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bidim®

Storage & Installation Guide

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1 HANDLING AND STORAGE

bidim® geotextile rolls are packaged in a UV stabilised, tight plastic wrapping. Each roll has a unique roll number which indicates the grade, width and length of the roll and are colour coded according to the various different grades.

bidim® geotextile rolls may contain a join over the roll length. Such rolls will be identified by a 'JOIN' sticker on the packaging. The roll dispensing direction is indicated by an arrow sticker on the packaging.

Site handling and storage practises should be such that exposure to conditions which may reduce or alter the geotextile properties are minimised.

Rolls are supplied in small despatches on a small truck or bakkie with racks and larger consignments are transported to site on a flatbed truck or semi-trailer. Rolls can be unloaded using a forklift, spreader bar or end 'carpet' prong.

Overview

It is recommended that:

- Geotextiles rolls are stored off the ground and under shade cover or tarpaulins.
- Installation of 5.3 metre wide rolls over difficult terrain be assisted with a spreader bar (refer to Figure 4 and the safe handling guidelines for details on safe usage).
- Once unrolled, the geotextiles should be covered as soon as possible. The geotextile should not be left exposed for more than 30 days.
- Adequate cover material should be in place before construction plant is allowed to traffic the geotextile. A recommended guide is 150mm minimum for firm foundations and 300mm minimum for soft foundations.
- Contaminated geotextile, damaged as a result of rainfall, erosion or other influence during installation should be removed and replaced.
- Geotextiles damaged when dragged across rough surfaces should be removed and replaced as the strength and filter properties of the geotextile may be affected.
- Safe work practices to relevant occupational health and safety and site specific requirements should be implemented prior to the installation of the geotextiles.

Roll Weights

Range	Length (m)	Approximate Mass Per Roll Width (kg)				
		1.32	1.76	2.65	3.53	5.3
A1	150	29	38	57	76	114
A2	150	33	44	65	87	130
A3	150	39	51	77	102	153
A4	150	45	59	89	118	177
A5	150	X	X	113	X	225
A6	75	X	X	70	X	140
A7	75	X	X	115	X	224
A8	50	X	X	105	X	210
A10	50	X	X	138	X	275

(X = width not available in that grade)

2 PLACEMENT

Placement procedures should be in accordance with the project specifications. This will include compliance with stripping, grubbing and final trim, grading requirements, cover material specifications, lift thicknesses and equipment requirements. Other considerations including placement in wind and underwater should be addressed in construction or site specifications.

Performance considerations such as removal of wrinkles and folds or pre-tensioning the geotextile should be addressed as specified. Seams should be exposed with the seamed joint facing upwards, such that the seam can be inspected and repairs easily made should faults be encountered. For placement of larger 5,3m rolls, a spreader bar is recommended. (Refer to figure 4 and the Safe Handling Risk Analysis).

2.1 Installation on Slopes

Stability of the geotextile on the slopes should be assessed by the design engineer. Installation of rolls on slopes with a spreader bar is recommended. (Refer to figure 4 and the Safe Handling Risk Analysis).

Geotextiles should be deployed down the slope with overlaps in the slope direction. If unavoidable, geotextile panels should be placed according to the roof tile principal with intermediate joints anchored using suitable pins (refer to Figure1).

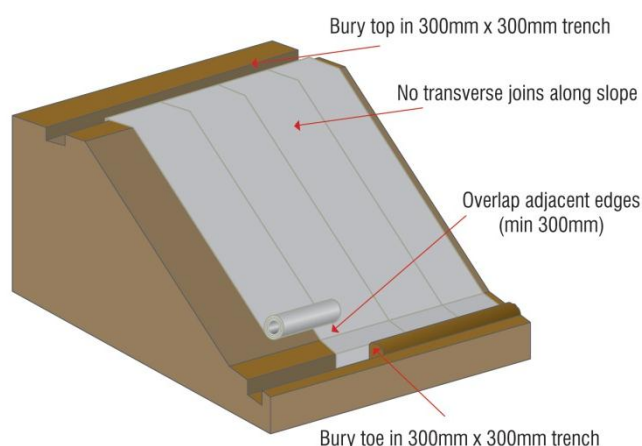


Figure 1. Correct roll deployment

2.2 Anchor Trenches

Geotextile installed on slopes may require securing by placement in an anchor trench at the top of the slope. Generally, geotextiles should be secured in an anchor trench on slopes steeper than 3 horizontal to 1 vertical. (For details of installation on slopes and rock revetments refer to Figures 2 and 3).

