Grasscrete

the environmental paving solution

GrassConcrete

the original ...the best, that's... Grasscrete

Our history

Grass Concrete Limited is a UK based company founded upon the principles of establishing environmental awareness in construction. Since our establishment in 1970 many of our aspirations that were then 'alternative' have now become part of mainstream policy adopted by governments and planners around the world.

Barely an issue in those days the company set out to change traditional thinking towards paving technology. The company's credentials have grown with that of its original product, the unique Grasscrete paving system. Alongside this original invention further paving systems have been introduced as well as a range of earth retaining walls and green roofing solutions.

Why Grasscrete?

With architects and engineers now embracing environmental technology, the relevance of Grasscrete has never been greater. A product ahead of its time has found its era.

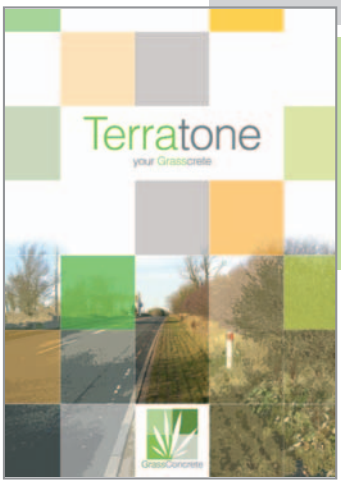
As probably the world's only supplier of a complete range of grass reinforcement products, we are able to say that Grasscrete stands alone in its unique capabilities. Though often thought of as a generic reference for grass reinforcement, it's much more than that and, indeed, shouldn't be confused with other types of grass paving.

The lightweight Grasscrete void former can be easily and cost effectively shipped throughout the World. Availability is enhanced by an extensive network of International Licensees.

applications

- Vehicle parking
- Access roads
- Fire and emergency access
- Laybys / pull ins
- Highway verges
- Abnormal load diversions
- SUDS (sustainable urban drainage system)
- Helipads
- Military installations
- Slope protection
- Drainage channels
- Swales
- Spillways

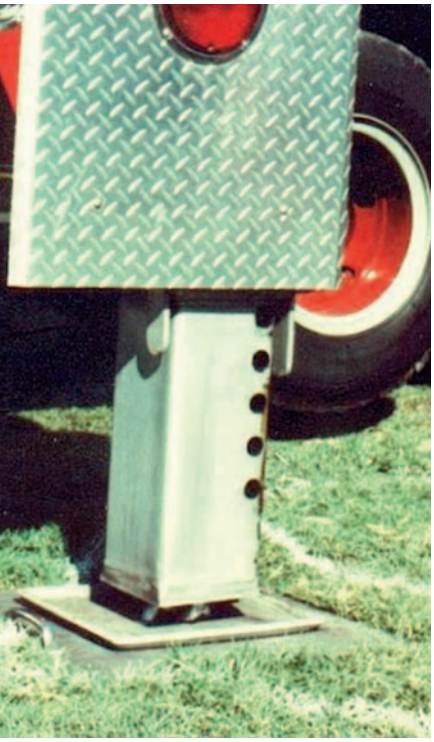
Now available in soil tone concrete. Please ask for further details of Terratone



structural performance

Grasscrete combines the environmental appeal of natural grass with the engineering principles of reinforced concrete.

This unique cellular structure is created using the Grasscrete void former; vacuum formed with a patented anti-static coating to prevent concrete adhesion as well as enabling easy packing and separation.



Key benefits

Resists differential settlement

Modular, pre-cast concrete or plastic systems rely significantly upon grass for stability by forming a composite tensile matrix. Under constant trafficking the combination of load and vibration can loosen root anchorage, leaving the surface prone to settlement in a syndrome known as 'elephant tracking'.

By contrast Grasscrete isn't structurally influenced by grass and can therefore be trafficked before grass establishment. The reinforced structure resists differential settlement and the flat, upper surface and pocket shape minimises vibration.

Ground heave

Grasscrete's unique pocket profile enables the release of frost heave and hydro-static pressure. These benefits enable the system to be used over frost influenced ground and in demanding slope protection works.

