

Pinning Erosamat to a Slope

This Technical Note provides guidance on the pins that can be used to fix **Erosamat** to a slope, how to install them, the number of pins required, and their layout. Erosamat comes in a range of types and colours. Type 1 & 1A are Jute, Type 2 & 4 are coir and Type 3 is polypropylene. This guidance is applicable to all types of Erosamat, and colours shown in the diagrams are indicative only.

Pin Type

The pins used should be specified in the Project drawings. They will either be J pins, U pins, helical pins or biopins. The type of pin typically used will depend on whether there is a limit to the depth that the pins can be installed (see Table 1), the soil type and water velocity/shear stress.

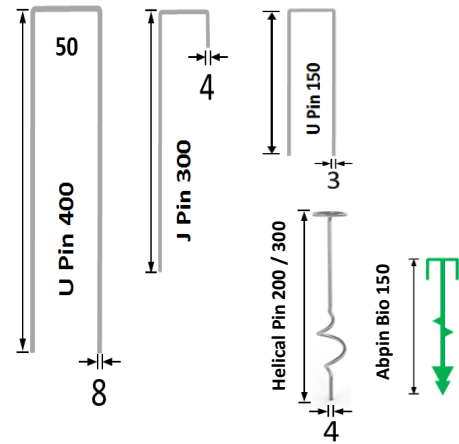


Table 1: Pin Types for use with ABG Erosamat

Pin	Type	Length	Diameter	ABG Erosamat Compatibility	Soil	Stress
Abpin 400/8 U	U Pin	400 mm	8 mm	Type 3	Fill	High
Abpin 300/4 J	J Pin	300 mm	4 mm	All	Fill	Medium
Abpin 150/3 U	U Pin	150 mm	3 mm	All	Top Soil	Low
Abpin 150SL Bio	Pin	150 mm	9 mm	Type 1 & 1A	Top Soil	Low
Abpin 150LL Bio	Pin	150 mm	10 mm	Type 2D & 4K	Top Soil	Low
Abpin 200/4H	Helical	200 mm	4 mm	All	Fill	Medium
Abpin 300/4H	Helical	300 mm	4 mm	All	Fill	Medium

Pin Type Selection

The large U pins are required when the Erosamat Type 3 is installed on spillways or where the soil is very loose. The J pin and helical pin are most often suitable for the majority of applications. Where there is a limit to the depth that the pin can be installed, small U Pins may be preferred. The limited depth may be due to an obstruction of rock layer at shallow depth or the presence of, for example, an impermeable membrane which must be protected from puncture. The biopin is available when decomposition is of concern. Contact the ABG Sales Consultant for further advice on the most suitable pin for each project.

Pin Installation

Both U Pins and J Pins are hammered into the slope using a mallet and should be installed at approx. 10° off perpendicular to the slope as shown below in Figure 1. The helical pins are driven-in using a bespoke Abpin install chuck, fitted to a standard power drill.

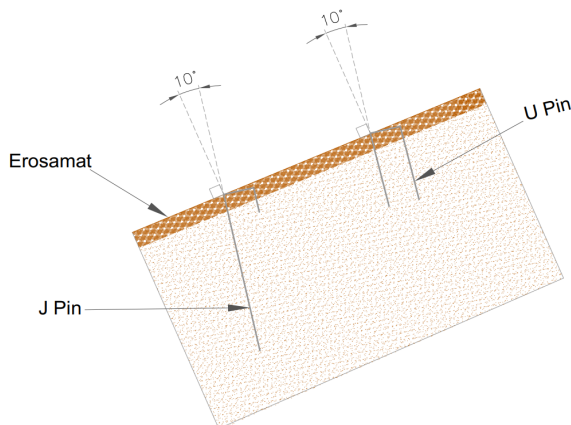


Figure 1a: Pin Installation on Subsoil (NTS)

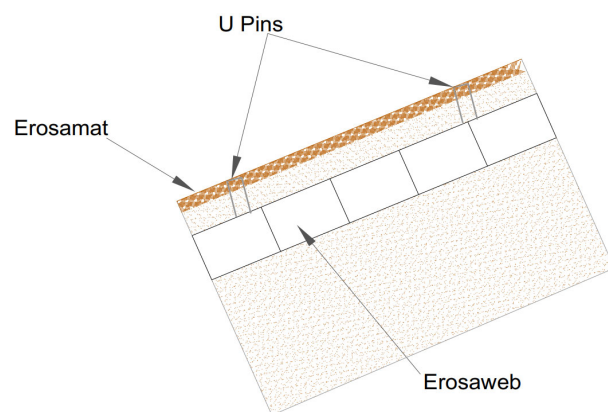


Figure 1b: Pinning Erosamat over Erosaweb geocell (NTS)

Pin Pattern

The layout of pins across an Erosamat blanket will vary depending on the slope angle and soil conditions, the width of the roll of Erosamat, and the type of pin used (e.g. J pin or U pin). Appended to this document are pinning patterns illustrating the pin layout for each of the standard roll widths;

