uniseal®

waterproofing • urban greenery • ecological

everyday innovation

"a greener today for a better tomorrow"

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NOTE

Message from our Executive Chairman…

Welcome to a fresh new edition of the Uniseal Book!

Uniseal is now moving into the next phase of enabling a sustainable and resilient built environment.

Increasingly, to achieve a sustainable and resilient built environment attention is drawn to below the ground in addition to above ground. Urbanisation and climate change are having a tremendous impact on the environment, in particular floods and erosions. Towards this end we have innovated solutions for storm-water management, tree root management and turf and slope stabilisation to meet this challenge.

As part of our Corporate Environment Responsibility and to reinforce our commitment for sustainability and resilience, in collaboration with the International Federation of Landscape Architects (IFLA) Asia-Pacific Chapter, we have established the **IFLA ASIAPAC-UNISEAL® RESILIENCE BUILDING FUND** to support Urban Greenery and Ecological Management projects.

Our belief in Knowledge and Intellectual Property as a pillar of our business philosophy continues to gather strength with 5 patents and another 1 pending, 44 design registrations and 9 trademarks 6 of which are registered. Our main trademarks are registered in over 40 countries.

We are now well placed to seek suitable partners to be our Licensee in the global market.

We take this opportunity to thank all stakeholders – our business partners, trade professionals and staff - for their support in bringing us to this level!

James Lim
Executive Chairman
Uniseal Group of Companies

Testimonials...

Message from IFLA Asia-Pacific Region President…

The journey for industry partnerships goes through many winding roads. It is either brief or rewarding. The compelling story for any successful partnership lies not in its perseverance, but on its commitment and integrity to make reliable delivery towards the promises and vision it sets.

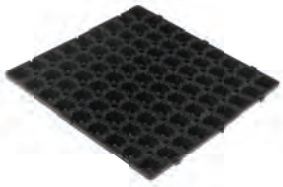
Uniseal proudly stands for such commitment and integrity when it comes to supporting and growing the landscape industry. Our longstanding partnership stemmed from those years when I was the president of Singapore Institute of Landscape Architects. For many years the like-mindedness and the shared vision for the global landscape profession continued; and has further propelled collaboration to take flight.

The recent sealed collaboration to establish IFLA AsiaPac-Uniseal Resilience Building Fund is a testament to the ongoing commitment that Uniseal promises. It goes beyond providing smart solutions in biophilia for business transactions, but sets in motion their corporate social responsibility to support resilience building programme for communities and the environment across the regions. From a casual conversation to signing on dotted lines, Uniseal has generously pledged its fund and resources to turn this pipe dream into a seeded reality. This truly signifies a major milestone for IFLA Asia-Pacific region and landscape architects leading resilience building programme in needed areas.

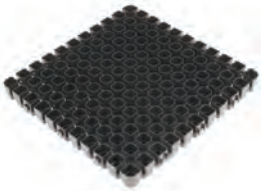
It is indeed a privilege to continually gain the support and grounded partnership of Uniseal. On behalf of IFLA Asia-Pacific region, I congratulate Uniseal for yet another chapter of accomplishments.

Damian Tang
President, IFLA Asia-Pacific Region (2016 – 2019)
International Federation of Landscape Architects

Urban Greenery - Green Roof

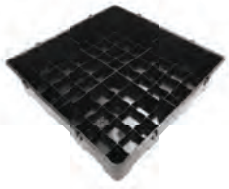


PlanterCell® 30



PlanterCell® 50

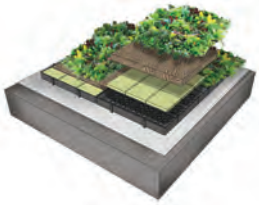
PlanterCell® 70



PlanterCell® 130

PlanterCell® VegaMat

PlanterCell® VegaMat FR



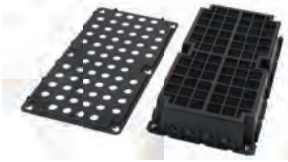
PlanterCell® 70 Plus

Urban Greenery - Green Wall

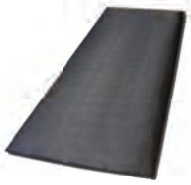
PlanterCell® 125

PlanterCell® 150 / 150 Mini

PlanterCell® 170 / 170 Mini



PlanterCell® 75

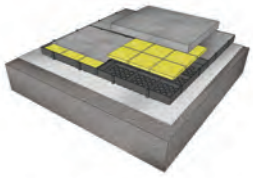


PlanterCell® H_2O-R Panel

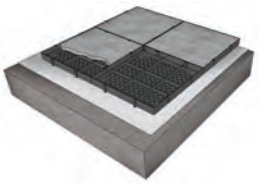
PlanterCell® H_2O-R Panel (FR)

Green Engineering - Composite Panels & Level Raising System

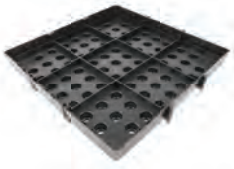
Insu® Slab 500



Insu® Slab 500 Plus



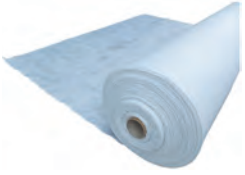
Insu® Slab 500 HD



Multitray™

Insu® Jac

Insu® Felt Black



Insu® Felt White

Ecological - Storm Water Management & Landscape Engineering

PlanterCell®
SW Tank Mini

PlanterCell®
SW Tank 250

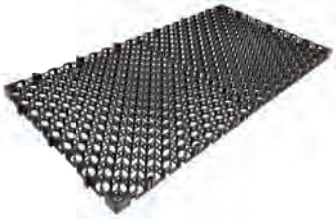
PlanterCell®
SW Tank 500

PlanterCell®
SW Tank 1000

GrasCell® DC20

GrasCell® DC30

GrasCell® DC50

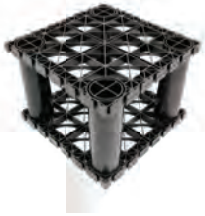


GrasCell® DC30 1000

GrasCell® G-Web®

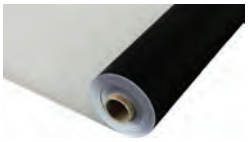
GrasCell® GP40

GrasCell® GP40 LW

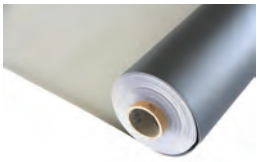


GrasCell® RC 550

Waterproofing - Pre-formed Membrane

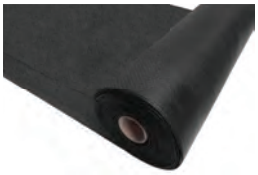


Uniseal® TPO

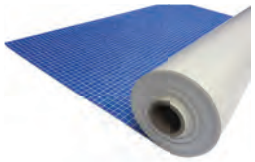


Uniseal® PVC

Uniseal® Torch-On 4mm



Uniseal® Torch-On 3mm



Uniseal® Pool Liner

Uniseal® HDPE

Uniseal® Self-Adhesive

Waterproofing - Liquid & Cementitious Range

Uniseal®
Acrylic

Uniseal®
WB PU

Uniseal®
Root Shield

Uniseal®
MS PU

Uniseal®
Insucoat

Uniseal®
Wall Coating

Uniseal®
Slurry+

Uniseal®
Flex

Uniseal...

Established in 1998, has evolved from a waterproofing specialist in Singapore to a growing global waterproofing, sustainable urban greenery and green engineering integrated solution provider. Built on a platform of practical innovation and strong intellectual properties, the Group is further moving into the ecological sector, with its range of proprietary products.

UNISEAL is engaged in the design, development, manufacture, marketing, distribution, sales and installation of eco-labeled green roof, green wall, sub-soil drainage, ecological management, raised floor, composite panels and waterproofing systems for the protection of buildings against the weathering elements and to provide a green sustainable environment within the urban landscape. The business is marketed under the distinctive and award winning trademarks:

uniseal® PlanterCell® Insu®

The company is founded on its principle and commitment to build a sustainable environment.

Our Vision is...

A Greener Today for a Better Tomorrow

Our Mission is...

