

ELCOSEAL SPREADER BAR # _____

VISUAL INSPECTION CONDITION REPORT

Customer : _____

CHECK : **OUT** Date : _____ **IN** Date : _____

STORE LOCATION : _____

A. Main Lifting Beam

Item	Number of items	Item name	Checked OUT	Checked IN	Remarks
1	1	Beam			
2	1	Main Lifting Hook with 2 swivels			
3	2	Main Lifting Chains			
4	1	Metal Tag on Chain with the date of testing			
5	2	Swivels			
6	2	D – shackles and pins			

B. Round Mandrel

Item	Number of items	Item name	Checked OUT	Checked IN	Remarks
1	1	Mandrel			
2	2	Slide on end flanges on Mandrel			
3	2	T - shaped Locking pins			
4	2	D - shackles and pins			
5	4	Swivels			
6	2	Small chains with metal tag on chain with the date of testing			
7	1	Documentation (20 pages)			

This equipment has had and “in service” inspection and found to have no obvious defects:

Checked out:

Checked in:

Name

Name

Signature

Signature

Remarks : _____

Dear Customer :

- **On receipt of this equipment, please check all equipment has been received, ensure your site staff read and understand the operating, maintenance and safety information, and use the equipment in a safe manner.**
- **Responsibility for safe operation of the equipment, and safety of your staff is to your care.**
- **At the conclusion of the use of the equipment, please clean the equipment, repack it for transportation and return to Maccaferri.**
- **Please advise if there are any missing parts. All equipment usage to be in accordance with Maccaferri's Hire Agreement. You will be charged for any damaged or missing components.**

ELCOSEAL SPREADER BAR

WARNING !

Any alterations to this hire equipment may prove dangerous to the operator and will be in breach of the Equipment Hire Agreement

**Service must be performed only by an authorised Maccaferri service organisation.
Please contact Maccaferri (0800 60 60 20) for return of this equipment or servicing if it is found to be faulty.**

***This documentation is also available on our website
www.maccaferri.co.nz***

ELCOSEAL SPREADER BAR

Note all components should be stored and be transported connected together as a set to ensure parts are not lost. To prevent damage to the beam, mandrel and chains must be wired together.

Refer drawings and photos attached.

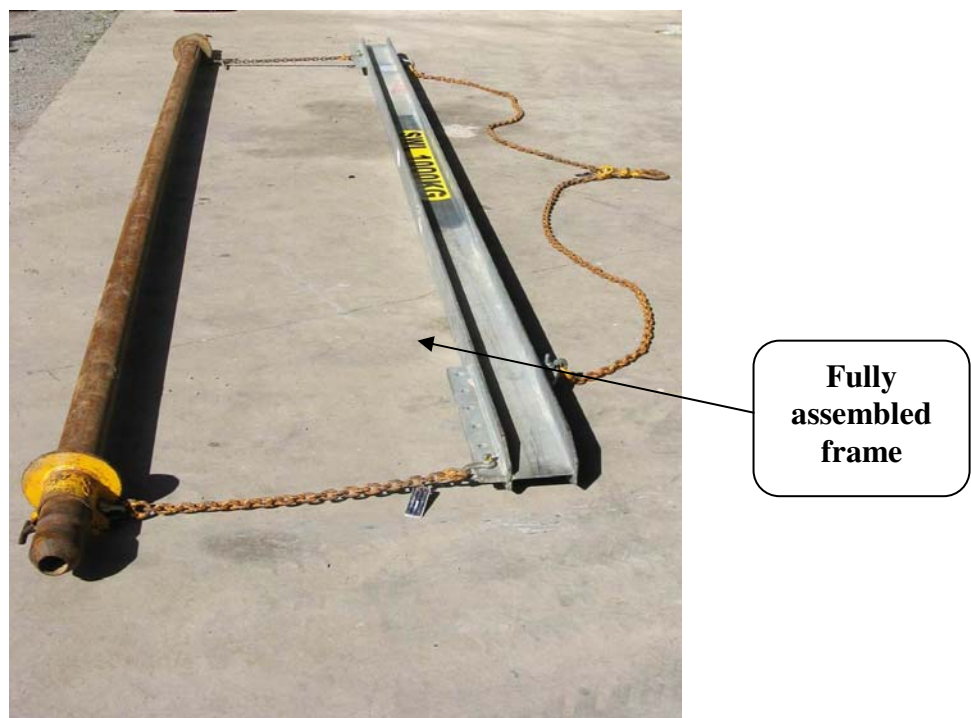
Components

One main lifting beam (A)

Check for damage such as being bent or major dents

One round mandrel (B)

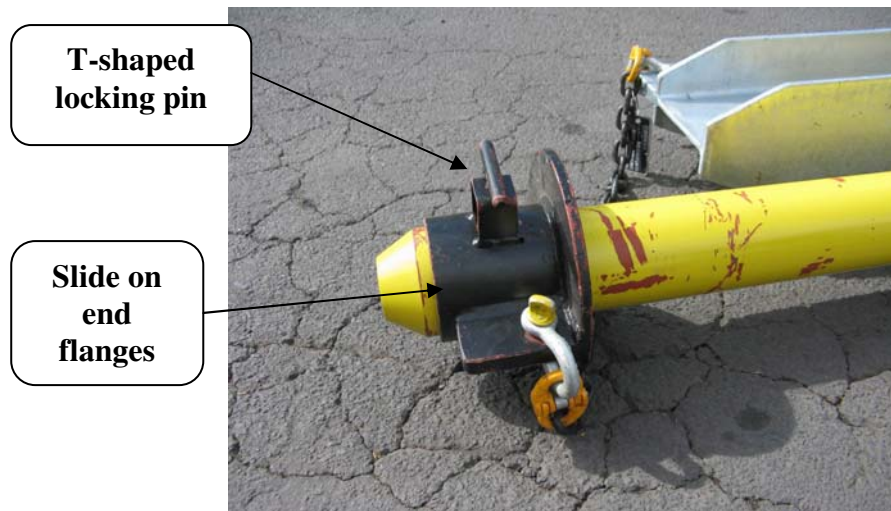
Check that it isn't bent or has major dents.



Two slide on end flanges on the mandrel

Check that the spring loaded T shaped locking pin works and isn't damaged. These should be placed on each of the mandrel with the locking pins securing the flanges in the holes on the mandrel

Note on some sets the flanges are left and right handed on others the mandrel is left and right handed. Components must stay together as sets.