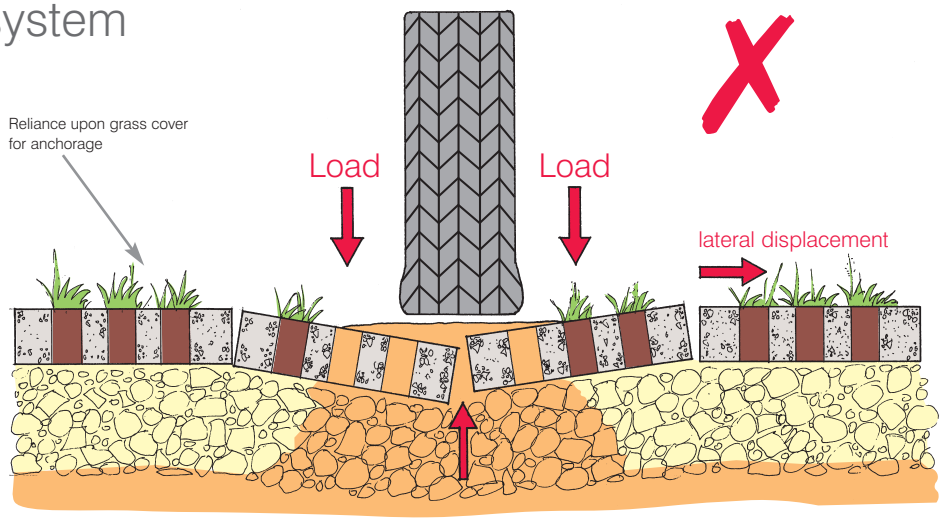
Sub-base depth

With an allowable ground-bearing requirement of just 45kN/m^2, Grasscrete can be installed over slimmer sub-bases than required for pre-cast or plastic types.

Edge details

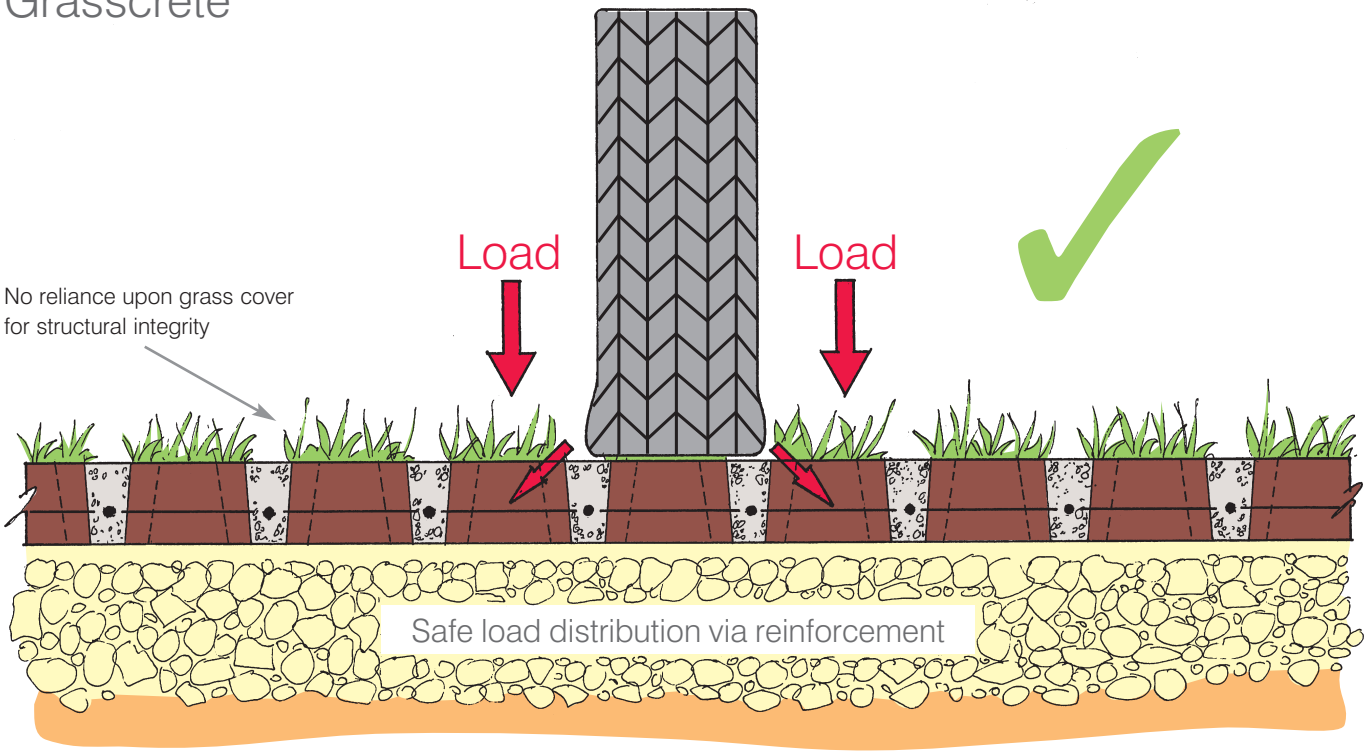
Modular pre-cast concrete or plastic systems require edge restraints or kerbs. For larger projects intermediate shear anchors may also be needed. Grasscrete however, requires no such details, enabling it to blend naturally with adjacent finishes with subtle delineation created by a monolithically cast solid concrete edge margin.