- Erosamat 1.22m roll width Pin Layout Diagram **Type 1**
- Erosamat 1.83m roll width Pin Layout Diagram **Type 1a**
- Erosamat 2.0m roll width Pin Layout Diagram **Type 2 & Type 4**
- Erosamat 2.5m roll width Pin Layout Diagram **Type 3**

These pinning patterns are collectively referred to as the ‘Erosamat Pin Layout Diagrams’ and should be read in conjunction with the advice in this Technical Note. For non-standard roll widths contact ABG for specific advice. The total quantity of pins required will depend on the number of ‘Intermediate Pins’ (pins dispersed evenly across the slope), ‘Panel Overlap Pins’ (pins located between Erosamat panels) and ‘Edge Pins’ (pins at all edges of the slope). The number of Intermediate Pins and Panel Overlap Pins required is specified as a ‘Pinning Pattern’. Table 2 lists the pin frequencies for average ground conditions and the most common roll widths of Erosamat, plus the Pinning Pattern to use in accordance with the Erosamat Pin layout Diagrams. For site specific advice, the ABG Technical Team should be contacted for recommendations.

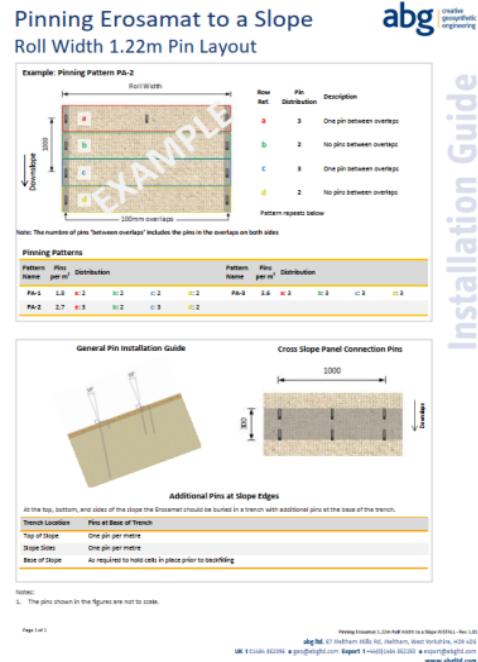


Figure 2: Example Pin Layout Diagram

Edge Pins

At the top, bottom, and sides of a slope covered in Erosamat, the Erosamat should be buried in trenches along each side with additional Edge Pins installed at the base of each trench. Trenches at the top and sides of the slope should have a pin every metre. At the bottom of the slope Edge Pins are only required to help hold the Erosamat in place prior to backfilling – so every two metres should be adequate.

Downslope Panel Overlap Pins

Where Erosamat blankets are laid adjacent to one another the edges must be overlapped and pinned in place. Overlaps running down the slope should be a minimum of 100mm wide with pins at 0.5m centres. These pins are referred to as ‘Downslope Panel Overlap Pins’.

Cross Slope Panel Overlap Pins

Additional pins are required where one end of a roll of Erosamat finishes and the next one starts. These are referred to as Cross Slope Panel Overlap Pins. The Cross Slope overlap should be at least 300mm wide with pins at 0.5m centres at both the top and bottom of the overlap (4 pins per metre length). This is illustrated in the Erosamat Pin Layout Diagram.

Intermediate Pins

Intermediate pins are required to hold the Erosamat onto the slope in close contact with the soil.

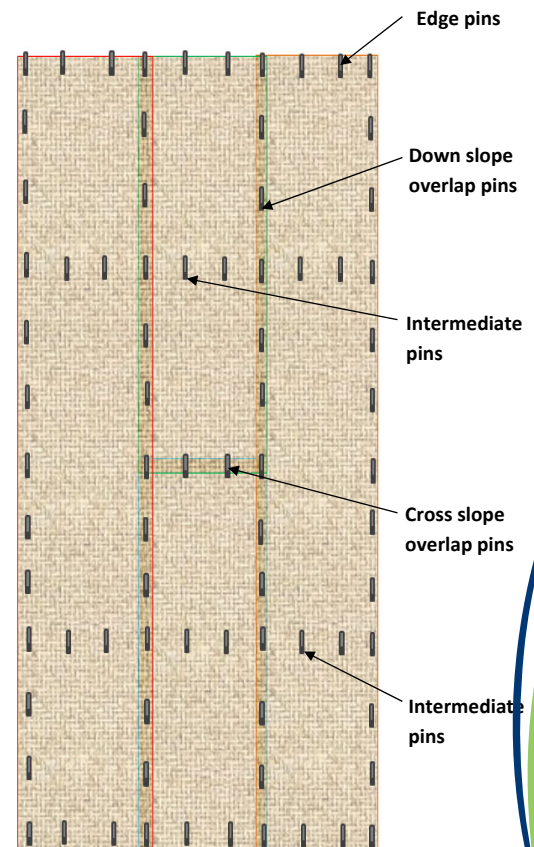


Table 2: Typical Pin Frequencies (excluding edge pins)