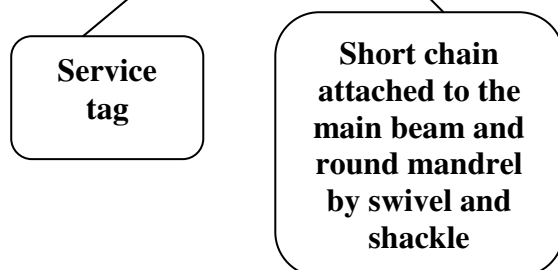
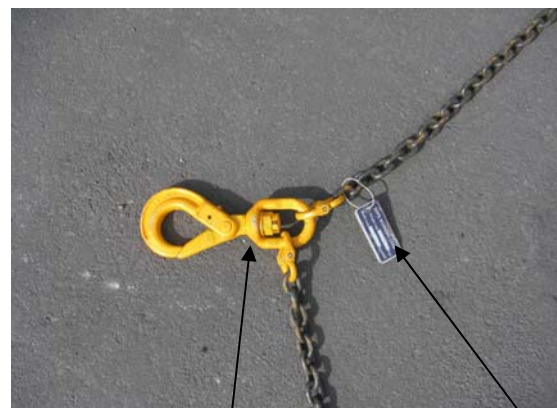
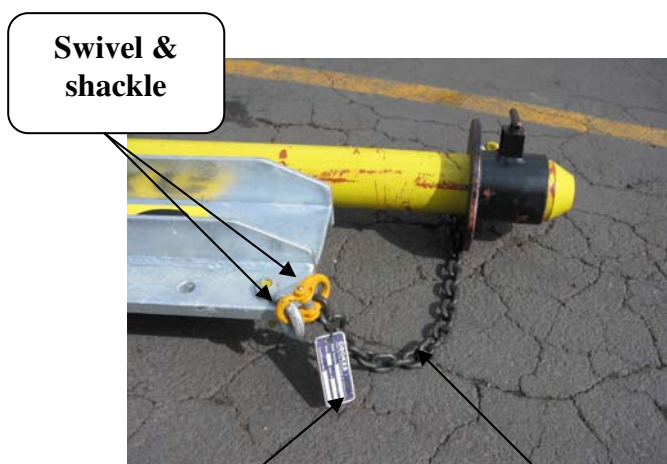


Two short chains with "D" shackles both ends connecting end flanges to main beam

Check that pins are not falling out, chains are not damaged and correct bolts are in shackles.

Each chain should have a metal tag indicating the last date of test.

This should not be more than one year old.





ELCOSEAL Transport and Handling Instructions

Applicable to: Stores Personnel
Carrier and transport operator
Site Personnel Unloading and Storing Goods

1. Wrapper Damage:

ELCOSEAL is moisture sensitive! After transportation and unloading the plastic wrapping must be checked. Minor damage must be repaired immediately and effectively with a strong weather resistant self adhesive tape. (Note the plastic wrapper may need to be cleaned first). If the wrapper cannot be repaired or there is any other damage contact **Maccaferri immediately, on 0800 606020** and keep the roll under cover.

2. Unloading and handling:

Rolls must always be unloaded and moved by machine. Under no circumstances should ELCOSEAL rolls be dragged, lifted by one end only, pushed to the ground from delivery vehicle or otherwise unloaded in a fashion which could damage the roll.

The rolls must be unloaded on to a flat hard, dry and free draining surface free of any sharp or protruding objects. The surface must be even and provide continuous support for the rolls.

3. Lifting:

ELCOSEAL rolls are heavy (between 750 kg and 1100 kg) and should be carefully handled by either:

- a) Using a suitable "carpet prong" protruding from the front end of a suitable forklift (> 3.5 tonne). The prong must be at least three quarters the length of the roll and be capable of supporting the full weight of the ELCOSEAL roll without significant bending.
- b) Rolls may be lifted by two suitable rated slings using a "choker" configuration wrapped around the ELCOSEAL rolls at one third points. Where Maccaferri slings are supplied these must be kept with the rolls and delivered to the consignee as a separate line item.

Rolls must be handled with care to prevent excessive deformation or bending of roll. The rolls must not be bounced, jerked or transported any distance using slings. Care must be taken at all times to ensure the core is not damaged or broken.

Rolls should never be lifted with the forks under the rolls as this will damage the wrapper and the product.

4 Storage:

Rolls must be protected from contact with water. Unless the rolls are stored inside a waterproof building or container they must be fully covered by a well-secured waterproof cover.

The rolls should be stored lying flat, continuously supported and free of any standing water. When storing outside sites with a small gradient are preferred.

The maximum storage height is four rolls.

Where the rolls are transported or stored against vertical bars or stanchions the rolls must be aligned so that they are in vertical rows and not nestled into each other. Failure to do this will result in excessive pressure on the vertical supports and damage to the rolls.

5 Carriers responsibility:

Carriers must comply with the above instructions and ensure proper care for the rolls.

If the carrier arrives at the job site where there is no equipment to lift off the rolls, or there is no site personnel available to receive the rolls the carrier **MUST** phone **Maccaferri on 0800 606020** to obtain instructions. **UNDER NO CIRCUMSTANCES** shall the carrier push the rolls off the truck.

The carrier shall co-ordinate site delivery times with the consignee, and, unless the carrier vehicle has a Hiab unit fitted to the truck, the carrier shall leave the unloading to the consignees care. In all instances the unloading must take place in the presence of the consignee who must sign that the rolls have been delivered in good condition.

ELCOSEAL®

Installations Guidelines



The Next Generation,
Australian Made Geosynthetic Clay Liner
Engineered For Performance



CERTIFIED QUALITY
MANAGEMENT SYSTEM
— ISO 9001 —

Accreditation number: 8122079245

ELCO Solutions Pty Ltd
Certification Number: 8264



ELCOSEAL® Installation Guidelines

Index

1.	INTRODUCTION	3
2.	PACKAGING, TRANSPORTATION & UNLOADING ON SITE	3
3.	STORAGE.....	4
4.	INSTALLATION REQUIREMENTS	4
5.	INSTALLATION TEAM	4
6.	SUBGRADE PREPARATION	4
6.1	Earthen Subgrades	4
6.2	Geosynthetic Subgrades.....	5
6.3	Anchor Trenches	5
7.	WEATHER CONDITIONS FOR INSTALLATION	5
8.	ELCOSEAL® GCL PLACEMENT	6
9.	TREATMENT OF ELCOSEAL® PANEL OVERLAPS.....	7
9.1	Cross sections of different ELCOSEAL® grades	7
9.2	Treatment of Edge (or longitudinal) overlaps	7
10.	TREATMENT OF END OVERLAPS (TRANSVERSE DIRECTION)	8
10.1	Preparation of End overlap area	8
10.2	Undercoat application	8
10.3	Topcoat application.....	8
10.4	Closing the Overlap	9
10.5	Additional requirements for ELCOSEAL® X2000 and X3000.....	9
11.	INSTALLATION ON SLOPES	10
12.	CONNECTIONS & PENETRATIONS	11
13.	PREPARATION FOR PLACING SOIL COVER.....	12
14.	SOIL COVER PLACEMENT	12
15.	REPAIRS.....	12

1. INTRODUCTION

ELCOSEAL®¹ is a needle-punched Geosynthetic Clay Liner (or GCL) produced in Australia in accordance with the ISO 9001:2000 Quality Management System.

ELCOSEAL® consists of premium grade sodium bentonite powder, which acts as the swelling and sealing component, embedded and sandwiched between two or more geotextiles. The composite is then needle-punched through all layers and thermally-locked developing high connection strength. Thus, ELCOSEAL® is a shear strength transmitting GCL.

ELCOSEAL® is generally fast and easy to install, however the performance of the GCL is dependent on the quality of its installation. It is the installer's responsibility to follow these guidelines and the project specifications and drawings whenever possible. It is the engineer's and owner's responsibility to provide construction quality assurance (CQA) for the installation to ensure that the installation has been executed properly. Variance from this guideline is at the engineer's discretion.