Everyday Innovation

Our Business Philosophy...

- Pioneering spirit for first mover advantage
- Knowledge and Intellectual Properties are our key assets
- Quality, Service, Reliability, Innovation, Care for Environment are our core values
- Staying relevant at the forefront of the industry keeps us on our toes

Our Intellectual Properties...

Intellectual properties reinforce our innovative spirit, are our key assets and provide a platform for our continued growth. Our intellectual Property portfolio consists of the following :

» Trademarks

- Uniseal®
- PlanterCell®
- Insu® Slab
- GrasCell®
- G-Web®
- Insu®
- Ovalis®
- Multitray™

» Patents

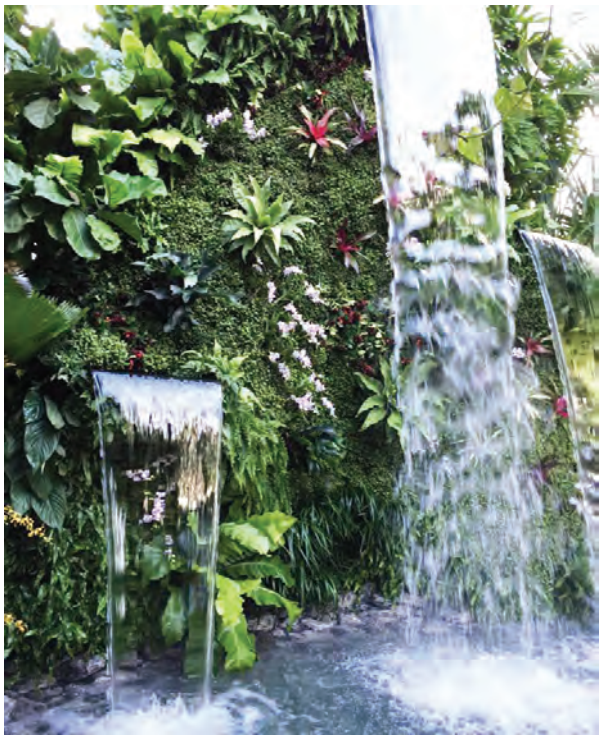
• Insu® Slab 500	P-No. 148063
• Insu® Slab 620	P-No. 141638
• PlanterCell® 50/500	P-No. 174112
• GrasCell® RC 550 / Multipal™	P-No. 11201701813Q
• Multi-Functional Tray	P-No. 11201701971R

» Design Registrations

• PlanterCell® 30P	D2011/1315/E
• PlanterCell® 30	30201703868P
• PlanterCell® 60	30201704763S
• PlanterCell® 60 Extender Panel A	30201704764P
• PlanterCell® 60 Extender Panel B	30201704765T
• PlanterCell® 70	D2014/789/C
• PlanterCell® 70 Plus	30201501228Y
• PlanterCell® 130	D2009/694/B
• PlanterCell® 75	D2011/236/D
• PlanterCell® 125	D2010/787/J
• PlanterCell® 150	30201703866W
• PlanterCell® 150 Mini	30201703867R
• PlanterCell® 170	D2014/922/E
• PlanterCell® 170 Mini	D2013/1020/E
• PlanterCell® Pot 120	D2009/710/G
• GrasCell® DC30	D2014/788/G
• GrasCell® GP40	D2013/1041/B
• GrasCell® GP40LW	30201703869U
• PlanterCell® SW Tank Mini	30201703865Q
• PlanterCell® SW Tank 250	30201703864V
• PlanterCell® SW Tank 500	D2013/76/G
• PlanterCell® SW Tank 1000	30201703863X
• Insu® Drain US6P	D2014/787/J
• Insu® Jac	30201500759P; 30201500760Y; 30201500761T; 30201500762S; 30201500763X; 30201500764V; 30201500765Q; 30201501267Y; 30201501268W; 30201501270Y; 30201501271T; 30201501279U; 30201704754R; 30201704755P; 30201704756Y; 30201704758X
• Insu® Jac 2	30201704762R
• Insu® Jac 10	30201704757U

Chelsea Flower Show 2015
Uniseal Innovative Products + Creative Design Silver-Gilt Award

The **Esmond Landscape & Horticultural** - **Uniseal** partnership bagged a Silver-Gilt award with their "Hidden Beauty of Kranji" garden display at the recent prestigious Chelsea Flower Show 2015 held last 19 – 22 May 2015.



Behind the creative design is the innovative PlanterCell® Green Wall System by Uniseal. The Green Wall System provided an opportunity for the designers to create a stunning waterfall against a green wall backdrop at the centrepiece of the display, which helped to clinch the award. This demonstrates the positive impact of collaboration between creative design and innovative products.

James Lim, the Chairman of Uniseal, an Urban Greenery, Ecological Management and Waterproofing specialist, added "We developed our range of proprietary PlanterCell® products with a clear vision in mind, to provide landscape designers the freedom to realise their creativity. We are looking to contribute towards more award winning landscapes through partnerships with designers in the future. We want to play a part in bringing Singapore to the world stage in the Urban Greenery arena."

Production and installation progress..

1) Design concept. Shown in artist's impression.


2) Construction of the frames for the two main features: Waterfalls & Garden Shed.



3) Setting out of the greenwall panels to form the Waterfall feature.

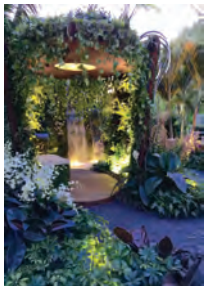

4) Installation of greenwall panels for the Garden Shed feature.


5) Installation & securing of the two main features: Waterfalls & Garden Shed.


6) Planting of trees, shrubs and ground plants.






7) Planting of decorative and exotic plants onto the waterfall feature.


SG50 National Day Rally 2015

2015 is Singapore's Jubilee year and a moment for Singaporeans to come together to celebrate our 50th year of independence as one people and one country. On 23rd August 2015, our Prime Minister Mr. Lee Hsien Loong delivered the National Day Rally (NDR) speech, announcing policy changes that drew cheers from many in the audience.

Uniseal is proud to be part of this historic event by installing the 15.0 meters by 8.40 meters high green wall that forms the backdrop of the National Day Rally stage.

We are honoured to be given the opportunity to showcase our craftsmanship in this important national event. The green wall design is a familiar public housing estate that is very close to our heart, with LED lights outlining the housing blocks to create a dramatic stage presence. This is the first time real living green wall is being showcase at the NDR, making SG50 a significant moment for Uniseal where we share our pride with Singapore.

MAJULAH SINGAPURA
OUR GOLDEN JUBILEE

Greenwall production and installation progress..

1) Laying out of the panels and marking the design pattern according to the approved design.

2) Setting the panels in upright position to prepare for planting.

3) Planting of the approved selected plants according to the design pattern.

4) Completed planting at the R&D centre, inspected and ready for site delivery.

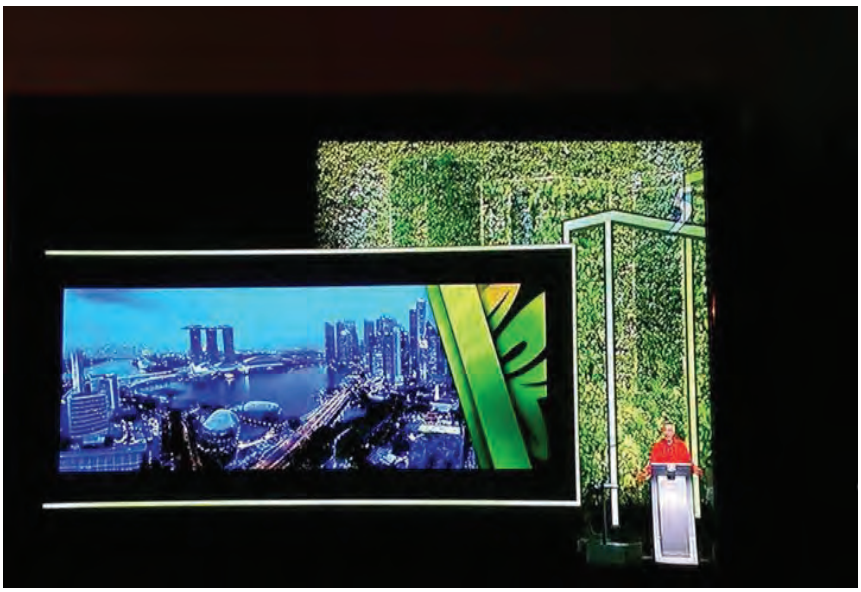
5) At the site, the floors are marked prior to installation of scaffold frame.

