

# Permathene Newsletter

**No 8, Dec 2007** Latest News and Information from Permathene Civil & Environmental

## Auckland City Council Approves Liquid Boot® for Water and Gas Proofing



Auckland City Council has accepted Liquid Boot® as complying with the New Zealand Building Code in particular Clauses B2 (Durability) and E2 (External Moisture), when installed per specification and applied by Permathene trained applicators.

## 8th IGS Conference in Yokohama, Japan



*September 2006.*

Permathene attended the 8th IGS Conference held in Yokohama. It was a great opportunity to share with some of the latest advancements in geosynthetics. Permathene's fabricated products, including baffles and turbidity curtains, received world wide interest.

## Content

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- Liquid Boot® approval by ACC
- 8th IGS Conference in Yokohama, Japan
- NZ Conferences and Workshops Attended in 2007

### Product Feature:

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- Geocell

### Case Study:

- Gasproofing - Smales Road & Edmund Hillary Retirement Village
- Containment - Water Treatment Ponds

## NZ Conferences and Workshops Attended in 2007

1. 16 - 18 May, NZWWA, Stormwater Conference, Auckland
2. 24 - 26 June, Build NZ, Auckland
3. 19 - 21 September, NZWWA, Annual Conference, Rotorua
4. 27 September, ARC Sediment Workshop, Auckland
5. 6 - 8 November, WasteMINZ, Annual Conference, Hamilton
6. 18 - 20 November, NZIHT, International Erosion Control Conference, New Plymouth

# Product Feature

## eeek! Coir Erosion Control Blanket

eeek! Coir is processed from ripe coconut husks retted in freshwater for at least six months. This results in an increased resistance to UV (ultraviolet) degradation and also increases the flexibility of processed fibre without causing deterioration.

### Composition

eeek! is manufactured from 100% coir fibres which are held together by a cotton stitched photodegradable polypropylene mesh on both sides.

### Advantages

- Moisture absorption: factor 9 times its dry weight (900%)
- Retains humidity in the soil and atmosphere
- Slows discharge of water
- Excellent at reducing soil erosion
- Resists temperature and wind extremes
- Promotes and protects healthy growth of vegetation
- Biodegrades within time scale



***To download the latest "Erosion & Sediment Control" catalogue please visit [www.permathene.com](http://www.permathene.com).***



### **Applications**

- Over steepened slopes, road, rail embankments, industrial, mining restoration, earth dams
- Drainage channels, culvert outlets, washout drains and emergency water courses
- Highly erodible soils (embankments and sandy / silty soil areas, high gradient slopes)
- Badly compacted areas, junctions with civil engineering works such as bridge abutments and inaccessible areas
- Unpredictable or low rainfall areas
- Heavy rainfall areas
- Irrigated areas
- Channels, coastal and sea shores - shore protection Public and private parks, terraces, dams
- Golf courses
- Lawns - temporary reinforcement and protection
- Roads - temporary reinforcement

# Geocell: Cellular geosynthetic for retention of soil on slopes

Permathene Geocell is a lightweight and flexible cellular structure erosion and sediment control product. Made of perforated polyethylene strips that are ultrasonically bonded together to form an extremely strong configuration, this pioneering Geocell system can be filled with a wide range of material including aggregate, concrete, sand and soil among others. Geocell helps prevent horizontal movement and substantially improves the material shear strength and improves bearing capacity.

