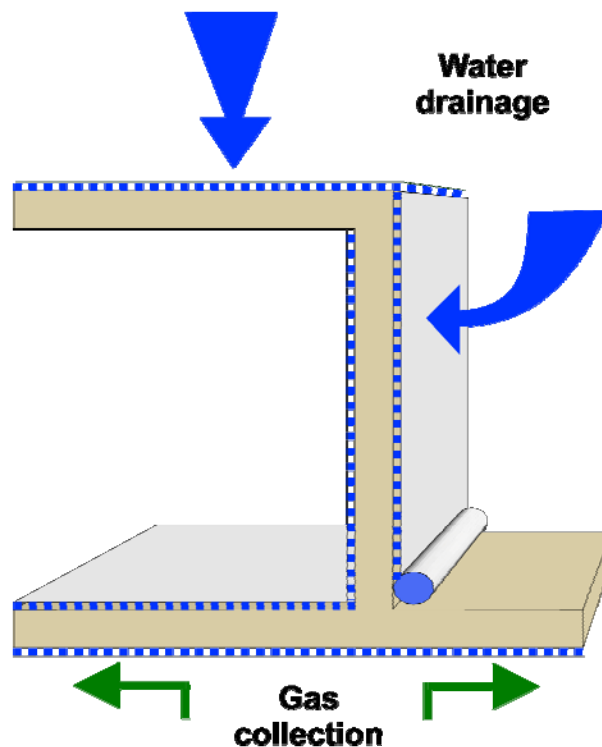


Installing Protexia cusped drainage products

7/10/10



Introduction

This document covers the general installation of Protexia cusped drainage systems. 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 products' performance, and without compromising health and safety.



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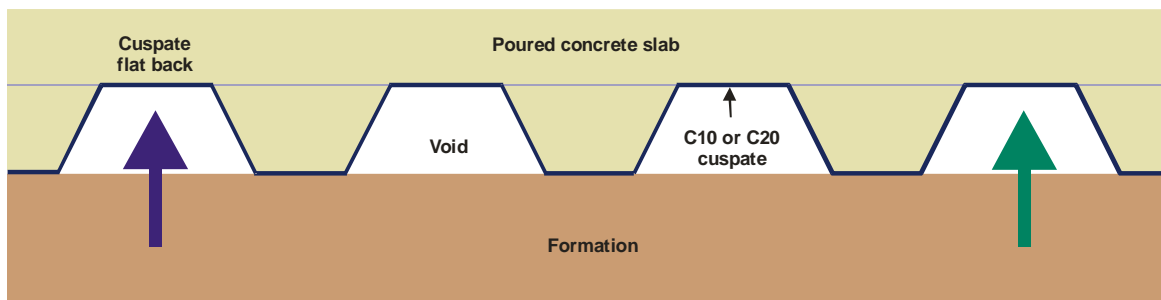
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Characteristics and properties

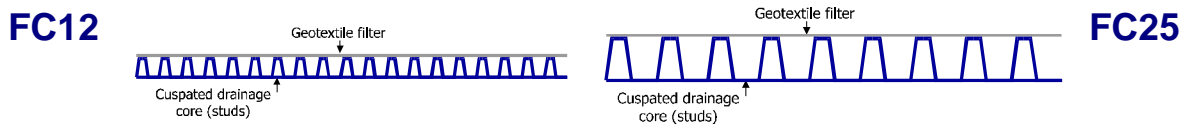
- These cusped products are manufactured from extruded polyethylene sheet.
- The range includes products with a polypropylene geotextile filter bonded to the studs and products that are fully wrapped with a geotextile.
- The products are typically delivered to site as 0.9m or 1.0m wide by 50m long rolls.
- All cusped products are delivered to site in shrink-wrap packaging.

Standard Protexia products:

- The core-only cusped products – **C10** with a 10mm cup height and **C20** with a 20mm cup height - are generally used as void formers beneath concrete slabs or behind renders to form a drainage path. They are laid with the cups pointing towards the gas or water source and the flat back facing the concrete or render.

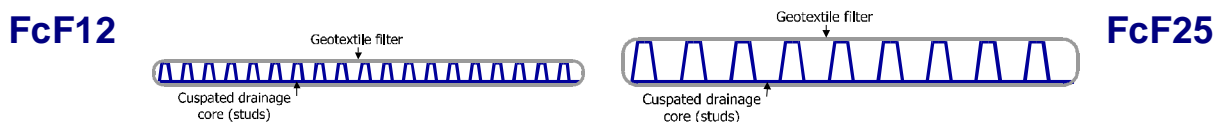


FC12 and **FC25** are formed from a cusped and geotextile filter bonded to the stud face. They are used as drainage layers between a structure and backfill. They can be installed vertically or horizontally, but always with the geotextile filter towards the backfill.



These are always placed with the textile filter towards the backfill

FcF12 and **FcF25** fully-wrapped versions are used as fin drains in highway works and are deployed beneath membranes to form gas protection systems for building.



These are always placed against the underside of floor slab
(with the studs towards the gas or water source)
or with the studs pointing away from the centre line of a highway

The products can also be used for other specialist applications including *green* roof systems and for land and sports-field drainage. Please contact GEOfabrics Limited for further advice and assistance.

Standard shipping information

Product	C10	C20	FC12	FC25	FcF12	FcF25
Approx. roll weight (kg)	49	49	58	74	65	81
Roll size (m)	0.97 x 50	0.97 x 50	1.0 x 50	0.90 x 50	1.0 x 50	0.90 x 50
Roll diameter (m)	0.85	1.00	0.90	1.30	1.00	1.40

Unloading handling and storage

- Depending on the product, roll weight can be between 49kg and 81kg and hence appropriate equipment is required for unloading and handling.
- The shrink-wrap packaging is intended to keep the material in a compact form during transit, not to protect the contents from physical damage and the effects of weathering. This packaging should not be removed until immediately prior to installation.
- If it is necessary for the products to be stored prior to their installation, they should be stacked on level dry ground, not more than three rolls high, and no other material should be stacked on top of the rolls.

