GEOfabrics®

High-performance geosynthetics

Installing GEOfabrics' protectors & LFX composites – Landfill

GEOfabrics Limited, Skelton Grange, Stourton, Leeds LS10 IRZ, United Kingdom
T: +44 (0) 113 202 5678 F: +44 (0) 202 5655 E: info@geofabrics.com

GEOfabrics®

Installation of geosynthetics

Introduction

This document covers the general installation of GEOfabrics' nonwoven geotextiles & the LFX composites. Further attention may be required to address site-specific requirements and conditions. These guidelines are intended for the installer and to promote the most efficient and effective installation, whilst maintaining quality, maximising the geotextiles' performance, and without compromising health and safety.

Unloading, handling & Storage

Roll weights can be between 300kg (660lbs) and 1320kg (2904lbs) and hence appropriate equipment is required for unloading and handling e.g. front-end loader, back hoe, forklift (pole truck) or crane.

Rolls should be lifted by using one of the following:

- Lifting straps capable of lifting twice the anticipated load. Straps should be located 1/3 of the way in from the roll ends.
- A spreader beam attached, by lifting chains, to a core bar inserted through the centre of the roll.
- A forklift truck and a stinger bar.

Note: GEOfabrics does not supply lifting equipment; please see suppliers' list later in this document

It should be noted that, in general, deliveries within Europe are made by flatbed trailer allowing them to be unloaded by any of the above methods. Deliveries outside Europe are made by freight container, which should be unloaded by forklift truck fitted with a stinger attachment. A strap should be wrapped around the top, centre roll in the container (the first roll to be removed) before unloading the by forklift. The strap should then be used to gently slide the roll from the container (the plastic packaging should allow the roll to slide) as the rolls may have settled during transit. The remaining rolls can then be removed using the forklift.

This document covers the general installation of GEOfabrics' nonwoven geotextiles & the LFX composites. Further attention may be required to address site-specific requirements and conditions. These guidelines are intended for the installer and to promote the most efficient and effective installation, whilst maintaining quality, maximising the geotextiles' performance, and without compromising health and safety.

The products will be delivered to site in plastic packaging that protects them from physical damage and the effects of weathering, notably degradation by ultra violet light (UV). This packaging should not be removed until immediately prior to installation. Removal of this packaging can result in damage from UV as well as the geotextile absorbing moisture, creating the potential for further degradation and an increase in the products' weight.

If it is necessary for the geotextiles to be stored prior to their installation, they should be stacked on level dry ground, not more than five rolls high, and no other material should be stacked on top of the rolls.

Installation

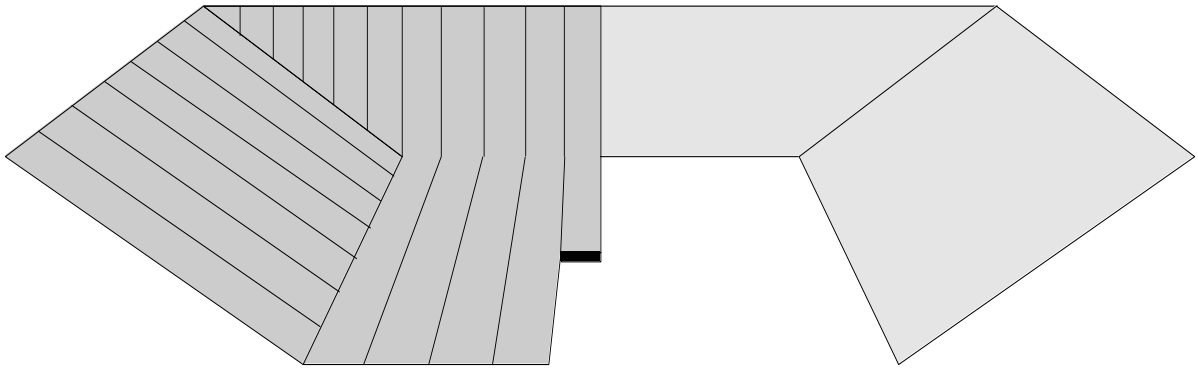
Equipment

In addition to conventional personal protective equipment (PPE) when working on site (hard hat, work boots and high visibility coat), the following equipment should be considered for use during installation:

- Gloves
- Safety glasses
- Carpet cutting knife (or Stanley knife)
- Hot air welding gun and hand roller
- Mobile electrical generator
- Sand bags or tyres

GEOfabrics®

Laying HPS geotextiles



Method of laying

- Rolls can be transferred to the working area of the site and the packaging removed without causing damage to the geotextile.
- Unroll by hand on level ground.
- Unroll down slopes with the assistance of the appropriate plant. Laying along slopes is not recommended, as this could lead to down-slope migration.
- Place rolls with offsets to allow for longitudinal and transverse overlaps.
- Once laid, the geotextile can be weighted with sandbags or tyres to prevent it being disturbed by wind.

Overlaps for HPS Geotextiles

Overlap widths are site specific and generally at the discretion of the on-site engineer. However, the following may be used as a guideline for landfill and general membrane protection applications:

Bonded Overlaps:	150mm (min)
Unbonded loose:	300mm

- Transverse overlaps (between subsequent rolls/lengths) should be located at least 1m from the toe and crest of slopes.
- Longitudinal overlaps (between adjacent roll lengths) should be formed down (not along) slopes.
- Overlap widths should be increased on steep slopes to 200mm, to allow for creep, and should be bonded with a hot air gun (see *Jointing*).
- Transverse overlaps should not be formed/jointed on slopes greater than 18^0 (1:3).

GEOfabrics®

Jointing HPS Geotextiles

Jointed overlaps should be formed using a hot air gun such as a Leister, fitted with a wide slot nozzle (see list of equipment suppliers for details), in conjunction with a hand roller.

These guns are available different voltage ratings. Operators should consult the relevant section in the manufacturer's guidelines for the appropriate electrical generator. The welding gun should be set for the correct heat output.

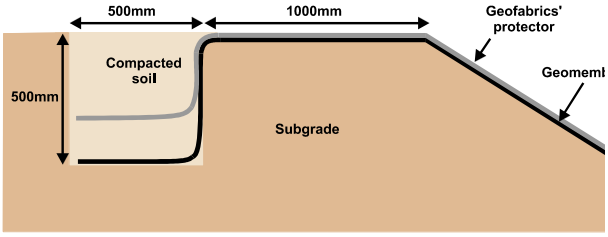
- It is recommended that appropriate work gloves and safety glasses should be worn when operating hotair welding equipment.
- The wide slot nozzle should be placed between the two layers of geotextile at the overlap long enough to slightly melt the fibres. Sufficient pressure should then be applied to the upper layer, using a roller, to press the two heated surfaces together. On cooling, the two layers will be bonded together. The gun should be steadily drawn along, with one hand, whilst simultaneously moving the roller across the joint at right angles.
- Care should be taken not to overheat the geotextile thus causing damage and increasing the risk of fire.
- **Hot air welding equipment should only be used in conjunction with manufacturer's guidelines.**
- **When working on landfill caps, it should be verified that electrical equipment is intrinsically safe and that a safe working method is followed if gas is present**

GEOfabrics Limited, Skelton Grange, Stourton, Leeds LS10 IRZ, United Kingdom
T: +44 (0) 113 202 5678 F: +44 (0) 202 5655 E: info@geofabrics.com

Anchoring HPS Geotextiles

Specific requirements for anchorage are dependent upon site specific conditions such as slope length and angle, weight of geotextile, and type of membrane (rough or smooth).

- Anchorage requirements should be in accordance with the project drawings, or be carried out under the guidance of the site engineer.
- It is recommended that the front profile of an anchor trench is rounded and smooth to reduce stress on the geotextile.
- The anchor trench should be backfilled with soil and compacted on completion of the geotextile installation.

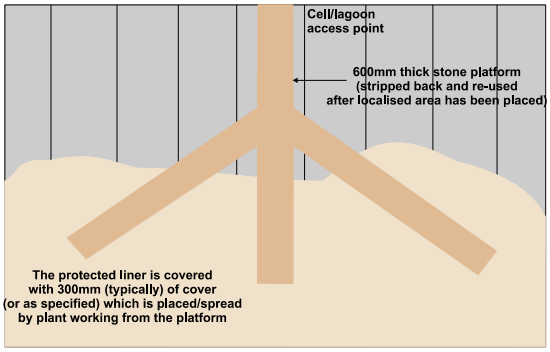


Typical anchor trench detail

Backfilling HPS Geotextiles

GEOfabrics' HPS (black) products contain 1% carbon black to provide UV resistance. However, it is recommended that these products should be covered within 1 month of installation to avoid any risk of degradation.

