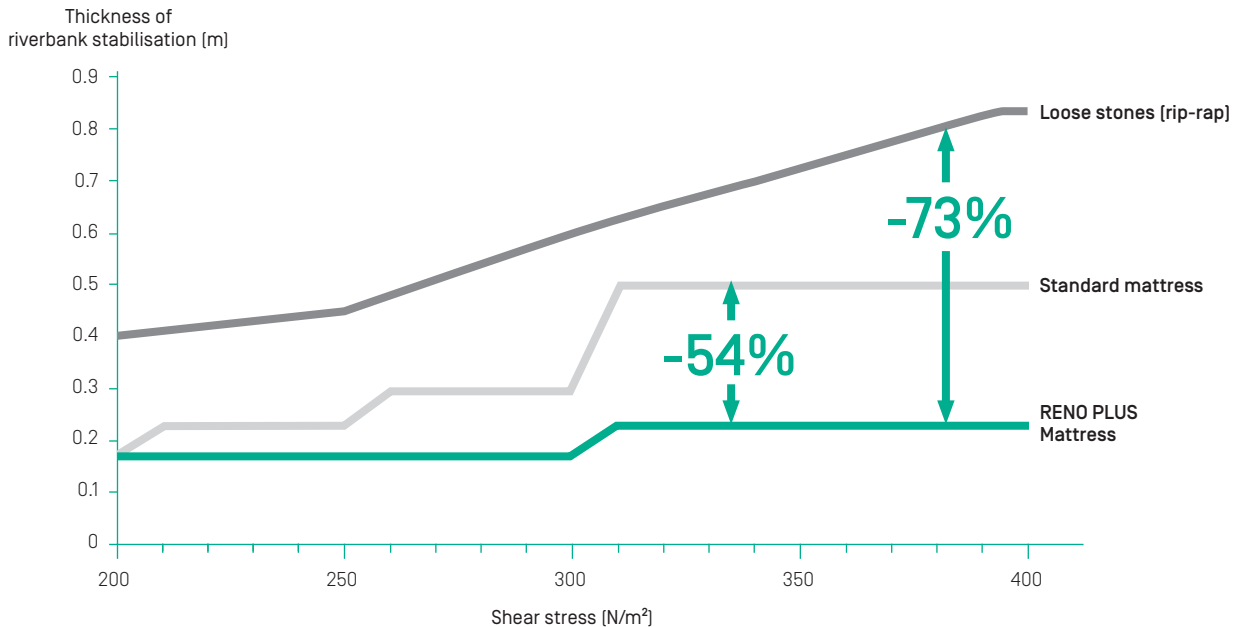
RENO PLUS Gabion Mattresses

Conservation of natural resources

The utilisation of RENO PLUS Gabion Mattresses allows for a considerable reduction in both the required rockfill size and installation thickness for riverbank and riverbed protection.

The resulting CO₂ saving is up to 82% kgCO₂-eq per m² of riverbank protection.

Comparison of riverbank protection – potential for savings in terms of layer thickness





Near-natural habitats

RENO PLUS Gabion Mattresses offer a natural habitat for aquatic plants and animals. The robust foundation provided by the steel wire mesh structure promotes the growth of vegetation, leading to enhanced water quality. Further, these habitats have the ability to attract a diverse range of aquatic life, including fish, amphibians and invertebrates. This can also help to enhance biodiversity in this area.

RENO PLUS Gabion Mattresses
require

-82%

less kg CO₂ per m²
riverbank protection

compared to riverbank
protection with loose stones
(rip-rap)

Working life
of up to

120
years

due to the PoliMac
coating

RENO PLUS Gabion Mattresses
achieve a

-73%

reduction in the layer
thickness of the bank
stabilisation

compared to riverbank
protection with loose stones
(rip-rap)



Durability

RENO PLUS Gabion Mattresses are extremely durable and robust and boast a long working life. In contrast to natural materials or purely plastic products, the PoliMac coated steel wire mesh demonstrates superior resistance to UV rays, extreme weather conditions and chemical degradation. This extends maintenance intervals, thereby reducing the frequency of interventions required in the watercourse. The working life is up to 120 years.



Environmentally safe

All components of the RENO PLUS Gabion Mattresses are environmentally safe. This was fully proven within the framework of a German environmental safety certificate according to M Geok E and with the EPD certificate [Environmental Product Declaration].



Material recycling

At the end of their working life, RENO PLUS Gabion Mattresses can be recycled. The steel wire mesh can be efficiently melted down and re-purposed to create new products, thus significantly reducing the demand for new materials and minimising waste generation.

ADVANTAGES

RENO PLUS Gabion Mattresses

- EPD certified
- Measurable
- High shear stress
- Excellent resistance
- Environmentally safe
- Long working life
- Abrasion resistant





Bermüller & Co GmbH

Rotterdamer Str. 7
90451 Nuremberg

Telephone: +49 (0) 911 - 64200 - 0
Telefax: +49 (0) 911 - 64200 - 90

beco-bermueller.com