Pre-cast system



Sub-base deforms causing sub-grade to pump to surface

Grasscrete



Key environmental benefits

Permeability

Capable of draining at rates of up to 90% that of normal grassland, Grasscrete maintains the natural equilibrium of ground water re-charge. This serves to reduce the incidence of clay sub-soil shrinkage and attending instability of local building foundations. By combining with underground storage Grasscrete can offer the twin options of rainwater harvesting or the creation of a lag time to mitigate downstream flood potential.

Grasscrete's technology pre-dates what is now commonly termed as Sustainable Urban Drainage (SUDS) and its principles are equally at home under that heading.

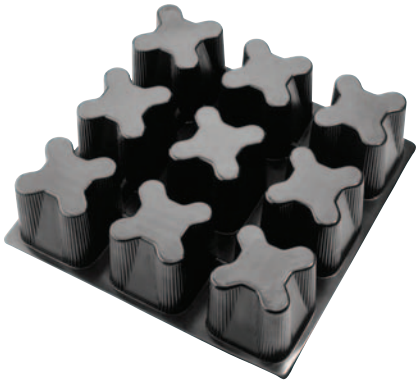
The structure creates a natural biological filter for attenuation or rainwater harvesting taking place below. With low surface run-off factors, levels can be freed from the normal requirements to create drainage falls. This offers significant advantages in earthworks design and enables existing installations to be extended with minimal alterations to infrastructure.

Greenspace

Greenspace mitigation within urban areas is invaluable in balancing CO_2 levels created by vehicular traffic. Located at the actual point of emission, the natural digestion by a grassed parking area can help to avoid atmospheric CO_2 build up and reduce the "urban green island effect". The 'feel good' factor of greenspace cannot be overlooked as street scenes are softened without losing essential structural performance.

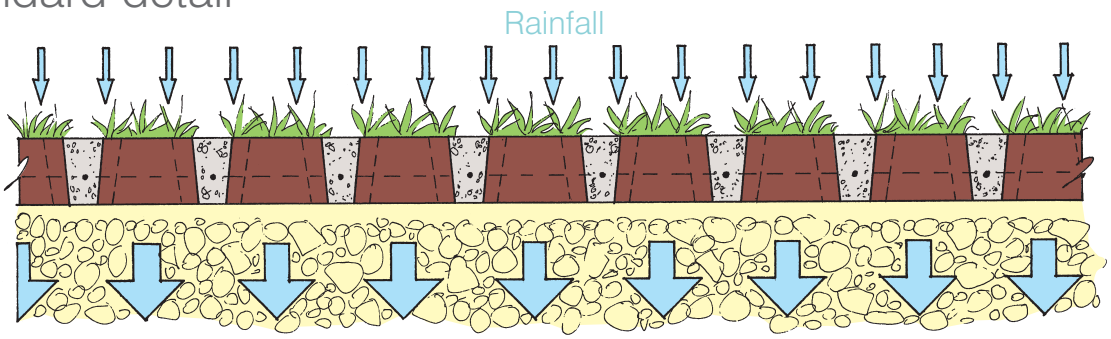
Recycling

Grasscrete maintains an environmental focus in the use of recycled materials in the manufacture of the styrene formers. This policy is also extended to the soil pockets and sub-base layers where recycled materials are encouraged.