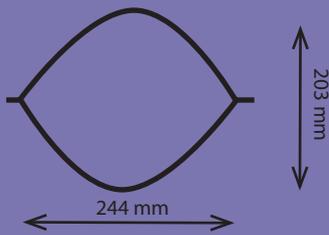


## Applications

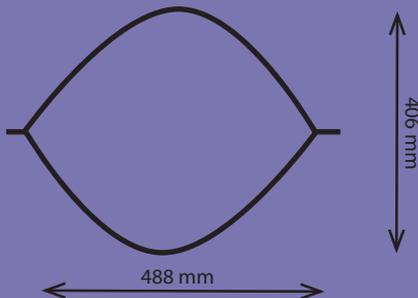
- Slope Protection
- Earth Protection
- Channel Protection

Permathene Geocell is made from a premium high density polyethylene for geotechnical applications. It is a three dimensional cellular confinement system available in smooth and textured and in two open cell sizes:

**Type A (each cell) dimensions: 203 mm x 244 mm**



**Type B (each cell) dimensions: 406 mm x 488 mm**



Applications of Geocell include erosion control, slope protection, retaining wall, load support, channel protection, and ground stabilisation.

In load support applications for example, a high degree of friction is developed between the aggregate infill and the cell wall that directly increases the stiffness of the system by reducing the ability of a shear plane developing between the infill and the cell wall. Perforations in the Geocell allow water to move from cell to cell by reducing undesirable cell ponding and providing lateral drainage.

In vegetated slope and channel protection systems, roots can grow through the perforations increasing the stability of the vegetated cover when subjected to gravitational and hydrodynamic forces.

The Permathene Geocell is an innovative erosion and sediment control product that provides cost effective solutions for ground stabilisation, erosion control and earth retention.

## Gas Proofing

### Smales Road Mobil Service Station Methane Barrier, Auckland

**Client: SAI Developments**

**Date: October 2005 – November 2007**



Smales Road Mobil Service Station in Manukau City is part of a commercial development proposed to house a small commercial hub of office buildings on the now completed segment of the Greenmount Landfill. In this type of situation, old landfill sites have potential exposure to landfill gases.

Liquid Boot® (cold applied, double component) was specified for the Mobil Service Station site by the architects and consultants. Designed to seal and protect against potential exposure from gases, including methane and industrial chemical contamination (such as from chemical and petroleum production and storage), Liquid Boot® is made from a chloroprene modified asphaltic (CMA) emulsion. A two component product which

is water based and cold applied, forming a seamless single course membrane suitable for large scale industrial applications as well as smaller buildings.

Liquid Boot® completely and seamlessly covers all protrusions such as venting, pipe works, steel works, columns and pads. This is almost impossible when using traditional sheet materials where the integrity of the product can be compromised when fastened to foundation walls, footings and especially service penetrations. Installation using traditional materials can often take weeks even for small buildings, added to that the high number of service penetrations as seen in the Smales Road service station project (over 50 pipe penetrations required sealing). The entire project including testing, penetrations and detailing was completed in just three days; a very impressive time frame relative to the size of the site.

Liquid Boot® adheres to almost any surface type, including service channels, below footing, above footing, walls, columns, structural surfaces (e.g. foundation walls) thus preventing harmful gases to migrate under the membrane and accumulate under areas where most leakage is possible.

An integral component is the gas collection venting system, a geotextile covered extrusion, complete with outlets with reducers for connection of the 300 mm × 30 mm geocomposite to conventional PVC or High Density Polyethylene (HDPE) pipes. This system has a number of advantages over traditional methods. There is less trenching required due to its flat nature making it quick and easy to install. It does not use slots for gas collection and thus is less vulnerable to siltation and other clogging. The gas collection system was successfully installed in less than an hour, complete with outlet connectors and reducers.

The Quality Assurance protocol for Liquid Boot® includes thickness and Smoke Testing, ensuring the maintenance of the geomembrane integrity. Usage of the Smoke Testing protocol allows for Permathene to find and fix even smallest pinholes in the geomembrane.

Permathene engineers supplied consultants with a complete set of standard details and specifications, making design of the geomembrane an efficient, comprehensive and cost-effective project for all parties.

# Case Studies

## Gas Proofing

### Edmund Hillary Retirement Village, Auckland

**Client: Ryman Healthcare**

**Date: October 2005 – November 2007**

The Edmund Hillary Retirement Village Development, recently under construction in Remuera, Auckland, is one of Australasia's leading projects of its type, involving the use of gas proofing through installation of Liquid Boot®.