6) Setting-up and installation of the P.E. approved scaffold frame.

7) Installation of greenwall panels onto the completed scaffold frame.

8) Installation and testing of decorative LED lights.

9) Final checking and testing the over-all effect of the completed greenwall together with the media technical crew.



10) Completed greenwall with instant effect.

Gaia Condominium at Jalan Dusun

Before..

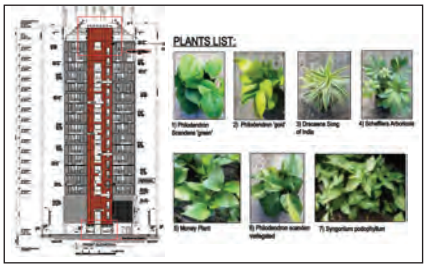
After..

GAIA Condominium at Jalan Dusun is an iconic building with a cliff-like structure design featuring a majestic 60-metre green wall centrepiece, making it the tallest green wall installation in Singapore.

Blending with the structure's earth-inspired design, the green wall is strategically located in the middle of the building's façade the entrance, creating a 'green lung' amidst the hard structures to embrace and welcome visitors with a green relief.

This spectacular display of abstract art-inspired greenwall has won the Gold award under Greenwall Category in the 2015 LIAS Awards of Excellence. Uniseal is once again proud to be a partner of this iconic building in the Singapore skyline.

Greenwall production and installation progress..



1) Design conceptualization and plants selection stage.

2) Installation of main frames at site.

3) Installation of PlanterCell® 170 greenwall trays.

4) Laying of PlanterCell® Planting Media onto the trays.

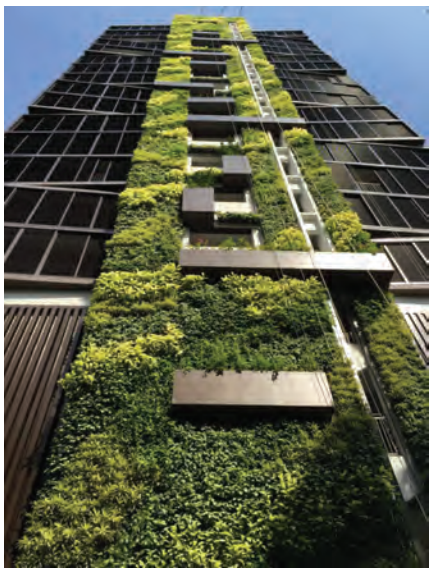
5) Installation and setting of Auto-Irrigation accessories. (e.g. pressure regulators, solenoid valves, controller, etc.)

6) Installation of auto-irrigation pipes and emitters.

7) Checking and water testing of the irrigation pipes and emitters prior to plant installation.

8) Planting according to approved design and selected plants.

9) Final checking and testing the overall effect of the completed greenwall.



10) Completed greenwall

Our Facilities...

R & D Centre / Logistics / Nursery

Manufacturing

Production Line & Tooling Process

Our Credentials...

These awards and accreditations are recognition of our efforts to serve the industry.

» Sustainability

Eco Green Award

2014

Singapore Business Federation Green Technology Award 2014 Achievement in Excellence

THE ROYAL HORTICULTURAL SOCIETY Sharing the best in Gardening
RHS CHELSEA FLOWER SHOW 2015
SILVER-GILT MEDAL AWARD

» Management

» Branding

Our Credentials...

These awards and accreditations are recognition of our efforts to serve the industry.

» Trade

BCA
Building and Construction Authority of Singapore – Trade Registration CR13-L4 Waterproofing

Waterproofing Accredited Contractors W1

新加坡建築商公會有限公司
THE SINGAPORE CONTRACTORS ASSOCIATION LTD
Trade Registration AF 10, 12 and 13

» Accreditations

SINGAPORE BUSINESS FEDERATION

ASME
For Entrepreneurs By Entrepreneurs

SMa
Singapore Manufacturers' Federation
新加坡制造商联合会

WTAS
WATERPROOFING TRADES ASSOCIATION SINGAPORE

SIA
SINGAPORE INSTITUTE OF ARCHITECTS
Strategic Partner

SINGAPORE GREEN BUILDING COUNCIL

SILA
SINGAPORE INSTITUTE OF LANDSCAPE ARCHITECTS

LIAS
Landscape Industry Association (Singapore)

IFLA
INTERNATIONAL FEDERATION OF LANDSCAPE ARCHITECTS

At Your Service...

At UNISEAL we provide one-stop integrated solutions for all stakeholders in the built environment. We offer consultancy on application; design and horticulture; product development to meet special needs; manufacturing; products and systems; installation services and maintenance services.

Products

We market a range of proprietary systems for the urban greenery and ecological sectors under the PlanterCell® & GrasCell® trademark; green engineering products under the Insu® trademark and waterproofing systems under our Uniseal® trademark.

Our complete product portfolio is illustrate in the following pages within this book.

Installation Services

In Singapore, we design and construct roof gardens, green walls & partitions, raised floors, sub-soil drainage and landscape engineering systems.. We also provide services to design and install waterproofing systems.

Licences

For the global market, we work through strategic partners engaging them as our licensees under our technology and trademark business licences. We have a portfolio of 4 licences.

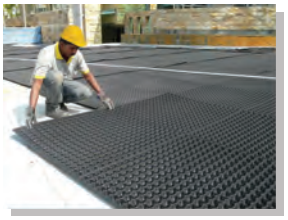
- To market, distribute, sell, and install WATERPROOFING PRODUCTS AND SERVICES under the Uniseal® and Insu® trademarks.
- To market, distribute, sell and install URBAN GREENERY AND ECOLOGICAL PRODUCTS AND SERVICES under the Uniseal®, PlanterCell®, GrasCell®, Insu® and G-Web® trademarks.
- To market, distribute, sell and install COMPOSITE PANELS under the Insu® Slab trademark.
- To manufacture, market, distribute, sell and install COMPOSITE PANELS under the Insu® Slab trademark.

Installation...

PlanterCell® 30 Green Roof System

1) Laying of Root-proof Waterproofing Membrane.

2) Laying of PlanterCell® 30 Green Roof trays.



3) Properly aligning of PlanterCell® 30 Green Roof trays.

4) Laying of 120g/m^2 Insu®Felt geo-textile.

5) Laying of PlanteCell® Planting Mix.

6) Laying of Auto-Irrigation lines and ground cover plants.

Project: Prince George's Park Residence - NUS, Singapore

Installation...

PlanterCell® 70 Green Roof System

1) Surface Preparation.

2) Laying of Root-proof Waterproofing Membrane.

3) Completed waterproofing membrane.

4) Laying of pre-planted PlanterCell® 70 Green Roof trays.

5) Properly aligning of PlanterCell® 70 Green Roof trays.

6) Completed Green Roof.

Project: ITE College West, Singapore

Installation...

PlanterCell® H_2O-R Panel Green Wall System

1) Pre-packed panels are delivered at site.

2) Setting-out & fixing of panels onto the prepared wall surface.

3) Completed installed panels.

4) Drawing of the pattern design indicating plant species.

5) Installation of Auto-Irrigation lines.

6) Planting according to the plant pattern design.

Project: Glyndebourne Condominium, Singapore

Installation...

PlanterCell® 170 Mini Green Wall System

1) installation of PlanterCell® 170 Mini Green Wall trays.

2) Installation of Auto-Irrigation lines.

3) Connection of Auto-Irrigation lines.

4) Laying of PlanterCell® Planting Mix.

5) Plants selection for Green Wall.

6) Planting according to design.

Project: Jalan Bumbong Residential, Singapore

Installation...

GrasCell® GP40 Fire Engine Access System

1) Laying of GrasCell® GP40 onto the prepared leveling sand.