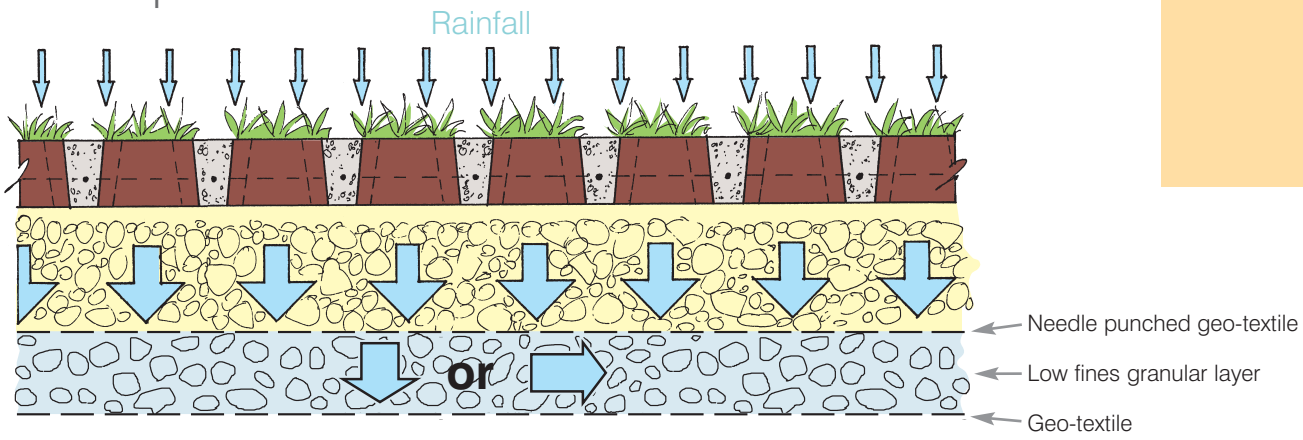
sustainable drainage technology(SUDS)