The anchor trench should be constructed free of sharp edges and loose material. Geotextile should be placed inside, down and front face, along the base and up the back face, with backfilling sourced from clean and compactable insitu material or sand. Place and compact the backfill material to the finished surface level (refer to Figures 2 & 3).

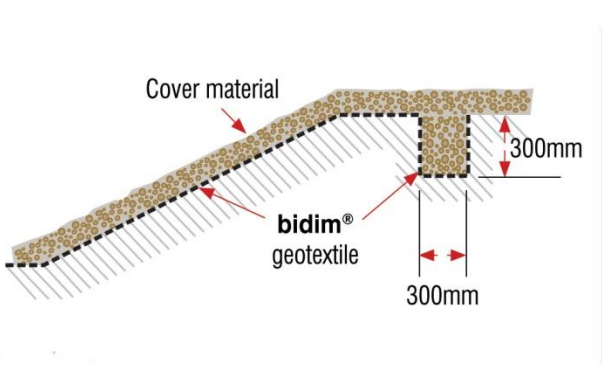


Figure 2. Slopes

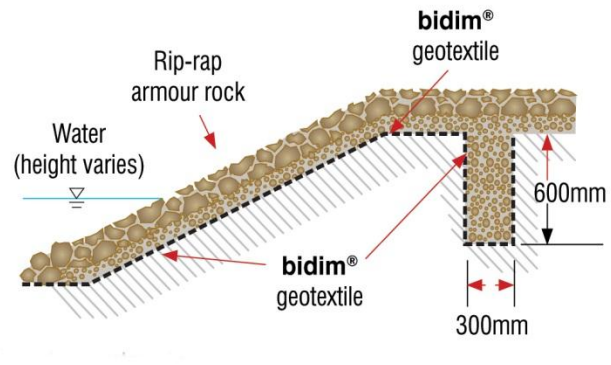


Figure 3. Revetments

2.3 Spreader Bar

Installation of 5,3 metre width rolls with spreader bar is recommended.

Refer to Figure 4 and to the Safe handling Risk Analysis below for details of geotextile spreader bar handling.