2) Detailing by cutting GrasCell® GP40 according to corner angle.

3) Compacting and leveling of surface.

4) Prepared area with levelled GrasCell® GP40.

5) Laying of soil.

6) Planting of ground cover turf.

Project: Bukit Panjang N6C10 HDB, Singapore

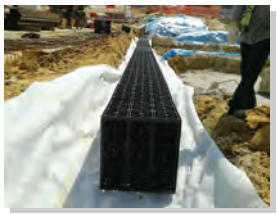
Installation...

PlanterCell® SW Tank - Storm Water Run-off Management System

1) Levelling of surface according to design gradient.

2) Laying of Insu® Felt over proper prepare surface.

3) Installation of SW Tank.



4) Completion of SW Tank installation.

5) Cover SW Tank with Insu® Felt prior back fill.

6) Back filling.

Artist's Impression (Site Plan)
Project: D'Nest Condominium at Pasir Ris, Singapore

7) Completion of back filling.

8) Levelling of soil surface at sub-basement level.

9) Laying of Insu® Felt and DC30 Drainage Cell.

10) Installing Insu® Felt ovef DC30.

Installation...

Root-Proof Waterproofing System (Liquid-applied Membrane)

1) Surface Preparation.

2) Installation of angle fillets.

3) Upturn and corner detailing.

4) Whole roof area coverage.

5) Installation of geotextile, planting media and plants.

6) Completed greenroof with Root-shield waterproofing membrane.

Project: Punggol Waterway Terraces I & II, Singapore

Installation...

PVC Waterproofing System (Pre-formed Membrane)

1) Surface preparation.

2) Unrolling of PVC membrane over prepared substrate.

3) Application of bonding adhesive.

4) Hot welding of over lapping joints and edges.

5) Grooveline tuck-in for upturn and detailing areas.

6) Completed Roof.

Completed waterproofing works at Terminal RC Roof

Project: Singapore LNG Facility at Jurong Island, Singapore

Installation...

Insu® Jac - Level Raising System

1) Setting out of Insu®Jac pedestals.

2) Measuring and testing the floor levels & height before securing the wood batten.

4) Securing the wood battens onto the Insu®Jac pedestal.

3) Installation of wood battens and bearers.

5) Installation of timber board decking.

6) Timber decking showing the Insu®Jac system below.

Project: Skyline at Orchard Boulevard, Singapore

Installation...

Insu® Slab - Composite Panels for Maintenance Pathways

1) Installation of waterproofing membrane.

2) Surface preparation and cleaning prior to installation of Insu®Slab.

3) Marking out and setting out of Insu®Slab onto prepared surface.

4) Applying PU grout at the bottom for spot-bonding.

5) Installation of Insu®Slab spacers.

6) Securing the Insu®Slab onto the prepared surface.

Project: Bulim Bus Depot, Singapore

Our Product Portfolio

Urban Greenery

Ecological

Our Product Portfolio

Green Engineering

Waterproofing

Job References

Plants List

Urban Greenery: Green Roof and Green Wall

Rapid urbanization and climate change are providing an impetus for urban greenery and Green Roofs and Walls are key ingredients in this movement. Green Roofs transform an otherwise un-utilised or under-utilised space into a green habitat whilst Green Walls enhance the living experience of the community.

Green Roofs and Walls contribute many environmental and psychological benefits:

- »Provide thermal insulation
- »A green lung within the vicinity
- »Reduce noise and dust pollution
- »Alleviates rain water run-off
- »Efficient utilisation of roof
- »Enhance aesthetics and image of real estate
- »Provide focus for community interaction
- »Contribute to the Singapore BCA Green Mark Score

Our PlanterCell® family of Urban Greenery systems currently consists of 6 Green Roofs and 7 Green Walls together with a suite of peripheral products.

Manufactured from recycled polypropylene, PlanterCell® products[1] are eco "Green Label" certified by the Singapore Environment Council (SEC) reinforcing our commitment to a green environment. In addition, all our products[1] are certified "Green Products" by the Singapore Green Building Council (SGBC).

Our products also meet the fire propagation specifications under British Standard 476: Part 6: 1989 + A1: 2009 and Part 7: 1997

Benefits of the PlanterCell® Systems

Our PlanterCell® systems offer many benefits

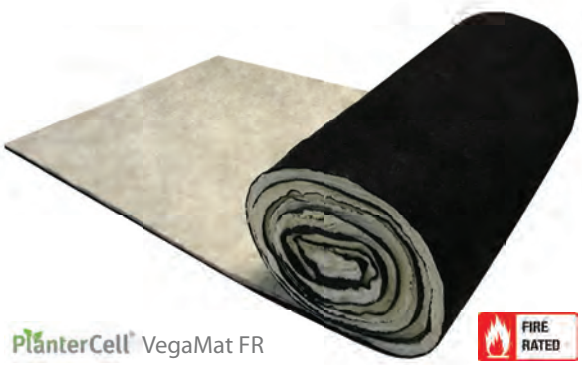
- »Plants continuously hydrated, reducing irrigation needs
- »Lightweight with good strength
- »Easy installation
- »Efficient logistics (Lightweight and stackable)
- »Reusable and Recyclable
- »Modular (Allows simple replacement)
- »Root resistant

In addition, certain models offer specific benefits

- »Dual applications (Green roof or sub-soil drainage)
- »Adjust to contour of deck (Sheet is flexible)
- »Planting on-top or within tray
- »Instant greening (Pre-Growing)
- »2-sided greenery
- »Can be resized by cutting
- »Solutions where there is space constraint

[1]except PlanterCell® 70 Plus

PlanterCell® VegaMat

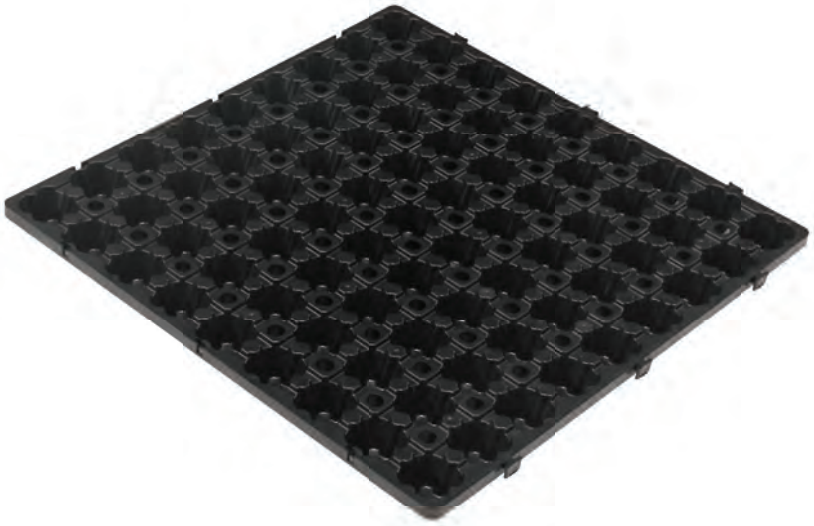


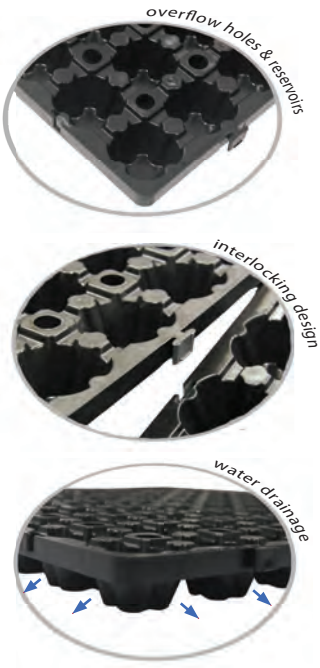
PlanterCell® VegaMat / PlanterCell® VegaMat FR is a lightweight hygroscopic green roof composite mat which incorporates multifunctional water retention and filter layers to form a flexible vegetated blanket, ready for installation over existing or new roof structures without any secondary substrate growing medium. Organic soilless planting media is use in the pre-growing process. Both non-FR and FR version can be easily cut to conform to any sizes and shapes of the roof structures.