Recommended further reading:-

1. ASTM D5888 - "Standard Guide for Storage and Handling of GCL's"
2. ASTM D6102 - "Standard Guide for Installation of GCL's"
3. ASTM D5889 - "Standard Practice for Quality Control of GCL's"
4. ASTM D6072 - "Standard Guide for Obtaining Samples of GCL's"

2. PACKAGING, TRANSPORTATION & UNLOADING ON SITE

ELCOSEAL® rolls are packed in moisture tight plastic wrapping. The standard roll dimensions and weights are listed in Table 1. Every ELCOSEAL® roll has a unique roll number on the wrapping label and on the panel itself.

Table 1 - ELCOSEAL® standard grade roll dimensions and weight.

Grade	Width (m)	Length (m)	Diameter (m)	Mass (kg)
X800	4.7	35 or 45	~0.55	~800 or ~975
X1000	4.7	35	~0.52	~875
X2000	4.7	30	~0.52	~730
X3000	4.7	30	~0.55	~825

Note: Up to 15% of rolls may contain a join over the length. These rolls are marked on the outside of the wrapping with a green circular sticker indicating a join and the individual panel lengths.

ELCOSEAL® rolls are usually delivered to site in closed containers or covered trailers on flatbed trucks. At the point of unloading the rolls need to be accessible either from the top of the trailer or the container opening.

Should any damage to rolls occur in transit it must be immediately brought to the attention of the Supplier, who will advise on the required course of action.

A flat, hard, dry and free draining surface must be provided for unloading and storage. Rolls may be off-loaded using:-

- a **Spreader Bar with steel tube insert through the core of the rolls. Refer to Section 8 and the "ELCOSEAL® Spreader Bar Safe Usage Guideline" in the ELCOSEAL® Product folder for detailed information.**
- or ELCOSEAL® may be unloaded and handled using a 'carpet prong' protruding from the front end of a forklift (>3.5 tonne) or other equipment. The prong should be at least 3/4 the length of the core and also must be capable of supporting the full weight of ELCOSEAL® without significant bending.
- the two slings provided by the manufacturer (upon request) wrapped around the ELCOSEAL® roll at third (1/3) points, fixed to an excavator bucket or a front-end loader. Slings should not be used for general lifting and transportation around the site. If excessive deformation or bending of the roll occurs the integrity of the composite may be affected. A steel tube or similar reinforcement can be inserted into the core of the roll to prevent excessive deformation across the roll during off-loading.

Under no circumstances should ELCOSEAL® rolls be dragged, lifted by one end only, pushed to the ground from the delivery vehicle, or otherwise unloaded in a fashion which could damage the roll.

After transportation and unloading the plastic wrapping should be checked. Minor damage should be repaired with weather-resistant adhesive tape. Wrapping should only be removed immediately before use. The maximum storage height is four rolls.

3. STORAGE

ELCOSEAL® rolls should be stored in their original, unopened packaging in a location away from construction traffic but sufficiently close to the active work area to minimise handling.

The designated storage area should be level, dry, well-drained, stable, and should protect the product from:-

- precipitation
- chemicals
- standing water
- excessive heat
- ultraviolet radiation
- vandalism and animals

ELCOSEAL® rolls should always be stored lying flat, continuously supported, and should never be stored standing on one end. Enclosed indoor storage such as shipping containers or a warehouse environment is preferred if ELCOSEAL® is to be stored for long periods.

4. INSTALLATION REQUIREMENTS

- Excavator (tracked or wheeled) or front-end loader
- Spreader Bar/Loading Frame
- Bentonite Paste, available in 2 options:-
 - Option A - Premixed from the supplier in 20 litre buckets (Undercoat and Topcoat).
 - Option B - 25 kg bag of TruGel® powder to be mixed on site.
 - Water (water container)
 - Heavy duty drill with industrial whisk (high shear force required)
 - Mixing containers
- Trowel
- Carpet knife or knife with covered blade (for safety)
- Felt pens or chalk
- Measuring tape
- Broom
- Dusk Masks & Goggles (optional) - refer to ELCOSEAL® MSDS for recommended Dust Mask.

5. INSTALLATION TEAM

Before installing ELCOSEAL® this guideline should be read thoroughly by the installation personnel. The installation team should be aware of their individual roles in ensuring a quality installation. Any questions raised by the installation team that cannot be answered by this document should be referred immediately to the Supplier.

6. SUBGRADE PREPARATION

The preparation of the subgrade before placement of any lining material is critical to the system's performance. The surface(s) upon which ELCOSEAL® is to be laid should be suitable for the intended application and function.

ELCOSEAL® will generally be placed on either an earthen (eg. compacted clay) or geosynthetic (eg. geotextile or geocomposite) subgrade.

6.1 Earthen Subgrades

The surface upon which ELCOSEAL® will be deployed should conform to the following:-

- The subgrade should be firm and unyielding (typically compacted to >90% density), without abrupt elevation changes, and be proof rolled with a smooth drum roller immediately prior to deployment of the panels. The subgrade should not be disturbed or rutted by the equipment deploying the rolls or other traffic. No foreign matter

or stones loose on the surface or penetrating out of the subgrade >10mm should be allowed. The engineers approval of the subgrade needs to be obtained immediately prior to roll deployment.

- In applications where ELCOSEAL® is the sole or primary barrier, and will be subjected to constant or long-term hydraulic heads exceeding 300mm (1 foot), subgrade surfaces consisting of gravel or granular soils may not be appropriate due to their large void contents and puncture potential. In these applications, the top 150mm of the subgrade should possess a particle size distribution where at least 80% of the soil is finer than 0.25mm (or #60 sieve) - unless the ELCOSEAL® grades X2000 or X3000 are being used, (see below).

For X2000 and X3000 grades (with a composite woven/nonwoven carrier geotextile) in high hydraulic head applications:-

Subgrade materials **recommended** without further investigation are:-

- Clays or clay-based mixes
- Sandy Clays (with > 20 % fines)
- Silty or Loamy Clays (with > 20% fines)
[fine grained soils should be placed at suitable moisture contents for construction operations and roll deployment - that provide adequate bearing capacity to deploy the rolls without disturbance of the subgrade - ie no rutting or large deflections]
- Well graded sands and gravels ($d_{max} < 32$ mm, $d_{60} < 5$ mm, $d_{20} < 0.15$ mm)
[these materials should bind and have good bearing capacity when compacted/rolled.]

Subgrade materials **not recommended** without further investigation:-

- Single-sized and gap-graded sands and gravels of any size or description.
- Sands or soils that have low bearing capacity at the moisture contents during the construction/ deployment operations (ie materials that do not bind when rolled, or will heave or shove under equipment or foot traffic during or after deployment).
- Subgrades that have a bony or porous appearance after compaction and rolling.

6.2 Geosynthetic Subgrades

When deploying ELCOSEAL® over a geosynthetic material such as a geomembrane or geotextile, the surface should be firm and unyielding as per the requirements for Earthen Subgrades. The equipment used to deploy ELCOSEAL® should be approved for use by the Design Engineer and/or the Supplier of the underlying geosynthetic material. Generally, the underlying geosynthetic and ELCOSEAL® rolls will be deployed consecutively such that each layer is side-cast from equipment tracking over the earthen subgrade - unless specialised light rubber tyred dispensers are available and approved by the Design Engineer that allow direct trafficking over the geosynthetics.

6.3 Anchor Trenches

Anchor trench and slope stability considerations should be assessed by the Design Engineer.