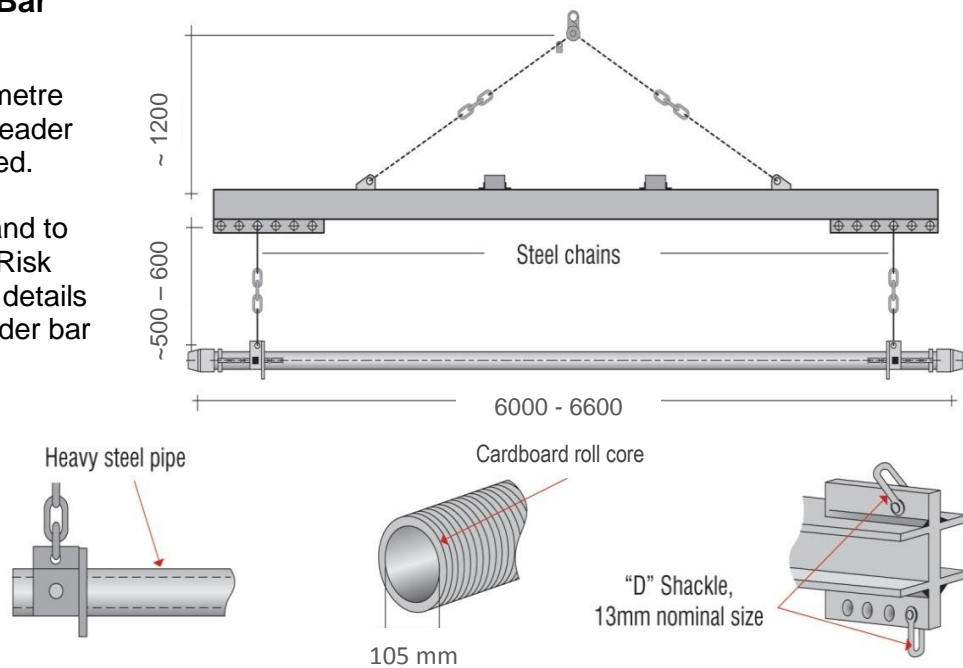


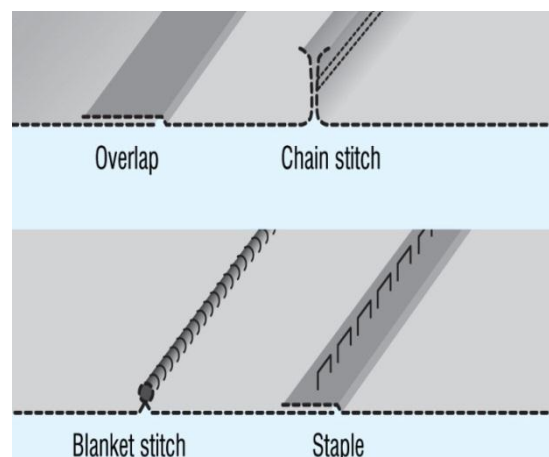
Figure 4. Spreader Bar

bidim® Spreader Bar Assembly – Safe Handling Risk Analysis

	Sequence of Basic Job Steps	Hazards	Controls/Recommended
1.	Brief all personnel on the OH&S Issues.	Not wearing PPE for task.	Wear high visibility vest, hard hat, safety boots, safety glasses, long trousers at all times.
2.	Ensure all the lifting equipment is in sound order and the chains are not twisted, are equal length and spacing on the spreader beam.	Uneven lifting of the roll.	Ensure chains are free and equal in length.
3.	Insert pole manually into central core of the bidim® geotextile roll.	Looking down core or viewing core at eye level.	Do not use machinery to force pole through the core. Keep away until the pole protrudes.
4.	Shackle spreader bar assembly onto machine.	Incorrectly attached to machine.	Check shackles and connections before lifting.
5.	Position spreader beam over, or preferably on the ground alongside the roll to be lifted.	Wind or machinery movement causing the suspended frame to swing around uncontrollably.	When frame is suspended, ensure stability using guide ropes.
6.	Attach end collars onto pole and tighten locking nuts.	Not (adequately) tightening locking nuts.	Check nuts.
7.	Check chain attachment position (eyelet) on frame to ensure chains hang vertically when roll is suspended.	Chains angle outwards (at top of chain), tending to pull collars off the end of the pole.	Check each roll as core widths (and hence position of the collar) may vary slightly from roll to roll.
8.	Raise spreader bar.	Lifting too fast/tangled chains. Uncontrolled movement.	Raise in controlled manner with no personnel near or beneath lifted roll.
9.	Move roll into start position.	Roll/frame jerking and swinging can lead to personal injury.	Keep personnel clear and use guide ropes to minimise roll swinging without standing beneath or near the suspended roll.
10.	Place roll into position.	Lowering onto personnel.	Roll must be positioned and grounded, clear of personnel.
11.	Unroll at rate not faster than walking pace.	Uncontrolled roll frame movement can cause personal injury.	Keep personnel at a safe distance behind the roll.
12.	Once the roll is dispensed, remove pole from core manually after detaching chains from the spreader bar.	Removing pole with machine, uncontrolled spreader bar can cause personal injury.	Manual operation only, with all chains disconnected and machinery stationary.

3. JOINING

Seam and overlap requirements should be specified by the design engineer, for both factory and field seams. Where overlaps are to be used, 300mm or more is required. In critical applications such as embankments and revetments, overlaps in excess of 900mm may be required to obtain satisfactory performance. Actual overlap requirements will depend on the particular application and load applied to the geotextile. On embankment slopes and soft subgrades, overlap of the geotextile strips is not recommended and should be replaced with seamed joints.