Technical Specifications		UOM	PlanterCell® VegaMat
Product Codes			PUG-GR-VEGM-NR PUG-GR-VEGM-FR
SGBC Green Product			✓✓
Size:	Roll	m	1m W x 6m L
	Thickness	mm	±20
Density		kg/m³	100 to 110
Water Retention		l/m²	~17
Saturated Weight:		kg/m²	25 to 35
Planting			Extensive

SGBC = Singapore Green Building Council

PlanterCell® 30





PlanterCell® 30 is a lightweight and high strength water retention and drainage tray that can be applied both as a green roof system or a sub-soil drainage system. The sturdiness of the tray supports the weight of the water stored in its cells, planting mix, plants and human traffic.

The tray, manufactured from recycled polypropylene raw material using injection moulding process, has 81 cells, acting as reservoirs with water storage capacity of approx. 8.80 l/m^2 to keep plants nourished via capillary action, reducing irrigation frequency needed when applied as a green roof system. The holes on the ridge between the rows of cells, serves to discharge water when applied as a sub-soil drainage system.

The tray interlocks together to form a sturdy platform for planting or for drainage purpose.

The system consist of the tray, PlanterCell® Planting Mix and Insu® Felt as a separation layer between the planting media and the cells to prevent clogging of the reservoirs.

PlanterCell® 30 GREEN ROOF SYSTEM

(1) Metal Roof System
(2) PlanterCell® 30
(3) Insu® Felt
(4) PlanterCell® Planting Mix
(5) Selected Green Roof plants

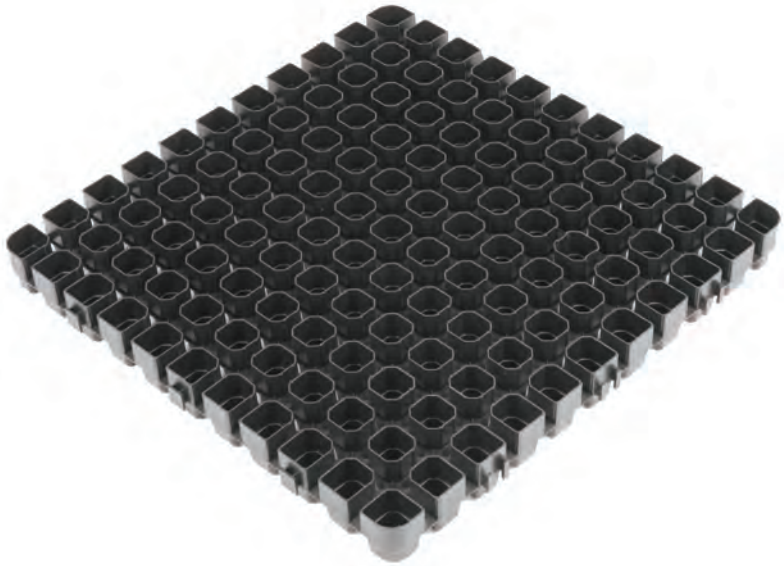
Technical Specifications		UOM	PlanterCell® 30
Product Codes			PUG-GR-30XX-01-NR PUG-GR-30XX-01-FR
SEC Green Label			Yes
SGBC Green Product			✓✓✓✓
Material			Recycled PP
Colour			Black
Size:	Height	mm	30
	Width	mm	500
	Length	mm	500
Pieces per m² Area		pc	4
Nominal Weight:	Empty	kg/m²	2.80
	Planted	kg/m²	120 to 135
Cells (Reservoirs)		nos.	9 x 9
Water Storage	Capacity	l/m^2	8.80
Compressive Strength		$tonnes_f/m^2$	97.0
Planting			Intensive Extensive

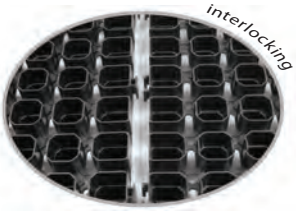
SEC = Singapore Environment Council

SGBC = Singapore Green Building Council

Fire resistant version available. Please contact us for more information.

PlanterCell® 50





PlanterCell® 50 is an innovative patented product with dual applications. It is a green roof system on one side and a sub-soil drainage mat on the other. The flexibility of the mat allows it to adjust to the contour of an uneven deck and its high compressive strength accommodates human traffic.

The mat, a single piece injection moulding, is designed with 121 cells, acting as reservoirs with water storage capacity of approx. 17.4 l/m² to keep plants nourished via capillary action, reducing irrigation frequency needed. The space between the cells acts as a drainage channel for excess water to prevent water logging. Male/female interlocking system at the sides of the mat allows the mats to be laid out securely to form a platform for planting.

PlanterCell® 50 when flipped over transforms into a drainage mat as the reservoirs are not in use and the channels drains water.

The system consist of the tray, PlanterCell® Planting Mix and Insu® Felt as a separation layer between the planting media and the cells to prevent clogging of the reservoirs.

PlanterCell® 50 GREEN ROOF SYSTEM

(1) Roof Slab
(2) Root Resistant Waterproofing Membrane
(3) Termination Groove Line 12mmx12mm
(4) GrasCell® DC30
(5) PlanterCell® 50
(6) Insu® Felt
(7) PlanterCell® Planting Mix
(8) Selected Green Roof plants
(9) Drain Pipe

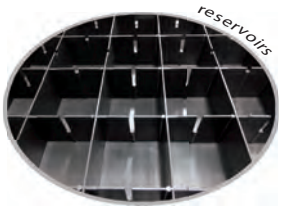
Technical Specifications		UOM	PlanterCell® 50
Product Codes			PUG-GR-50XX-01-NR
			PUG-GR-50XX-01-FR
SEC Green Label			Yes
SGBC Green Product			✓✓✓✓
Material			Recycled PP
Colour			Black
Size:	Height	mm	50
	Width	mm	500
	Length	mm	500
Pieces per m² Area		pc	4
Nominal Weight:	Empty	kg/m²	4.80
	Planted	kg/m²	130 to 145
Cells (Reservoirs)		nos.	11 x 11
Water Storage	Capacity	l/m²	17.40
Compressive Strength		$tonnes_f/m^2$	87.3
Planting			Intensive
			Extensive

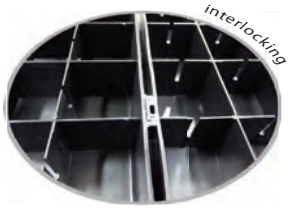
SEC = Singapore Environment Council

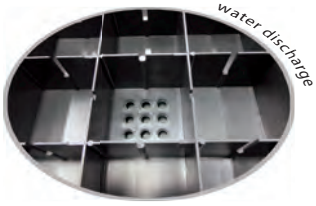
SGBC = Singapore Green Building Council

Fire resistant version available. Please contact us for more information.

PlanterCell® 70



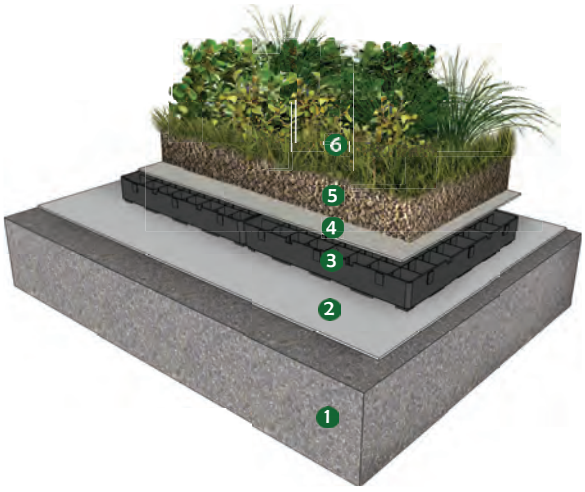




PlanterCell® 70 is a green roof modular tray system with high water storage capacity to reduce irrigation needs and can also be used as a part of rain water management to reduce peak flow. It has a high compressive strength to accommodate human traffic.