As a general guide: -

- An anchor trench should be used at the top of slopes steeper than 7H: 1V. (see Figure 15 for a typical anchor trench detail).
- The anchor trench should be constructed free of sharp edges or corners and maintained in a dry condition. The ELCOSEAL® panels should be placed down the front face and along the base of the anchor trench. The base of the anchor trench should not contain large gravel or loose material and the trench backfill material should be compacted.

7. WEATHER CONDITIONS FOR INSTALLATION

Light rainfall¹ should not affect the installation of ELCOSEAL® provided deployed panels are covered and confined by 300mm of cover soil (or equivalent) within 2 hours of first exposure to the light rain. Heavy direct raindrop impact should be avoided. The ELCOSEAL® panels can be covered during heavy rainfall events with a tarpaulin or plastic sheet if there is not enough time to complete soil cover placement.

Avoid placing ELCOSEAL® in areas where water is ponding unless panels can be confined immediately (with 300 mm cover soil or equivalent).

1. Light rainfall is defined as < 5mm / hr intensity

8. ELCOSEAL® GCL PLACEMENT

The ELCOSEAL® roll wrapping should only be removed immediately prior to installation. On site, ELCOSEAL® is unrolled along the prepared subgrade using the Spreader Bar assembly as shown in Figures 1 and 2.

ELCOSEAL® should only be trafficked by light, low tyre pressure vehicles (no tracked vehicles).

Rolls must be laid without folds on the subgrade with a standard overlap of 300 mm in both the longitudinal and transverse direction. For longitudinal or edge overlaps, the blue coloured line on the underside of the panels can be used to ensure the correct overlap width. The edge of deployed or previously placed panels needs to coincide or match with the visible blue line on the roll being deployed.

The transverse or end overlaps need to be sealed using bentonite paste that is applied in 2 layers with different consistencies. The treatment of end (transverse) overlaps is detailed in Section 10.

Rolls can be cut to length with a carpet/stanley knife. When overlapping cut panels bentonite paste will need to be applied as per the requirements for end (transverse) overlaps in Table 2 of Section 9.

No trafficking or walking should occur over the overlap region. The overlap must also be free from folds and foreign matter (eg. soil). Any soil particles on the laps must be swept away carefully.

Overlaps should occur in the direction of ground slope in a similar manner to roof tiles.

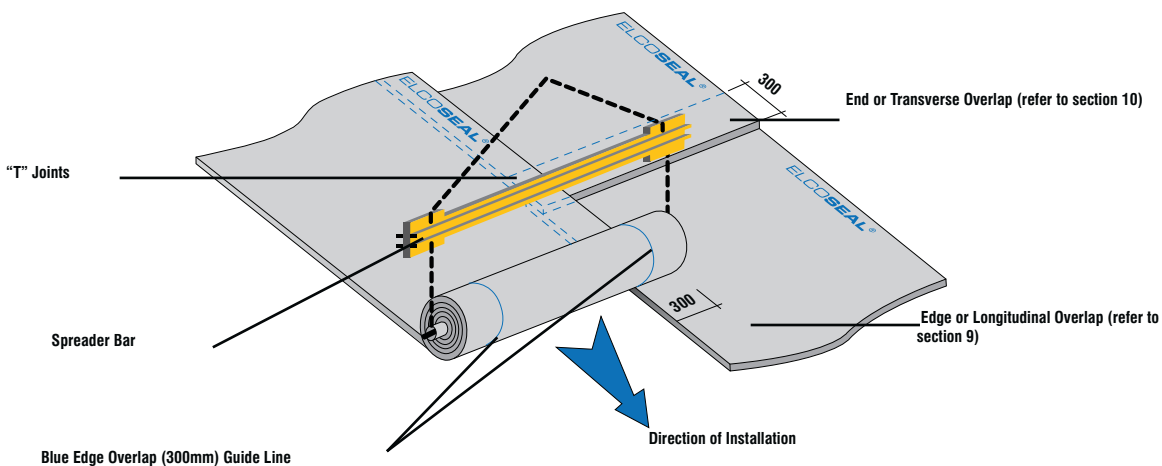


Figure 1. ELCOSEAL® deployment using the standard ELCOSEAL® Spreader Bar
 [Important: Refer to the “ELCOSEAL® Spreader Bar Safe Usage Guideline” prior to using the lifting equipment and ensure Occupational Health and Safety requirements have been met and potential hazards are eliminated]

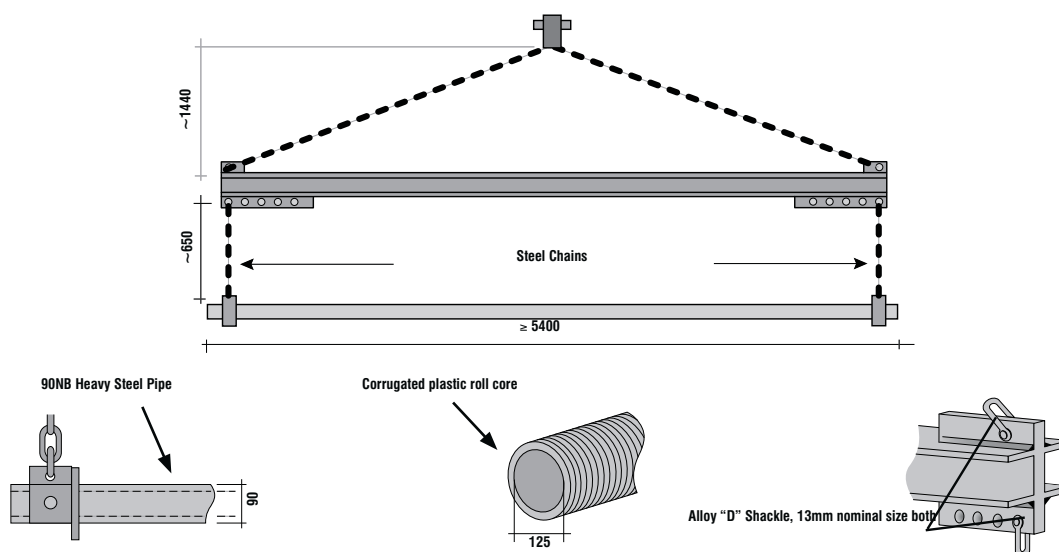


Figure 2. Spreader Bar Assembly - 1000 kg safe working load (Structural Engineer shop drawings provided upon request)

9. TREATMENT OF ELCOSEAL® PANEL OVERLAPS

The composition of the various ELCOSEAL® grades are not identical, and as a result the treatment of the panel overlaps differ slightly. Figures 3, 4, and 5 show the grades in cross-section and highlight how the panel edges in the roll (or longitudinal) direction differ. The treatment of the overlaps for each grade has been summarised in Table 2. **Selection of the appropriate ELCOSEAL® grade should be discussed prior to installation with the Supplier.**

Table 2 - Summary of ELCOSEAL® panel overlap treatment to be performed on site.

ELCOSEAL® Grade	Minimum Overlap Length (mm)	Edge (or longitudinal) Overlaps	End (or transverse) Overlaps			
		Are edges self sealing?	Undercoat	Topcoat	Fillet of Bentonite	XRoll
X800 (Figure 3)	300	✓ ₁	✓ ₂	✓ ₂	✗	✗
X1000 (Figure 3)	300	✓ ₁	✓ ₂	✓ ₂	✗	✗
X2000 & X3000 (Figure 4)	300	✓ ₁	✓ ₃	✓ ₃	✓ ₃	✓ ₃

Notes:

1. During the ELCOSEAL® manufacturing process, bentonite powder is encapsulated into the upper nonwoven geotextiles along the edges of each roll. Subsequently, the Edge (or longitudinal) overlaps do not require any additional treatment. See Figure 5.
2. See Figure 10 for a cross section of treated End (or transverse) overlaps.
3. See Figure 13 for a cross section of treated End (or transverse) overlaps.