Standard detail

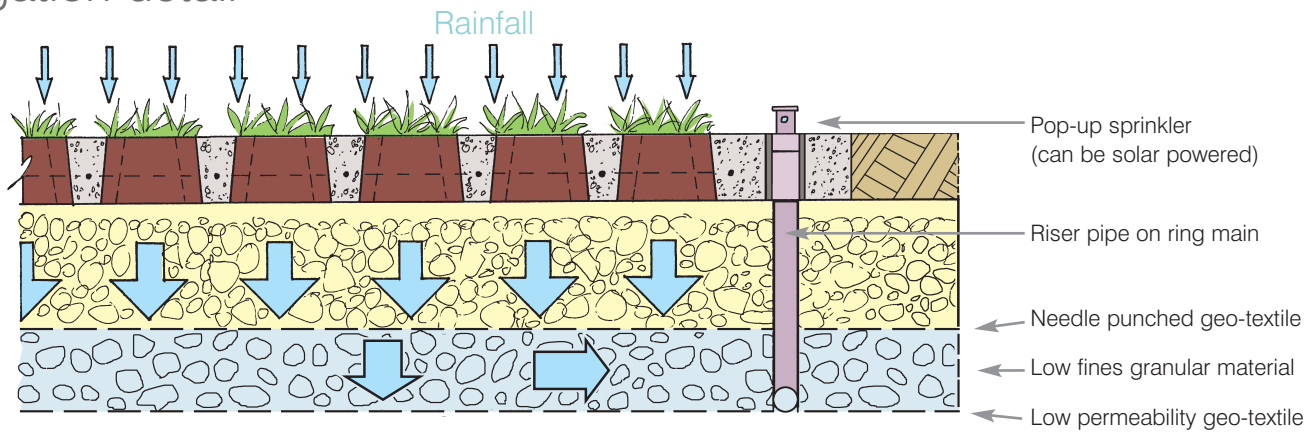


Natural filtration to sub-grade

Advanced percolation detail



Irrigation detail



slope protection

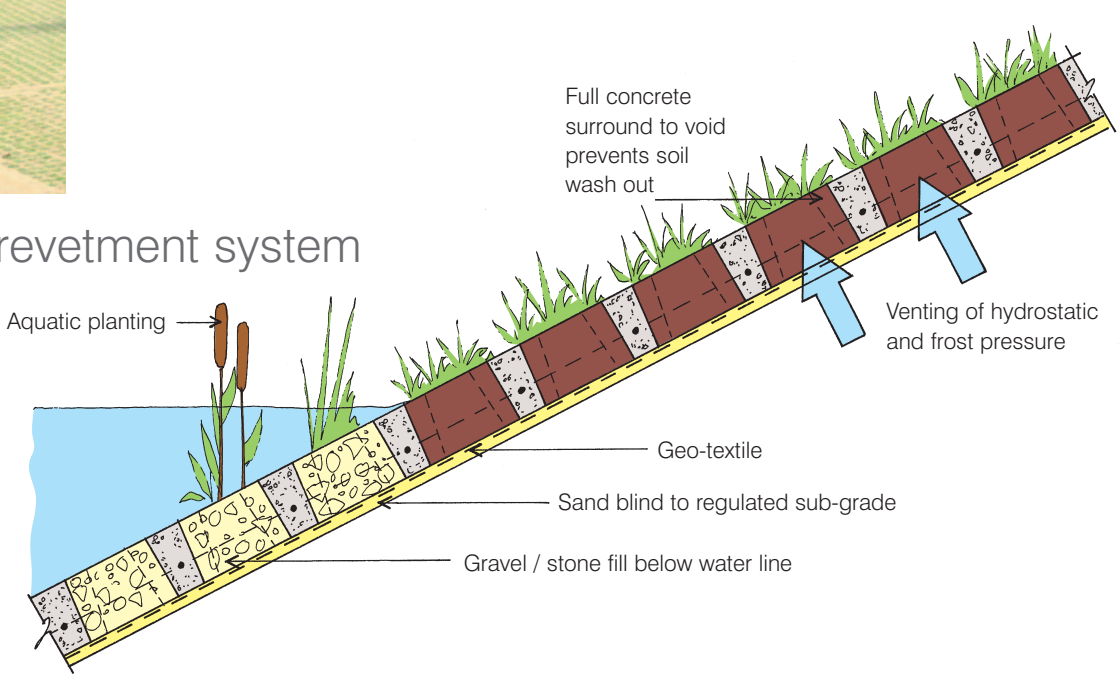
Grasscrete has been flow tested to rates in excess of 8 metres per second. This enables it to be used in exacting locations such as emergency spillways.

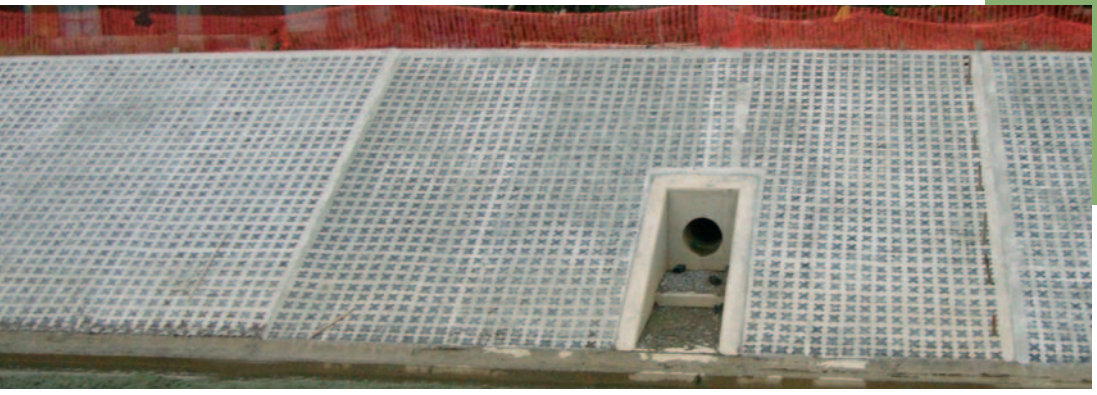
The same testing process has also shown that when used in water flow Grasscrete is hydraulically efficient. Under heavy flow, long stemmed grass is flattened with the resulting thatch reducing the Mannings 'n' value for hydraulic roughness to as low as 0.03.