Design of seam strengths should meet specified levels of seam efficiency proportionate with the geotextile strength. Hence the geotextile design strength may be greater in order to provide seam strength efficiency equal to the required geotextile tensile strength.

Several types of seams and sewing techniques may be used to meet requirements for specified seam efficiencies. A “lock-type” stitch that is not easily unravelled is preferred to a “chain stitch” that can be unravelled when pulling the thread line from the terminal end of the seam. If single-thread chain-type stitches are used, double seams should be sewn and a careful field observation program established to ensure seam integrity.

3.1 Overlapping

Overlap joints provide continuity between adjacent geotextile rolls through frictional resistance between the geotextile layers. Sufficient overlap width is required to prevent soil squeezing into cover material at the geotextile overlap. The amount of overlap depends primarily on the soil conditions and the potential for equipment to rut the subgrade.

If the ground will not rut under construction activities, a minimum overlap of 300mm should provide the pullout resistance required to achieve continuity of specified tensile strength. As the potential for rutting and squeezing of soil increases, the required overlap increases. Rutting potential can be related to subgrade strength and the CBR value can be used as a guideline for the minimum overlap required- see below.

Recommended Minimum Overlap Requirements

CBR	Minimum Overlap
>3	300-450 mm
1-3	0,6 – 1,0 m
0.5-1	1,0 m or Sewn
<0.5	Sewn
All roll ends on subgrade	as above
Roll ends on slopes	1,0 m or sewn

3.2 Sewing

Site sewn geotextile joining requires a portable sewing machine. Ideally, thread used in the sewing machine should be sufficient strength to provide a sewn seam strength equal to specified seam efficiency. Seam tensile strength is approximately two-thirds of the geotextile strength when high - strength thread and double-sewn overlap 'J' seams are used. Seam efficiencies of between 50% - 60% are achievable with standard threads available for portable sewing machines. All field seams should be double sewn, with the thread tied off at the end of each sewing pass and in other locations where thread ends are produced. Sewing machines are generally powered by electric motors and a portable electrical generator may be required on site.

Geotextile placed on embankments can be deployed with factory sewn panels at maximum widths that can be safely handled by construction personnel. Site joining can be completed with field - sewn joints sewn down the embankment. Special seaming layouts should be considered where large areas or embankment protection is to be installed to ensure geotextile joints are orientated to provide design in the appropriate direction.

As the placement of the geotextile requires significant labour, the process may be simplified by using prefabricated geotextile panels. These panels can be prefabricated off site to the following recommendations:

- a. The geotextile should be manufactured to the maximum machine width possible.
- b. Geotextile panel widths should be factory sewn to provide the maximum width compatible with transport, field handling and installation length.
- c. Geotextile rolls should be transported in lengths equal to one or more multiples of the embankment slope length.

4 GEOTEXTILE REPAIR

Geotextile repair procedures for damaged or disturbed geotextile sections (i.e. rips, tears, clogging) should be as detailed in project specifications. Procedures should include overlap requirements, seaming requirements or replacement requirements. Rectification by sewing is recommended in accordance with the guidelines in this document.

5 FILL PLACEMENT

Fill over a geotextile should be placed in such a way that the integrity of the joints is maintained. Driving vehicles or machinery directly over the geotextile can cause damage and must be avoided. Use only light construction equipment initially over weak soils.



6 OUTDOOR EXPOSURE

bidim® polyester geotextiles are manufactured to withstand exposure for periods of up to 1 month with limited strength loss and are tested periodically in accordance with ASTM D4355 (results can be provided upon request).

Recommended exposure on site is 14 days prior to cover material placement on road pavements, trenches and slopes. Kaytech supplies bidim® geotextiles wrapped in UV stabilised PE wrapping to prevent it from damage in transit and provide prolonged exposure protection on site.

Reference;

- AASHTO M288-06 , Geotextile Specification for Highway Applications
- Koerner – Designing with Geotextiles – Fifth Edition