9.1 Cross sections of the different ELCOSEAL® grades

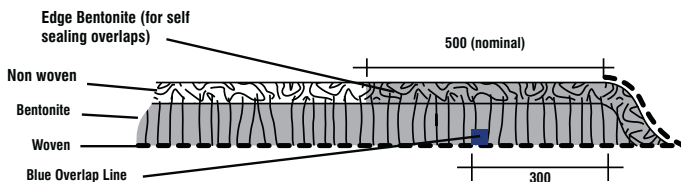


Figure 3. ELCOSEAL® X800 & X1000 roll Edge

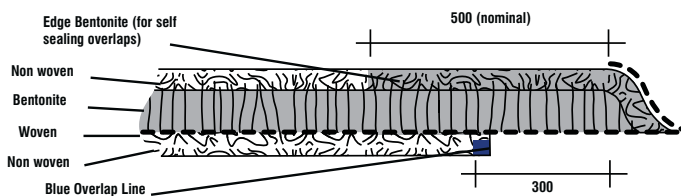


Figure 4. ELCOSEAL® X2000 & X3000 roll Edges (note: X3000 is approximately 10% thicker than X2000)

9.2 Treatment of Edge (or longitudinal) overlaps (refer to note 1 above)

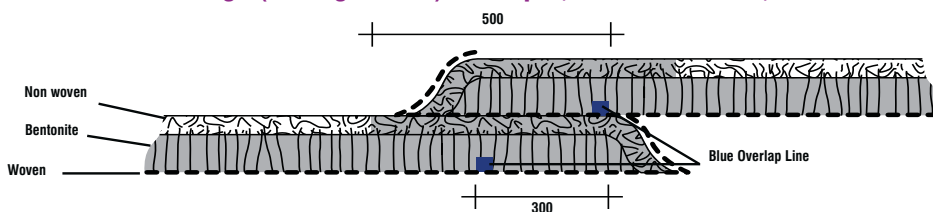


Figure 5. Edge (or longitudinal) overlaps, with self-sealing edges - X800, X1000, X2000, X3000 (X1000 Shown)

10. TREATMENT OF END OVERLAPS (TRANSVERSE DIRECTION)

To ensure the integrity of the ELCOSEAL® lining system it is essential that the treatment of end overlaps be carefully supervised. End overlaps in sumps or inverts are to be avoided.

All End overlaps must be sealed with bentonite paste.

10.1 Preparation of End overlap area

It is recommended that the topside of the underlying ELCOSEAL® panel be marked (as per Figure 6) as a reference point for paste placement. The top ELCOSEAL® panel is then pulled back after marking.

10.2 Undercoat application

A thin-fluid paste is applied as an undercoat in the overlap area. The aim is to fill the pores in the top nonwoven geotextile of the underlying ELCOSEAL® panel.

The Undercoat is prepared as follows:-

- A sufficiently big mortar tub or bucket is filled with water and bentonite powder is added incrementally through a sieve whilst mixing: 9 parts water to 1 part bentonite (for the recommended TruGel® bentonite available from the Supplier – other bentonites will swell differently and may not be of the same quality). An electric drill with an industrial whisk is required to ensure a smooth paste is achieved.
- The paste is spread with a trowel or broom into the overlap area as shown in Figure 7. The paste is applied into the cover nonwoven of the bottom ELCOSEAL® sheet to a width of 200 mm, 150 mm behind the recommended marking and 50 mm in front of the marking.

10.3 Topcoat application

A thick bentonite paste is required for the Topcoat in the overlap area and is prepared as previously indicated: using a mix of 6 parts water to 1 part bentonite (for the recommended TruGel® bentonite). The aim is to fill the free pore space of the overlap area.

This paste is evenly spread using a trowel applied over the Undercoat to a thickness of approximately 10 mm. The Topcoat is also spread to a width of 200 mm, 150 mm in the overlap and 50 mm in front of the overlap area (Figure 8).

Both the Undercoat and Topcoat can be purchased pre-mixed in 20 litre containers from the Supplier.