Pre-cast concrete systems require infill panels to create directional changes. These can cause turbulent flow that becomes a focal point for erosion, Grasscrete by contrast is a continuous slab with no such weakness.

The ability to easily link together individual slabs means that Grasscrete can be installed with a number of gangs operating in separate locations. This compares to the linear end-to-end construction required for pre-cast elements.

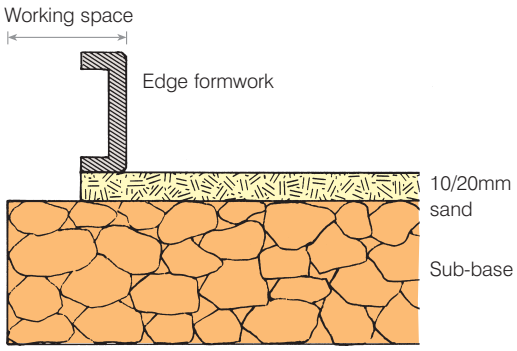
The natural revetment system



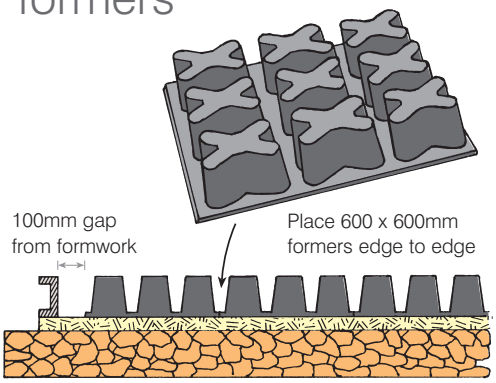


installation

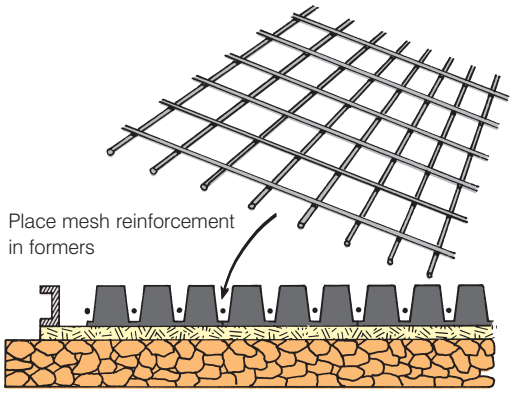
1. Preparation



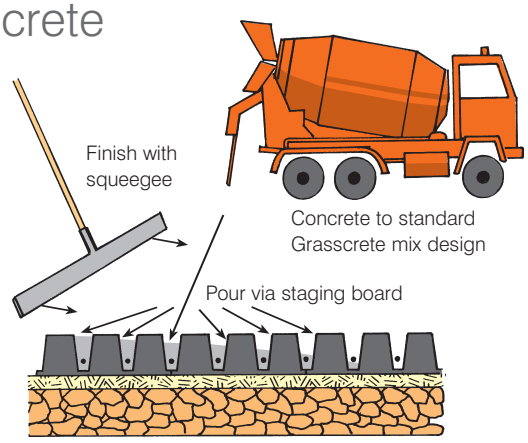
2. Lay formers



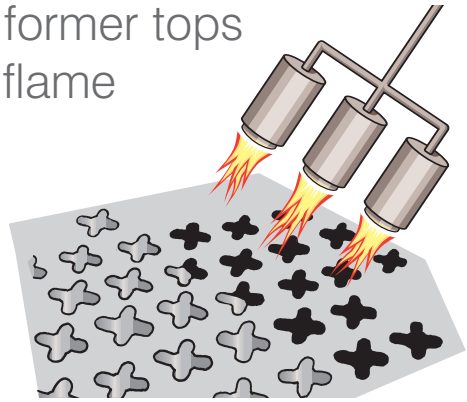
3. Mesh reinforcement



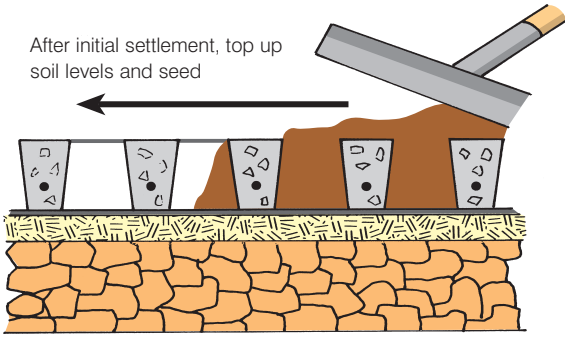
4. Concrete



5. Melt former tops with flame gun