The tray, a single piece injection moulding, is designed with 64 cells acting as reservoirs with water storage capacity of approx. 30.4 l/m^2 to nourish plants via capillary action resulting in minimal irrigation needed. Cell walls in one direction are slotted to equalise water amongst the reservoirs and perforations are made on 4 of the cell floor to drain excess water. The tray has raised legs to prevent water logging. Male/female interlocking system at the sides of the tray allows the trays to be laid out securely to form a platform for planting.

The system consist of the tray, PlanterCell® Planting Mix and Insu® Felt as a separation layer between the planting media and the cells to prevent clogging of the reservoirs.



PlanterCell® 70 GREEN ROOF SYSTEM

(1) Roof Slab
(2) Root-Resistant Waterproofing Membrane
(3) PlanterCell® 70
(4) Insu® Felt
(5) PlanterCell® Planting Mix
(6) Selected Green Roof plants

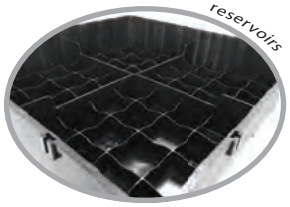
Technical Specifications		UOM	PlanterCell® 70
Product Codes			PUG-GR-70XX-01-NR
			PUG-GR-70XX-01-FR
SEC Green Label			Yes
SGBC Green Product			✓✓✓
Material			Recycled PP
Colour			Black
Size:	Height	mm	70
	Width	mm	500
	Length	mm	500
Pieces per m^2 Area		pc	4
Nominal Weight:	Empty	kg/m^2	5.40
	Planted	kg/m^2	145 to 160
Cells (Reservoirs)		nos.	8 x 8
Water Storage	Capacity	l/m^2	30.40
Compressive Strength		$tonnes_f/m^2$	55.0
Planting			Intensive
			Extensive

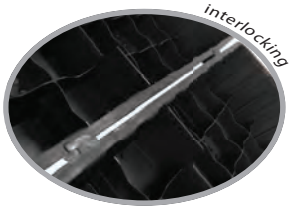
SEC = Singapore Environment Council

SGBC = Singapore Green Building Council

Fire resistant version available. Please contact us for more information.

PlanterCell® 130





PlanterCell® 130 is our premium green roof modular tray system with a good balance of water storage capacity to reduce irrigation needs and can also be used as part of rain water management to reduce peak flow. For sites with space constraint in planting, this tray allow for off-site pre-planting. It has a high compressive strength to accommodate human traffic. Single plants within the tray allows for easy changes in layout and design.

The tray, a single piece injection moulding, is designed with 4 compartments of 16 cells each, acting as reservoirs with water storage capacity of approx. 30.8 l/m^2 to nourish plants via capillary action resulting in reduced irrigation needed. It also incorporates a water leveling feature to distribute water evenly within the tray and a drainage system together with raised legs to prevent water logging. Male/female interlocking system at the sides of the tray allows the trays to be laid out securely to form a platform for planting.

The system consist of the tray, PlanterCell® Planting Mix and Insu® Felt as a separation layer between the planting media and the cells to prevent clogging of the reservoirs.

PlanterCell® 130 GREEN ROOF SYSTEM

(1) PlanterCell® 130
(2) Insu® Felt
(3) PlanterCell® Planting Mix
(4) Selected Green Roof plants

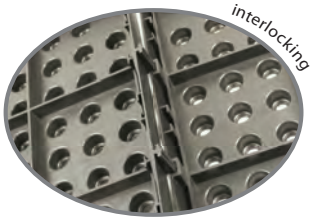
Technical Specifications		UOM	PlanterCell® 130
Product Codes			PUG-GR-130X-01-NR PUG-GR-130X-01-FR
SEC Green Label			Yes
SGBC Green Product			✓✓✓
Material			Recycled PP
Colour			Black
Size:	Height	mm	130
	Width	mm	500
	Length	mm	500
Pieces per m^2 Area		pc	4
Nominal Weight:	Empty	kg/m^2	7.40
	Planted	kg/m^2	115 to 130
Cells (Reservoirs)		nos.	4 x 16
Water Storage	Capacity	l/m^2	30.80
Planting			Intensive Extensive Pre-planting

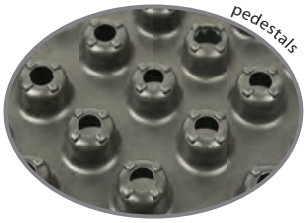
SEC = Singapore Environment Council

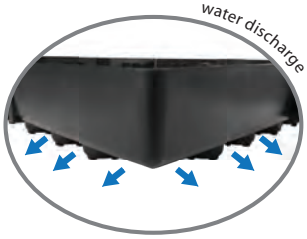
SGBC = Singapore Green Building Council

Fire resistant version available. Please contact us for more information.

Multitray™







Multitray™ is a multi-functional tray which can be used as a green roof tray or precast composite slab applications.

The tray is a single piece injection moulding manufactured from recycled polypropylene and designed with a series of 87 pedestals at the bottom to facilitate efficient water drainage.

PlanterCell® 70 Plus is a modular green roof tray utilizing Multitray™ as the planting platform, incorporating Growool™ water retention layer and PlanterCell® Planting Mix.

PlanterCell® 70 Plus

PlanterCell® 70 Plus GREEN ROOF SYSTEM

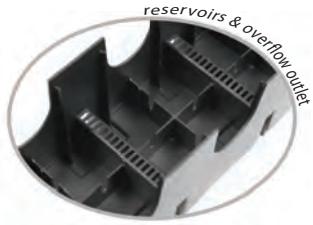
(1) Roof Slab
(2) Root-Resistant Waterproofing Membrane
(3) Multitray™
(4) Growool™ Water Retention Layer
(5) PlanterCell® Planting Mix
(6) Selected Green Roof plants

Technical Specifications		UOM	PlanterCell® 70 Plus
Product Codes			PGE-OT-MTRX-01-NR PGE-OT-MTRX-01-FR
SEC Green Label			Yes
Material			Recycled PP
Colour			Black
Size:	Height	mm	70
	Width	mm	500
	Length	mm	500
Pieces per m² Area		pc	4
Nominal Weight:	Empty	kg/m²	6.4
	Planted	kg/m²	80 to 120
Cells (Reservoirs)		nos.	3 x 3
Compressive Strength		$tonnes_f/m^2$	117.1
Planting			Extensive

SEC = Singapore Environment Council

Fire resistant version available. Please contact us for more information.

PlanterCell® 125



PlanterCell® 125 is an innovative lightweight but sturdy planter box that is stackable and allows for planting on both faces creating a double sided green wall.

The box, a single piece injection moulding, has 4 compartments each with 4 cells, acting as reservoirs with water storage capacity of approx. 36.8 l/m² to nourish plants via capillary action resulting in reduced irrigation frequencies needed. Three grids of overflow outlets within the planter box drains excess water preventing flooding and overweight situations.

The planter boxes are stackable and interlock with adjacent boxes to form a sturdy wall. The boxes can be cut to accommodate site conditions and designs. An end plate is available to close off the cut end.

The system consist of the planter box (with end plates), PlanterCell® Planting Mix and Insu®Felt as a separation layer between the planting media and the cells to prevent clogging of the reservoirs.

This system allows for planting within the tray or within the cells, catering for pre-growing of greens prior to installation on-site.

PlanterCell® 125 GREEN WALL SYSTEM

(1) PlanterCell® 125
(2) PlanterCell® Planting Mix
(3) Selected Green Wall plants

Technical Specifications		UOM	PlanterCell® 125
Product Codes			PUG-GW-125X-01-NR
			PUG-GW-125X-01-FR
SEC Green Label			Yes
SGBC Green Product			✓✓✓
Material			Recycled PP
Colour			Black
Size:	Height	mm	125
	Width	mm	125
	Length	mm	500
Pieces per m² Area		pc	16
Nominal Weight:	Empty	kg/pc	0.7
	Planted	kg/pc	5 to 7
Cells (Reservoirs)		nos.	4 x 4
Water Storage (planting within tray)	Capacity	l/pc	~2.3
Compressive Strength		$tonnes_f/m^2$	87.3

SEC = Singapore Environment Council

SGBC = Singapore Green Building Council

Fire resistant version available. Please contact us for more information.