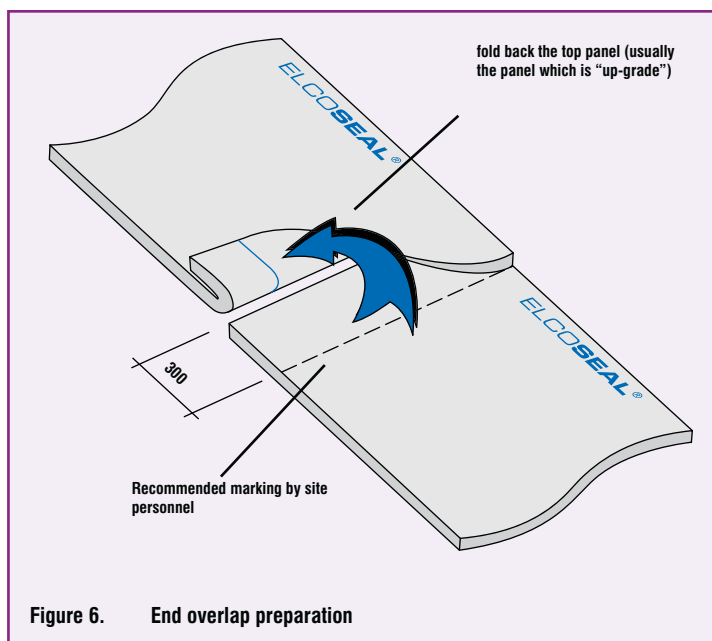


Figure 6. End overlap preparation



Undercoat



Topcoat

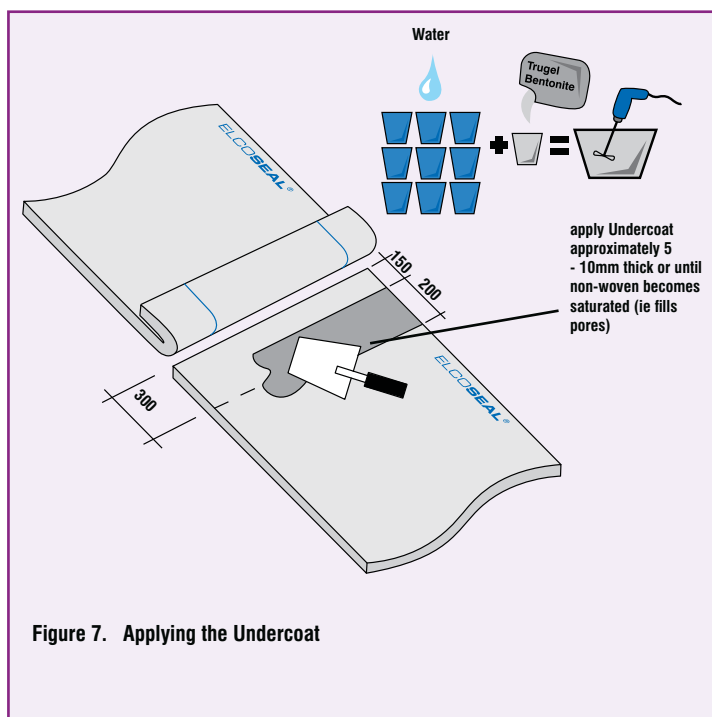
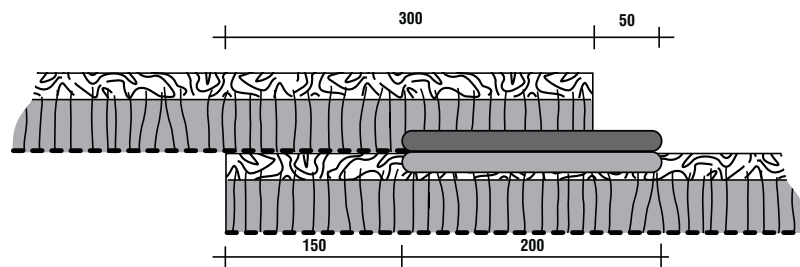
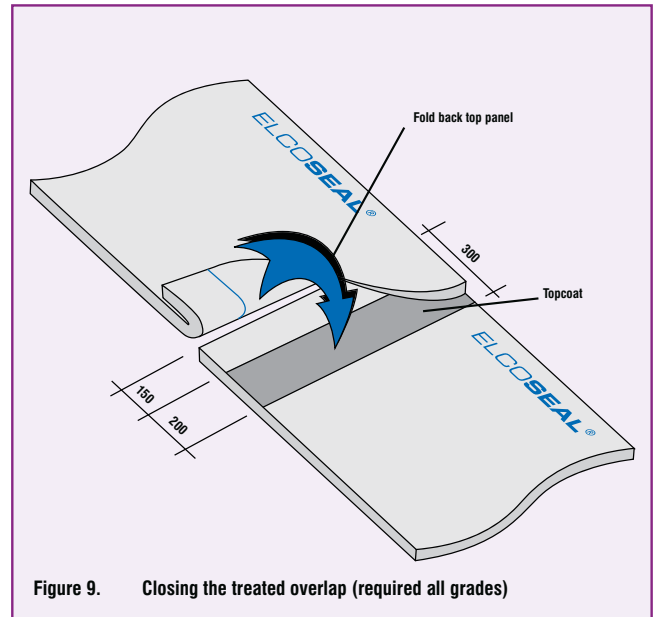
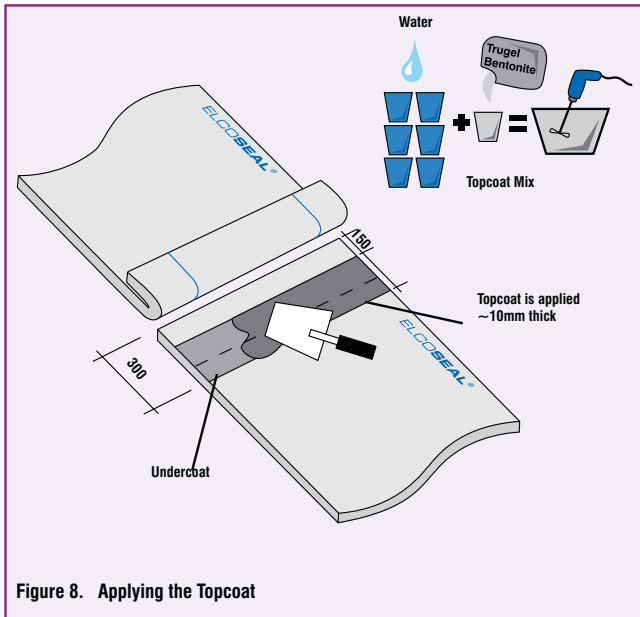


Figure 7. Applying the Undercoat

10.4 Closing the Overlap

The top panel is then rolled back into place and pressed down (Figure 9). Care should be taken to prevent folds or creases. The completed End (or transverse) overlap is shown in Figure 10.



10.5 Additional requirements for ELCOSEAL® X2000 and X3000

ELCOSEAL® X2000 and X3000 requires an additional fillet of bentonite paste over the end (transverse) seam area. After rolling back the upper ELCOSEAL® panel, the overlap edge is covered with thick bentonite paste to a thickness of approximately 10 - 20 mm and to a width of 100 mm either side of the overlap (Figure 11). A nonwoven fabric strip (XRoll – available from the Supplier) is then placed over the bentonite fillet to prevent cover soil ingress (Figure 12).

This step is not required with ELCOSEAL® X800 or ELCOSEAL® X1000.

The completed end (transverse) overlap for X2000 and X3000 is shown in Figure 13.



Applying the bentonite Fillet

ELCOSEAL® Installation Guidelines

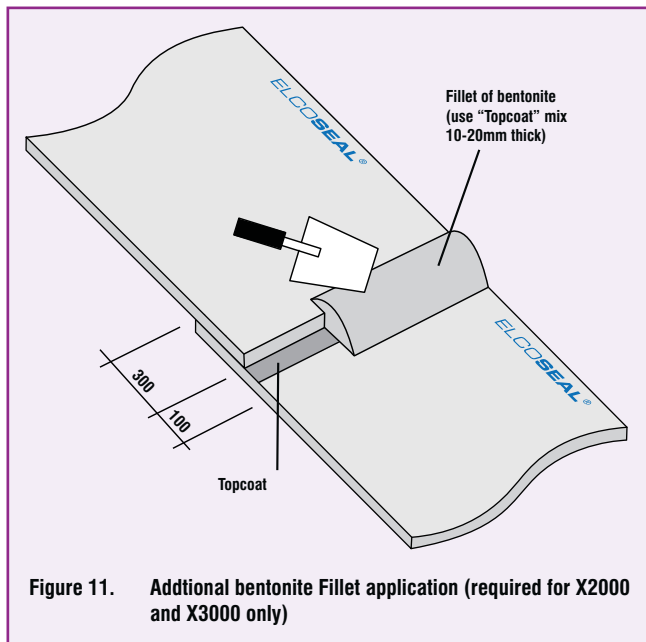


Figure 11. Additional bentonite Fillet application (required for X2000 and X3000 only)

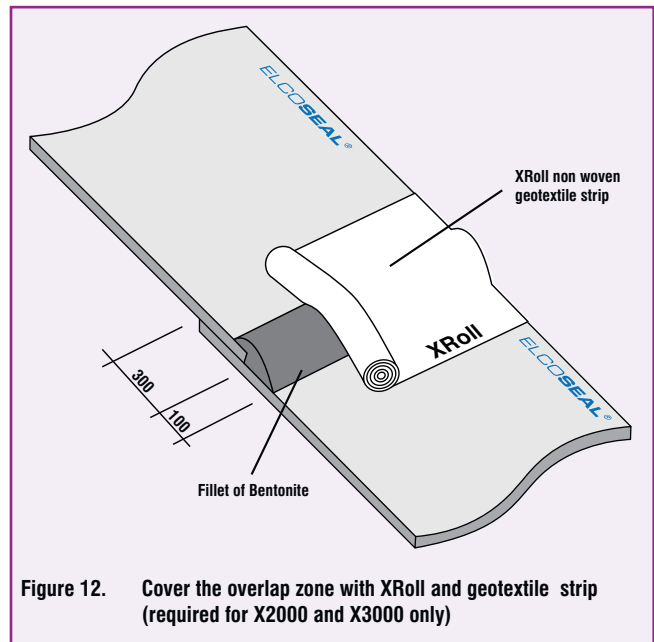


Figure 12. Cover the overlap zone with XRoll and geotextile strip (required for X2000 and X3000 only)