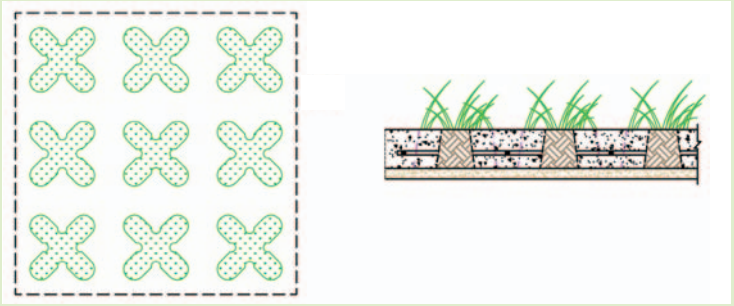


6. Top soil and seed



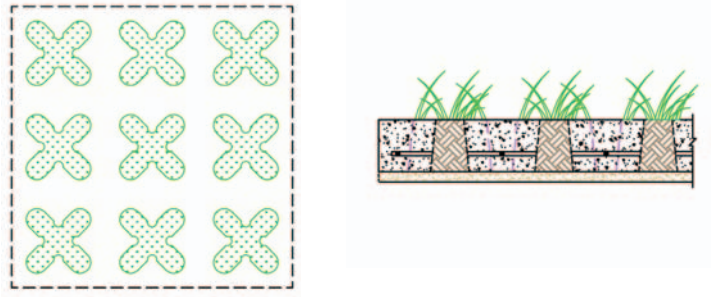
Types

GC3



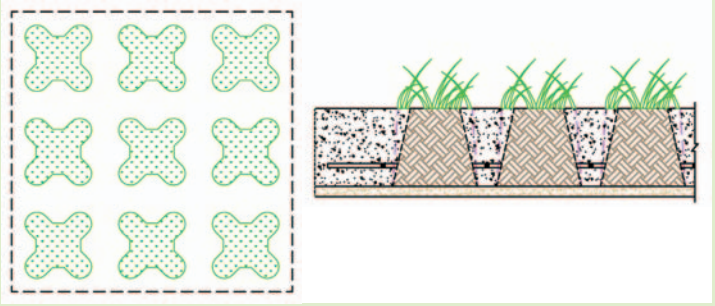
Void former size:	600 x 600 x 76mm
Paving depth:	76mm
Mesh reinforcement:	BS4483 Ref. A142 or A193 (200 x 200 x 6mm dia. or 200 x 200 x 7mm dia.)
Concrete coverage:	22m²/m³
Topsoil coverage:	24m²/m³

GC1



Void former size:	600 x 600 x 100mm
Paving depth:	100mm
Mesh reinforcement:	BS4483 Ref. A193 or A252 (200 x 200 x 7mm dia. or 200 x 200 x 8mm dia.)
Concrete coverage:	15.50m²/m³
Topsoil coverage:	18m²/m³

GC2



Void former size:	600 x 600 x 150mm
Paving depth:	150mm
Mesh reinforcement:	BS4483 Ref. A252 or A393 (200 x 200 x 8mm dia. or 200 x 200 x 10mm dia.)
Concrete coverage:	11.50m²/m³
Topsoil coverage:	12m²/m³

Specification

Grasscrete cast on site reinforced cellular paving.