"The Edmund Hillary Village is our new flagship," said Ryman chairman Dr David Kerr, and "has set a new benchmark for retirement living in New Zealand."

During monitoring of the preparation stage, gas discharge was found throughout the site. To negate this problem, a multifaceted double-layer gas proofing geomembrane system, with gas collection media under and monitoring lines between layers of the geomembrane was designed and implemented by environmental engineers.

Permathene was awarded with the contract for installation of Gas and Water Proofing Geomembrane in 2005 and has since installed more than 10,000 m<sup>2</sup> of High Density Polyethylene Geomembrane (HDPE), over 10,000 m<sup>2</sup> of Flexible Polypropylene Geomembrane (FPP), and around 2000m<sup>2</sup> of Linear Low Density Polyethylene Geomembrane (LLDPE). These materials required battening to the foundation walls, done by using flat aluminium bars fixed to the wall with Ramset® anchor fasteners. Altogether around 8 km of flat aluminium bars have been installed throughout the site, fixed with more than 30,000 anchor fasteners, installed by Permathene technicians.

Although HDPE has an excellent reputation in design and construction of gas proofing systems, its rigidity made it somewhat difficult to fit to the foundation wall's shape and even more difficult is the sealing of rigid materials to the many protrusions, including venting systems, ducting, pipes, etc. This method of using only rigid materials was extremely time consuming and inefficient. Even when fastened these types of membranes suffer from expansion and contraction at the fastening points which only add to the problem of gas proofing.

Permathene has managed to increase speed of installation significantly by using Liquid Boot®, a spray (cold applied, double component) geomembrane. Liquid Boot® has very intensive history of applications around the world with more than 2,000,000 m<sup>2</sup> installed in the USA alone. Comparatively, it is quick in installation (three-four times faster than HDPE). Additionally, it fully adheres to foundation walls without the need for battening. The implementation of a strict Quality Assurance system, including a comprehensive Smoke Test, allows for even the smallest pinholes in the membrane to be detected, and ensures consistency in the membrane during any part of the installation.

Liquid Boot® is extremely stretchable, with a coefficient of elasticity around 1300 % with around 90 % built-in polymer memory. The membrane can thus accommodate severe movements in building foundations without compromising integrity. It has been approved by various USA environmental authorities, CSIRO Building Product and Systems Approval Agency (Australia), and by the Auckland City Council (for both gas and water proofing).

Over 13,000 m<sup>2</sup> of gas proofing membrane has been installed at the Ryman Health site, and with several more buildings approaching construction stage, Permathene expect the system to serve as an integral part of this comprehensive project.



## Containment

### Wastewater Treatment Ponds, Dargaville.

**Client: PPCS Dargaville Beef Processing Plant**

**Date: July 2007.**

In November of 2005, Permathene was awarded the contract to supply and install geomembranes in the two new wastewater treatment ponds at the PPCS Dargaville beef processing plant. The one million dollar upgrade of the effluent treatment system was necessary in order to bring the plant in line with current and future legislative criteria governing the discharge of effluent.

The two new ponds, an anaerobic and an aerobic unit, are in addition to the large anaerobic pond that has been in use for many years.

Situated side by side, each of the new ponds is 90m x 30m with a depth of 7m. The excavations were lined with 1.5mm HDPE membrane, the new primary anaerobic pond also having a floating cover supplied and installed by Permathene. The secondary aerobic pond has been installed with aerators in order to increase oxygen levels and has an inspection pier cast in concrete. Permathene supplied HDPE profiles which were cast into the concrete in order for the liner to be attached by extrusion welding at the time of installation.

All welds were tested and passed as per the latest international test criteria. The ponds were commissioned in April of 2007.



## **Disclaimer**

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