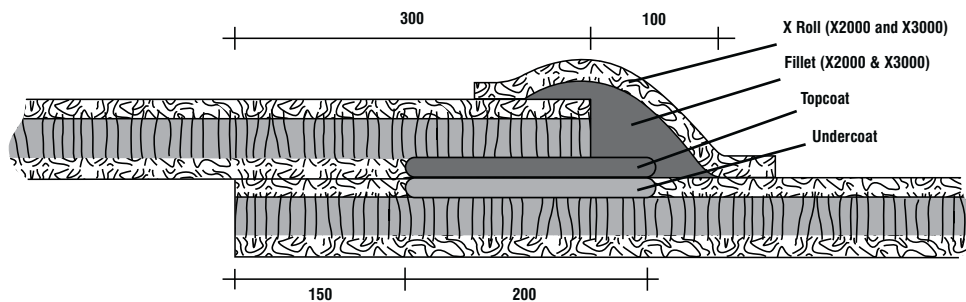


Figure 13 - End (or Transverse) overlap treatment for X2000 and X3000

11. INSTALLATION ON SLOPES

The stability of lining system components on slopes should be assessed on a case-by-case basis. The Supplier can assist in this respect upon request.

ELCOSEAL® panels should be deployed in the direction of the slope as per Figure 14 and anchored at the crest of the slope (Figure 15). End (or transverse) overlaps on steep slopes should be avoided. If they are unavoidable, the panels should be placed according to the roof tile principle and intermediate anchorage on the slope may be required.

Cover soil should be placed up the slope (starting at the toe). It must not be installed down the slope unless stability for this approach has been carefully investigated.

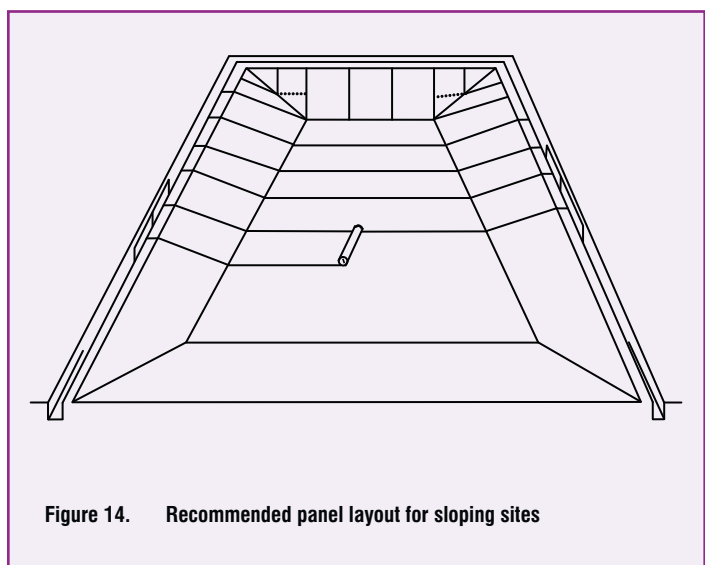


Figure 14. Recommended panel layout for sloping sites

12. CONNECTIONS & PENETRATIONS

Overlaps around connections, penetrations, and where panels have been cut should be carried out according to the principles outlined in Section 10. Most situations require site specific design input, however some commonly used details are shown below:-

- Integration with thick compacted clay liners is shown in Figure 16.
- Cut-off trenches using ELCOSEAL® GCL in cohesive soil are typically constructed as shown in Figure 17.
- Attachment and sealing against concrete structures, can be achieved according to Figure 18. This typical connection is appropriate where the structure needs to be waterproofed to a height above the maximum containment level. Temporary fixing of the vertical ELCOSEAL® panel to the structure (as shown) may be required to allow the backfill placement.
- Penetrations such as pipe ducts are typically carried out according to Figure 19.
- Further connection methods and penetrations details can be discussed with the Supplier.

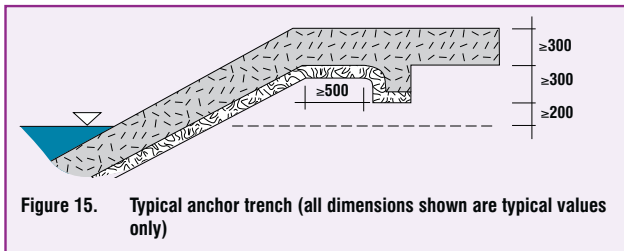


Figure 15. Typical anchor trench (all dimensions shown are typical values only)