Grasscrete formers type GC.....*, ...*mm deep laid on a consolidated sub-base with a 10/20mm blinding layer of sand. Steel mesh reinforcement to BS4483 reference .....*, weighing .....*kg/m². Concrete 30MN/m2 at 28 days with air entrainment of 3%. 10mm maximum aggregate and a .....*mm slump placed around formers and mesh and levelled to tops of formers. *(Where coloured concrete is required please suffix the GC former type reference with "Terratone" eg "GC3/Terratone".)* After 48 hours melt exposed tops of formers and fill with soil. Following settlement sow Grassmix No.....* at a rate of 50g/m² and top up with fine friable topsoil, apply fertiliser as necessary.

Expansion joints shall be incorporated at 10 x 10m centres and shall consist of 25mm wide pre-soaked softwood filler.

or (for GC2 with A393 mesh only) Normally only used for heavy load transference:

Expansion joints shall be incorporated at 10 x 10m centres and shall consist of 25mm wide foamboard filler with 20mm diameter x 300mm long sawn mild steel dowels at 400mm centres with cap and debond to one side. Joint shall be sealed with cold applied sealant.

**Refer to data in Grasscrete Types table and Specification Guide for items to be completed.*

Specification guide

Vehicular use

Maximum vehicle weight	Grasscrete type	Depth	Reinforcement	Minimum Sub-base depth*	Sub-base type
0 - 3.4 tonnes	GC3	76mm	A142	100mm	(UK) Specification for Highway Works Clause 803 Type 1 sub-base (International) 40mm down crushed stone granular sub-base
3.4 - 4.3 tonnes	GC3	76mm	A193	150mm	
4.3 - 10.8 tonnes	GC1	100mm	A193	150mm	
10.8 - 13.3 tonnes	GC1	100mm	A252	150mm	
13.3 - 30.0 tonnes	GC2	150mm	A252	150mm	
30.0 - 40.0 tonnes	GC2	150mm	A393	200mm	

**Assumes a free draining allowable ground bearing of 45kN/m² which should also be sufficient to enable construction plant/delivery access.*

Water environment

Water flow rate	Grasscrete type	Depth	Reinforcement	Preparation (all types)
Up to 4.5 metres / second	GC3	76mm	A142	Trimmed earth sub-grade
Up to 6.0 metres / second	GC1	100mm	A193	Sand blind Suitable geo-textile
Up to 9.0 metres / second	GC2	150mm	A252	Fine protective cover of sand

Seed specification

Mix	Sowing rate	*Specification (temperate European)	Application
No. 1	35gms/m²	50% perennial ryegrass 20% slender creeping red fescue 25% strong creeping red fescue 5% browntop bent	Vehicular parking, amenity areas
No. 2	30gms/m²	20% chewings fescue 20% slender creeping red fescue 30% strong creeping red fescue 25% hard fescue 5% browntop bent	Fire paths, shaded low maintenance areas
No. 3	20gms/m²	25% perennial ryegrass 20% strong creeping red fescue 30% hard fescue 10% smooth stalked meadow grass 10% browntop bent 5% white clover	Slopes, road verges *For other climate types please contact us

Please contact us for further information and advice relating to special mixes for applications such as water courses and spillways.

Grass Concrete Limited

Duncan House, 142 Thornes Lane, Thornes,
Wakefield, West Yorkshire WF2 7RE, England

Tel: +44(0)1924 379443 Fax: +44(0)1924 290289
info@grasscrete.com

A full range of brochures and technical guides are available upon request

www.grasscrete.com