PlanterCell® 150 / 150 Mini

PlanterCell® 150

PlanterCell® 150 Mini

PlanterCell® 150 and 150 Mini are specially designed lightweight but sturdy planter boxes to build a green wall.

PlanterCell® 150 and 150 Mini are manufactured from a single piece injection moulding, each designed with water retention reservoirs which store approx. 3.6 l/m² and 2.5 l/m² of water respectively to nourish plants via capillary action resulting in reduced irrigation frequencies needed. The overflow outlets within the planter boxes drain excess water preventing flooding and overweight situations.

The boxes have notches at the side walls to accommodate irrigation lines and self-locking clips at the back for a simple mounting onto structures.

The system consist of the planter boxes, PlanterCell® Planting Mix and Insu® Felt as a separation layer between the planting media and the cells to prevent clogging of the reservoirs. The system allow for pre-growing of greens prior to installation on-site.

PlanterCell® 150 / 150 Mini
GREEN WALL SYSTEM

(1) PlanterCell® 150 / 150 Mini

(2) PlanterCell® Planting Mix

(3) Selected Green Wall Plants

Technical Specifications		UOM	PlanterCell® 150	PlanterCell® 150 Mini
Product Codes			PUG-GW-150X-01-NR PUG-GW-150X-01-FR	PUG-GW-150M-01-NR PUG-GW-150M-01-FR
SEC Green Label			Yes	Yes
SGBC Green Product			✓✓✓	✓✓✓
Material			Recycled PP	Recycled PP
Colour			Black	Black
Size:	Height	mm	150	150
	Width	mm	135	135
	Length	mm	500	200
Pieces per m² Area		pc	10	25
Nominal Weight:	Empty	kg/pc	0.50	0.15
	Planted	kg/pc	3.70 to 4.20	1.40 to 1.90
Cells (Reservoirs)		nos.	2 x 4	4
Water Storage (planting within tray)	Capacity	l/pc	0.36	0.10

SEC = Singapore Environment Council

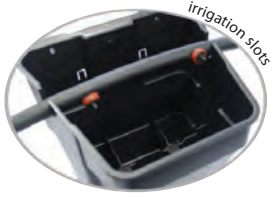
SGBC = Singapore Green Building Council

Fire resistant version available. Please contact us for more information.

PlanterCell® 170 / 170 Mini

PlanterCell® 170

PlanterCell® 170 Mini



PlanterCell® 170 and 170 Mini are specially designed lightweight but sturdy planter boxes to build a green wall.

PlanterCell® 170 and 170 Mini are manufactured from a single piece injection moulding, each designed with water retention reservoirs which store approx. 26 l/m² and 10.5 l/m² of water respectively to nourish plants via capillary action resulting in reduced irrigation frequencies needed. The overflow outlets within the planter boxes drain excess water preventing flooding and overweight situations.

The boxes have notches at the side walls to accommodate irrigation lines and self-locking clips at the back for a simple mounting onto structures.

The system consist of the planter boxes, PlanterCell® Planting Mix and Insu® Felt as a separation layer between the planting media and the cells to prevent clogging of the reservoirs. The system allow for pre-growing of greens prior to installation on-site.

PlanterCell® 170 / 170 Mini
GREEN WALL SYSTEM

(1) PlanterCell® 170 / 170 Mini

(2) PlanterCell® Planting Mix

(3) Selected Green Wall Plants

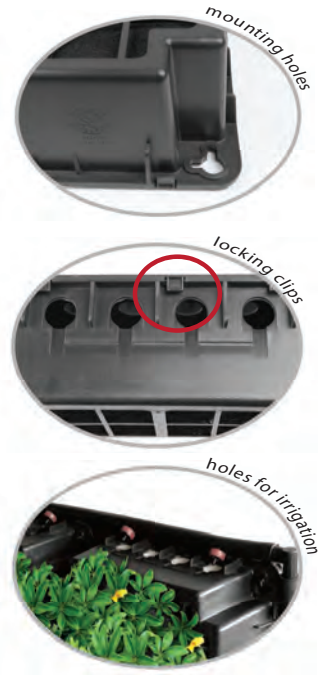
Technical Specifications		UOM	PlanterCell® 170	PlanterCell® 170 Mini
Product Codes			PUG-GW-170X-01-NR PUG-GW-170X-01-FR	PUG-GW-170M-01-NR PUG-GW-170M-01-FR
SEC Green Label			Yes	Yes
SGBC Green Product			✓✓✓	✓✓✓
Material			Recycled PP	Recycled PP
Colour			Black	Black
Size:	Height	mm	170	170
	Width	mm	150	175
	Length	mm	500	200
Pieces per m² Area		pc	10	25
Nominal Weight:	Empty	kg/pc	0.80	0.25
	Planted	kg/pc	6.45 to 6.95	2.15 to 2.65
Cells (Reservoirs)		nos.	2 x 10	6
Water Storage (planting within tray)	Capacity	l/pc	2.60	0.42
Compressive Strength		$tonnes_f/m^2$	55.0	117.1

SEC = Singapore Environment Council

SGBC = Singapore Green Building Council

Fire resistant version available. Please contact us for more information.

PlanterCell® 75



PlanterCell® 75 is a lightweight and sturdy cassette type system for green wall.

The cassette, a single piece injection moulding, comes with a back cover to hold the planting mix and a piece of PlanterCell® H_2O-R Foam within, to continuously hydrate the plants.

The cassettes are mounted via the back on structures using stainless steel anchoring studs create a green wall.

The PlanterCell® 75 system consist of the cassette, its' back cover, water retention foam, Insu® Felt and PlanterCell® Planting Mix.

PlanterCell® 75 GREEN WALL SYSTEM

(1) Back Cover
(2) PlanterCell® H_2O-R Foam
(3) PlanterCell® Planting Mix
(4) Insu® Felt
(5) Front Cover
(6) Selected Green Wall plants

Technical Specifications		UOM	PlanterCell® 75
Product Codes			PUG-GW-75XX-01-NR
			PUG-GW-75XX-01-FR
SEC Green Label			Yes
SGBC Green Product			✓✓✓
Material			Recycled PP
Colour			Black
Size:	Height	mm	75
	Width	mm	250
	Length	mm	500
Pieces per m² Area		pc	8
Nominal Weight:	Empty	kg/pc	0.6
	Planted	kg/pc	4.5 to 6.0
Water Storage (planting within tray)	Capacity	l/pc	~1.4
Compressive Strength		$tonnes_f/m^2$	18.0

SEC = Singapore Environment Council

SGBC = Singapore Green Building Council

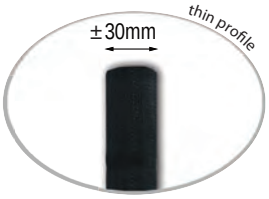
Fire resistant version available. Please contact us for more information.

PlanterCell® H_2O-R Panel

PlanterCell® H_2O-R Panel

PlanterCell® H_2O-R Panel FR

FIRE RATED



PlanterCell® H_2O-R Panel / PlanterCell® H_2O-R Panel FR is a pre-fabricated composite green wall system developed for the purpose of creating designer green walls of various shape and size configurations.

The composite panel consists of a backing panel, water retention substrate layer/s and a surface layer.

PlanterCell® H_2O-R Panel is a non fire-rated system. The backing panel Insu® Board provides the base for the system. The Growool™ Substrate acts as a media substrate and water retention layer to constantly hydrate the plants through a wicking action whilst the PlanterCell® H_2O-R Moisture Mat acts as additional water retention and transition layer to distribute water evenly amongst the plants. The Insu® Felt protects the Growool™ Substrate from UV rays and weather. The surface layer Insu® Net protects and holds the system and plants in place whilst allowing proper aeration.

PlanterCell® H_2O-R Panel FR is a fire-rated system. Aluminium Sheet forms the backing panel instead of the Insu® Board and the surface layer is a fire fabric Insu® Felt FR which protects the Growool™ Substrate from UV rays and weather as well as holding the system and plants in place whilst allowing proper aeration.

Prior to planting slits are made in the surface layer to a predetermined design and the roots of plants are then inserted into it.