- GEOfabrics' MPS (white) products are not UV protected and it is therefore recommended they should be covered within 24 hours to avoid any risk of degradation.
- Site or other equipment should never be driven directly on any geosynthetic product.
- When covering a large area of geotextile from a central point it is recommended that a temporary platform be constructed in a herringbone pattern. This should be a minimum thickness of 600mm of drainage stone. This platform should avoid the possibility of installation damage being caused by repeated trafficking. The stone can be stripped off and re-used once the area local to the platform has been covered.



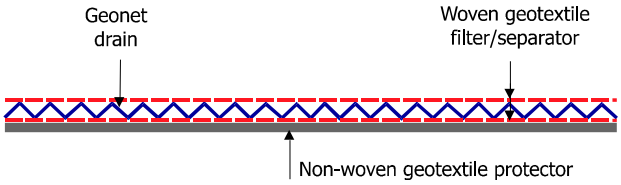
Sequence of backfilling (plan view)

GEOfabrics Limited, Skelton Grange, Stourton, Leeds LS10 1RZ, United Kingdom
T: +44 (0) 113 202 5678 F: +44 (0) 202 5655 E: info@geofabrics.com

Installing LFX geocomposites

An LFX geocomposite comprises (from top to bottom):

- Woven geotextile filter/separator
- Tri-Planer Geonet Core
- Woven geotextile filter/separator



Unloading, Handling and Storage

Rolls should be stacked on level dry ground, not more than four rolls high, and no other material should be stacked on top of the rolls. (See HPS for further information)

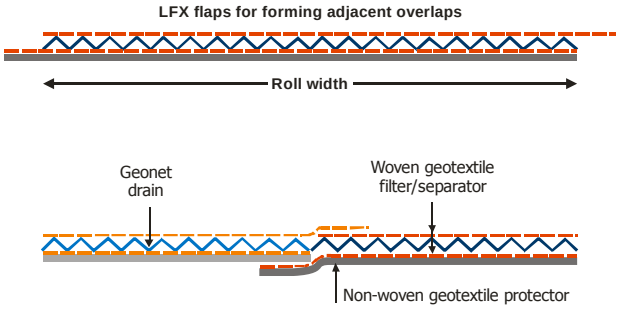
Method of Laying

LFX rolls are typically supplied to incorporate a 3.9m workable width with the upper woven geotextile filter/separator that provides an additional overlap on one edge for effective installation. LFX products are solely intended for basal cell drainage/protection & are not used on side slopes.

Rolls should be transferred to the working area of the site and the packaging removed without causing damage to the geocomposite.

Installation should be directly on to a clean geomembrane surface free from any foreign objects. We recommend LFX geocomposites are installed on smooth geomembranes in basal applications to prevent frictional forces being generated between geosynthetic elements.

Unroll by hand on level ground with the black HPS non-woven protector face down. Adjacent rolls should be placed with the geonet and protector butt jointed at the roll edges. This will leave the overlap of the upper woven filter/separator available so that it can be easily laid across the top of the adjacent roll.



Once laid, the geocomposite can be ballasted with sandbags to prevent being disturbed by the wind.

See the Jointing HPS geotextiles section on page 4 for welding techniques and appropriate equipment.

This installation technique will help maintain a high speed of installation, and ensure the LFX product functions effectively, whilst providing a secure surface for the granular drainage material to be placed on.

Equipment Suppliers:

- **Leister hot air welding tools and hand rollers** Barnes Plastic Welding Equipment Ltd, Lancashire – 01254 888861
- **Lifting Equipment (spreader bars) Invicta**, Leeds (Peter Sharpe) 0113 277 1222
- **RSU Lifting Services**, Milton Keynes (Candy Scott) 01908 649202
- **Lifting Equipment** (straps/slings) Euroweb Lashing Systems, Eastbourne (Terry Butchers) – 01323 646 925
- **Cutting knives Europa Machines Ltd**, Cheshire 01625 536314