Erosamat Type	Erosamat Roll Width	Pin Type	Slope ≤ 1:2 (≤26°)	Slope >1:2 to ≤1:1 (>26° to ≤45°)	Slope >1:1 to ≤2:1 (>45° to ≤65°)
Type 1	1.22m (Pattern PA)	Abpin 300/4 J	1.8 pins/m ² (Pattern PA-1)	1.8 pins/m ² (Pattern PA-1)	2.7 pins/m ² (Pattern PA-2)
		Abpin 150/3 U	1.8 pins/m ² (Pattern PA-1)	2.7 pins/m ² (Pattern PA-2)	3.6 pins/m ² (Pattern PA-3)
		Biopin 150	1.8 pins/m ² (Pattern PA-1)	2.7 pins/m ² (Pattern PA-2)	3.6 pins/m ² (Pattern PA-3)
		Abpin 200/4H	1.8 pins/m ² (Pattern PA-1)	1.8 pins/m ² (Pattern PA-1)	2.7 pins/m ² (Pattern PA-2)
Type 1a	1.83m (Pattern PB)	Abpin 300/4 J	1.5 pins/m ² (Pattern PB-1)	1.8 pins/m ² (Pattern PB-2)	2.9 pins/m ² (Pattern PB-3)
		Abpin 150/3 U	1.8 pins/m ² (Pattern PB-2)	2.9 pins/m ² (Pattern PB-3)	3.5 pins/m ² (Pattern PB-4)
		Abpin 150SL Bio	1.8 pins/m ² (Pattern PB-2)	2.9 pins/m ² (Pattern PB-3)	3.5 pins/m ² (Pattern PB-4)
		Abpin 200/4H	1.5 pins/m ² (Pattern PB-1)	1.8 pins/m ² (Pattern PB-2)	2.9 pins/m ² (Pattern PB-3)
Type 2 & Type 4	2.0m (Pattern PC)	Abpin 300/4 J	1.4 pins/m ² (Pattern PC-1)	1.6 pins/m ² (Pattern PC-2)	2.7 pins/m ² (Pattern PC-3)
		Abpin 150/3 U	1.6 pins/m ² (Pattern PC-2)	2.7 pins/m ² (Pattern PC-3)	3.2 pins/m ² (Pattern PC-4)
		Abpin 150LL Bio	1.6 pins/m ² (Pattern PC-2)	2.7 pins/m ² (Pattern PC-3)	3.2 pins/m ² (Pattern PC-4)
		Abpin 200/4H	Abpin 300/4 J	1.4 pins/m ² (Pattern PC-1)	1.6 pins/m ² (Pattern PC-2)
Type 3	2.5m (Pattern PE)	Abpin 300/4 J	1.3 pins/m ² (Pattern PE-1)	1.7 pins/m ² (Pattern PE-2)	2.5 pins/m ² (Pattern PE-3)
		Abpin 150/3 U	1.7 pins/m ² (Pattern PE-2)	2.5 pins/m ² (Pattern PE-3)	3.4 pins/m ² (Pattern PE-4)
		Abpin 200/4H	1.3 pins/m ² (Pattern PE-1)	1.7 pins/m ² (Pattern PE-2)	2.5 pins/m ² (Pattern PE-3)
	(Spillway Pattern)	Abpin 400/8 U	Contact ABG Technical Team		

Notes:

- The pinning frequencies outlined above should be used for budget pricing only. Contact Technical for advice before finalising the design. Particularly for slopes not specifically equal to 1:2, 1:1, or 2:1, more economic pin spacings than those outlined above can be achieved.
- The Pin frequencies in Table 2 include both intermediate pins and downslope overlap pins (pins to secure overlaps of adjacent sheets). Additional pins for cross slope overlap and anchor trenches are not included in Table 2.
- On slopes steeper than 65° additional measures may be required. Contact ABG for alternative soil retention solutions.
- The final spacing of Intermediate Pins used on site is heavily dependent on the ground conditions on site. As such the values given above are indicative only and no guarantee is given that they are accurate for all sites.
- Pin spacings are based on pins installed in average ground conditions. Spacings may be reduced if pins are to be installed in firmer ground and test pin installation shows improved performance. If poor ground conditions exist the ABG Technical Team must be contacted to provide site specific advice.
- Erosamat laid at the base of water courses will require ballast in addition to pinning.

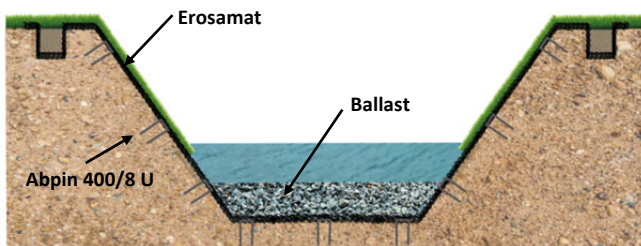


Figure 3: Water courses

- In all situations, Erosamat is an aid to establish vegetation on slopes.
- Further information on the Erosamat installation process is provided in the Erosamat Installation Guide.

Technical Note