Installation

Equipment

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

- Gloves
- Safety glasses
- Stanley knife or similar
- Sand bags or tyres
- Waterproof adhesive tape

Method of laying

- Rolls can be transferred to the working area of the site and the packaging removed without causing damage to the material.
- Unroll by hand on level ground. It may be easier to cut the required length from a roll prior to positioning if the product is to be placed vertically against a structure.
- Ensure that the product is placed facing the correct way (see page 2).
- Adjacent or subsequent rolls should be butt jointed without an overlap.
- The core-only products - **C10** and **C20** - should have the edges sealed with duct tape or similar to prevent grout entering the drainage void during compaction of the concrete.
- The geotextile-faced cores – **FC12** and **FC25** - have an additional 100mm wide geotextile flap at one edge. This should be used as an overlap between adjacent rolls and should be taped in place prior to backfilling.
- The fully-wrapped cores – **FcF12** and **FcF25** - should either be positioned at discrete intervals or butted up to each other, as shown on the project drawings.
- When installed vertically behind walls, each length should be held in place using sandbags (or other weight) at the top of the structure. The lengths can be fixed to the wall with suitable Hilti-type fixings plus waterproofing sealant, if these will not damage any structural waterproofing systems in use.
- When installed horizontally, sandbags should be placed at discrete intervals to ensure the product is not dislodged by the wind before backfilling.

Backfilling

- The geotextile filters used on these 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.
- Care must be taken not to dislodge the cusps during the backfilling operation. Only hand-propelled rollers should be used to compact a fill within 1.0m of any cusps.

Further information can be found at www.geofabrics.com
or enquiries can be e-mailed to info@geofabrics.com.

These notes are written in good faith and comprise several years' experience of a number of different installers. While it is intended to provide the best practice for installation these guidelines offer no guarantee for the quality and performance of the installation.

The Control of Substances Hazardous to Health, Regulation 1988 from 1 October 1989, (COSHH)

Introduction

This safety sheet outlines the precautions to be taken when handling and storing *GEOfabrics'* geocuspates.

GEOfabrics' geocuspates are manufactured from extruded polyethylene sheet and may be wrapped in a geotextile formed of fibres, filaments and yarns formed by the extrusion of polypropylene or polyethylene, individually or in combination. The handling and storage of *GEOfabrics'* products presents little or no health hazard.

Raw materials

The polymers used to manufacture the sheet and fibres - polypropylene and polyethylene - are polyolefins derived from oil and are regarded as chemically and biologically inert.

A lubricant is applied to the fibres during their manufacture to aid the subsequent needlepunching process. This lubricant, a blend of fatty acid esters and diethanolamide, is added in extremely small quantities - 0.4% by weight. The ecological data from the lubricant supplier refers to the lubricant in concentrated form and even then, it is only considered to be moderately toxic to aquatic organisms.

In some situations a *forming* effect may appear on the surface of a geotextile. This is a physical interaction between water and this lubricant. It is a transient effect and has no harmful effects on the environment.

Contact our Quality Manager if you require evidence to support the above statement please who will provide the following data.

GEOfabrics' products do not contain:

- Chlorofluoro carbons (CFC)
- Pentachloro phenols (PCP)
- Urea formaldehyde or derivatives
- Any product capable of forming dioxin
- Any toxic substance

Potential Hazards

Toxicity: the products are regarded as chemically and biologically inert.

Inhalation: the products do not release any toxic or obnoxious fumes at ambient temperatures. The fibres are long, greater than 50 mm. They cannot normally be inhaled.

Ingestion: the sheet and fibres used are inert and regarded as harmless. Certain additives and lubricants may be harmful if ingested in significant quantities. *GEOfabrics'* products do not contain quantities of these materials considered to be significant.

Skin contact: the products will not cause skin irritation under normal conditions. However, precautionary measures must be taken and employees who have a history of skin disease or allergy should receive medical clearance prior to direct contact.

Eye contact: the products are unlikely to come into contact with eye. Loose fibres are not normally released from the products.

Flammability: the products will not ignite easily. Melting will occur when heated in air at 165 - 170°C and decomposition will commence at about 300°C with the release of volatile, lower molecular weight hydrocarbons; carbon monoxide, carbon dioxide, water and carbon. In addition, very low concentrations of oxidation and breakdown products, associated with the additives and lubricants, may be released but are regarded as virtually insignificant. Combustion of *GEOfabrics'* products is similar to most organic materials e.g. wood, paper and cellulose, thus requiring similar precautions in the event of fire in particular in relation to the carbon monoxide.

Explosion: the products do not present an explosion hazard.

Preventative Measures:

Handling precaution: Operatives involved in normal handling and laying of *GEOfabrics'* products do not require special protective clothing or equipment. Operatives with sensitive skin or allergies are advised to wear gloves and seek medical advice.

Standard roll weights range from 45kg to 650 kg. Mechanical handling and lifting should be used.

Storage: The products may be stored inside or outside without special precaution. No environmental impairment will be caused.

Emergency Action

Fire: Toxic fumes are not produced but breathing apparatus may be required to combat smoke and carbon monoxide particularly in confined spaces. Molten burning droplets require resistant clothing and footwear.

Spillage: Not applicable.

GEOfabrics' specifications are subject to continuous review and variation in line with product improvement. However the raw materials used are unlikely to vary significantly.

Please contact *GEOfabrics* Limited if further information is required.

G Donald
Managing Director