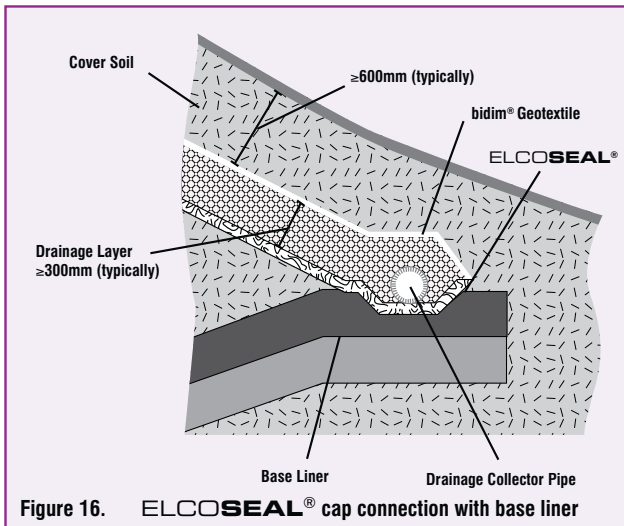


Figure 16. ELCOSEAL® cap connection with base liner

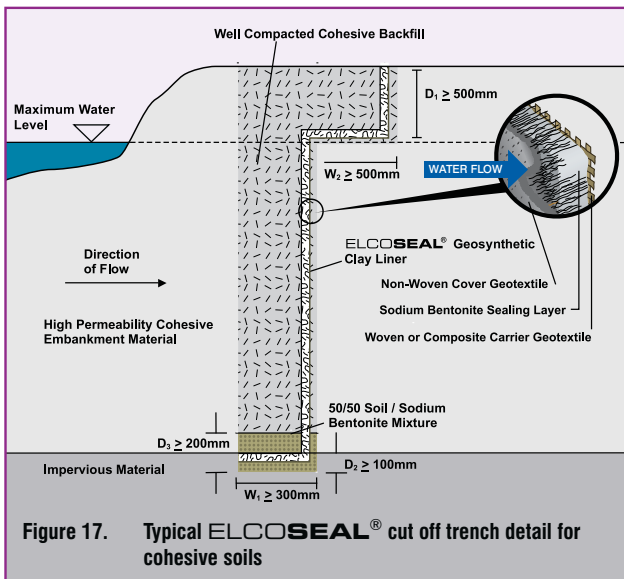


Figure 17. Typical ELCOSEAL® cut off trench detail for cohesive soils

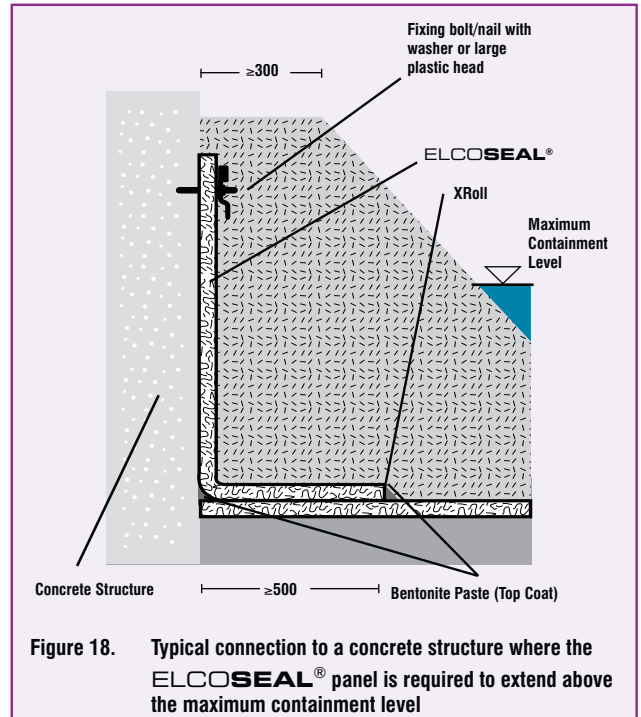


Figure 18. Typical connection to a concrete structure where the ELCOSEAL® panel is required to extend above the maximum containment level

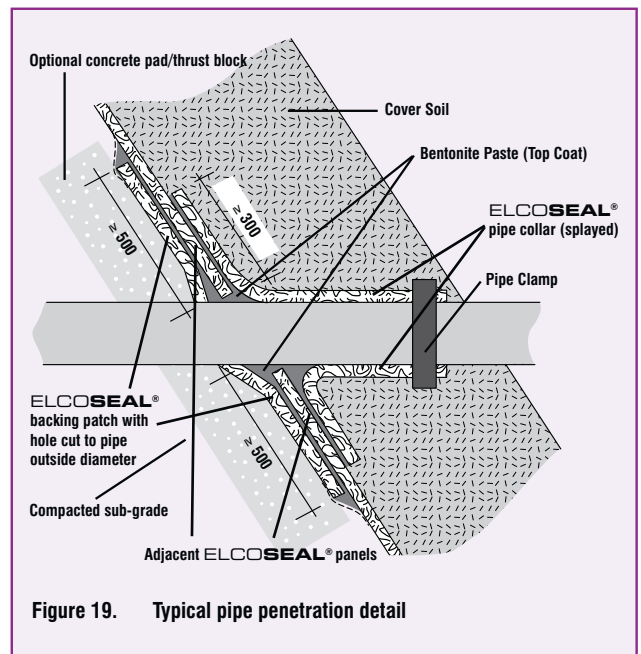


Figure 19. Typical pipe penetration detail

13. PREPARATION FOR PLACING SOIL COVER

Where the ELCOSEAL® is not confined by the cover soil the same working day as deployment, a temporary layer of plastic should be laid to protect ELCOSEAL® from prematurely hydrating (Figure 20).

If the deployed ELCOSEAL® panels have hydrated (for example during a rainfall event) without confinement, special operating conditions may need to be imposed during cover soil placement.

ie	If ELCOSEAL® m.c. ¹ < 50%	>	no special considerations
	If ELCOSEAL® 50% < m.c. < 100%	>	avoid direct traffic (including foot traffic) on the panels.
	If ELCOSEAL® m.c. > 100%	>	contact the Supplier for further advice.

14. SOIL COVER PLACEMENT

A cover soil layer at least 300 mm thick (approx. 6 kN/m² confining stress) should be placed and compacted over ELCOSEAL® each working day immediately after the deployed panels have been inspected. In general, fine-grained cohesive material is recommended, although stones up to 32 mm are acceptable if the material is well graded ($C_u > 5$) or stones up to 16 mm if single sized. Silty soils or organic material are not recommended without further stability analysis. Calcareous or limestone - based cover soils are unsuitable for use, without pre-treatment.

Disturbance of the overlap area during placement (by means of vehicles spreading cover soil) must be avoided. It may be necessary to place the cover soil in this area manually or carefully using vertical placement by an excavator. The cover should not be pushed or graded in a direction that may cause the overlap to move (Figure 21).

ELCOSEAL® may not be trafficked directly. The cover material should be pushed in front of the construction equipment thus creating a safe working platform. Overlaps should not be moved or squeezed during this process. In the case of an expected repeated dynamic load on ELCOSEAL®, a sand layer of at least 300 mm should be laid first on the ELCOSEAL®.

Generally, temporary access roads should not go over deployed panels. These areas should be sealed last to minimise traffic volume over deployed material. Where site traffic cannot be avoided (eg. the delivery of cover material by lorries) additional protection measures will be required. For temporary roads, a minimum roadbase thickness over ELCOSEAL® of 600 mm is acceptable without any further analysis. Shallower coverage or alternative cover materials may be allowed after further analysis or field trials to assess the damage potential.

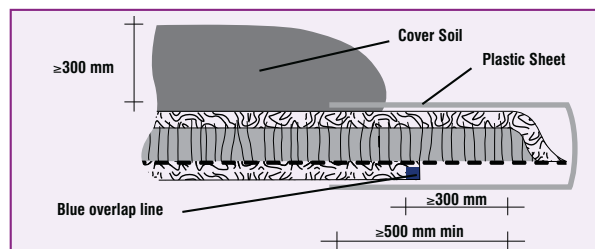


Figure 20. Covering ELCOSEAL® with plastic sheet overnight or during wet weather

15. REPAIRS

Where ELCOSEAL® has been damaged during installation, covering with an overlapping piece of ELCOSEAL® can repair such areas. The overlap should be at least 500 mm and should be completed in accordance with Section 10.

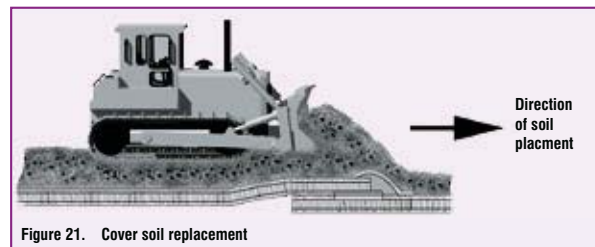


Figure 21. Cover soil replacement

IMPORTANT NOTICE

The information contained in this brochure is general in nature. In particular the content of this brochure does not take account of specific conditions that may be present at your site. Site conditions may alter the performance and longevity of the product and in extreme cases may make the product wholly unsuitable. Any data or specifications contained in this brochure are average values obtained in our laboratory. Actual dimensions and performance may vary. If your project requires accuracy to a certain specified tolerance level you must advise us before ordering the product from us. We can then advise whether the product will meet the required tolerances. Where provided, installation instructions cover installation of product in site conditions that are conducive to its use and optimum performance. If you have any doubts as to the installation instructions or their application to your site, please contact us for clarification before commencing installation. In all cases we recommend that advice be obtained from a qualified consulting engineer before proceeding with installation. © Copyright held by Geofabrics Australasia Pty Ltd. All rights are reserved and no part of this publication may be copied without prior permission.

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WHICH WAY UP DOES ELCOSEAL GO?



RIGHT WAY



WRONG WAY

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