Technical Specifications		UOM	PlanterCell® H_2O-R Panel	PlanterCell® H_2O-R Panel FR
Product Codes			PUG-GW-H2OF-S0-NR PUG-GW-H2OF-S1-NR	PUG-GW-H2OW-S0-FR PUG-GW-H2OW-S1-FR
SGBC Green Product			✓✓	✓✓
Panel Size	Thickness	mm	±30	±30
	Width	mm	1220	1220
	Length	mm	2220	2440
Nominal Weight:	Panel	kg/m²	8.0	13.3
	Planted	kg/m²	25 to 30	34
Backing Panel	Type		Insu® Board	Aluminium Sheet
	Thickness	mm	12	3
Insu® Felt	Type		Non-Fire Rated	Fire Rated
	Weight	g/m²	100	200
Growool™ Substrate	Thickness	mm	20	20
H_2O-R Moisture Mat	Weight	g/m²	400	N/A
Insu® Net	Material		HDPE	N/A
	Sun Protection		UV-Stabilised	N/A

SGBC = Singapore Green Building Council

PlanterCell® H_2O-R PANEL GREEN WALL SYSTEM

(1) Concrete Structure
(2) Waterproofing Membrane (where necessary)
(3) Backing Panel
(4) Water Retention Layer
(5) Media Substrate
(6) Insu® Felt Black
(7) Insu® Net
(8) Drip Irrigation System
(9) Selected Green wall Plants
(10) Drainage tray (where necessary)

Ovalis®

Ovalis® is an oval shaped decorative pot to create features on green walls. This product is also suitable for DIY enthusiasts.

An oval shaped pot made from porcelain, it can be hung from the ceiling or hooked onto the wall. The pot has a water reservoir to minimize the need for regular watering of the plants and an overflow channel to discharge excess water.

Technical Specifications		UOM	Ovalis®
Product Codes:			PUG-DC-OVAL-00-NR
			PUG-DC-OVAL-01-NR
Material			Porcelain
Colour			White
			Black
Pot Size:	Diameter	mm	230
	Height	mm	300
Opening	Diameter	mm	140
Nominal Weight	Empty	kg/pot	1.6
	Planted	kg/pot	2.6
Water Storage	Capacity	l/pot	0.3

PlanterCell® Pot 120

PlanterCell® Pot 120 is an innovative lightweight planter pot meant for the table top or as a feature on walls. The pot incorporates a reservoir with water storage capacity of approx. 0.26 l/pot and a filter layer, allowing roots of plants to be continuously hydrated.

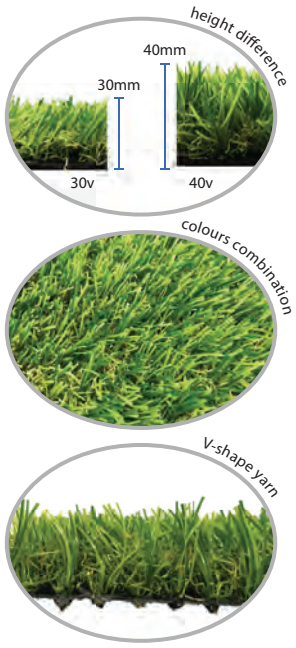
A water level indicator allows the water level to be monitored for replenishment of the water in the reservoir.

The Pot is used as a low maintenance decorative item to provide greenery in homes and offices.

Technical Specifications		UOM	PlanterCell® Pot 120
Product Codes:			PUG-DC-P120-01-NR
			PUG-DC-P120-01-FR
SEC Green Label			Yes
Material			Recycled PP
Colour			Black
			Other Colours Enquiry
Pot Size:	Diameter	mm	120
	Height	mm	120
Nominal Weight	Empty	kg/pot	0.10
	Planted	kg/pot	1.00
Water Storage	Capacity	l/pot	0.26

SEC = Singapore Environment Council

PlanterCell® ACG30V / 40V



PlanterCell® ACG30V and 40V is an artificial carpet grass made from a combination of recycled Poly-Ethylene and Poly-propylene. Both come with a non-woven fabric backing.

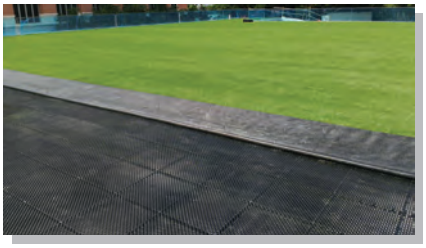
The V-shape yarn (green and yellow), and curve yarn (green and yellow) allow the PlanterCell® ACG to look more natural. Its soft and flexible feel make it suitable for indoor and outdoor applications.

The product is environmentally friendly, UV and fire retardant.

PlanterCell® ACG30V / 40V

(1) PlanterCell® ACG30V / 40V
(2) GrasCell® DC20 / 30

Technical Specifications		UOM	PlanterCell® ACG 30V	PlanterCell® ACG 40V
Product Code			PUG-PE-AG30-S0-F1 PUG-PE-AG30-S1-F1	PUG-PE-AG40-S0-F1 PUG-PE-AG40-S1-F1
Material			Recycled Polyethylene + Polypropylene	
Colour			4 Tones	4 Tones
Size:	Height	mm	30	40
	Size	m	2W x 25L	2W x 25L
	Size	m	4W x 25L	4W x 25L
Nominal Weight:		kg/m²	2.30	2.60
Density		stitches/m²	14,700	14,700
Detex			11,000	11,000
Stitching		stitches	14	14
Gauge		inch	3/8	3/8
Backing			SBR + PP + NET	SBR + PP + NET
UV Retardant			Yes	Yes
Fire Retardant			Yes	Yes



PlanterCell® Biochar

Technical Specifications	UOM	PlanterCell® Biochar
Product Code		PUG-MS-BCHA
Material		Wood chip
Moisture Content	%	2.8
Organic Carbon	%	74.1
H: Corg	Molar Ratio	<0.3
Ash	%	4.8
Nitrogen	%	0.18
Electrical Conductivity	dS/m	0.22
Particle size Distribution*:		
>4.76mm	%	32.9
2.38 - 4.76mm	%	41.6
0.42 - 2.38mm	%	14.2
0.42mm	%	10.9

*Progressive dry sieving with 4760µm, 2380µm and 420µm sieves, as outlined in ASTM D2862-10 Method for activated carbon (IBI testing guidelines)

Standard Conformance	Yes	International Biochar Standards (IBI) Certification Standards for Test Categories A and B
Poly Aromatic Hydrocarbons (PAHs)	mg/kg	<2.10
Dioxin / Furan (PCDDs/PCDFs)	µg/kg	<0.005
VOCs		Not Detected

PlanterCell® Biochar is a charcoal produced from plant matter by pyrolysis. It is particularly used as a soil amendment. Biochar is added to soil to improve the soil's physical qualities, especially its ability to provide nutrition for plants.

Biochar can be used to improve poor soils, or to rebuild soils which have been damaged by improper management. Independently, Biochar can increase soil fertility, increase agricultural productivity, and provide protection against some foliar and soil-borne diseases.

Also, Biochar is a desirable soil material in many locations due to its ability to attract and retain water. This is possible because of its porous structure and high surface area. As a result, nutrients, phosphorus, and agrochemicals are retained for the plants benefit. Plants therefore, are healthier and fertilizers leach less into surface or ground water.

PlanterCell® Planting Mix

Technical Specifications		UOM	PlanterCell® Planting Mix
Product Code			PUG-MS-PMIX
Material			Inorganic Compound
Pack Size:		l	40
Grain Size		mm	1 to 15
Fine Particles (<0.063mm)		% by wt.	4
Air Filled Pore Space		% by vol	37
Density:	Dry	kg/m³	597
	Wet	kg/m³	1003
Organic Content		% by wt.	0.7
ph Value			5.94
Soluble Salt Content		g/l	0.4
Water Holding Capacity		% by wt.	40
Water Infiltration Rate		mm/s	7

PlanterCell® Planting Mix is an inorganic, soil-less, lightweight mix specially formulated for green roof and green wall applications to minimize loading and maintenance.

It is a formulation of pumice and additives to supply needed water and nutrients to sustain healthy plant growth. Its high water retention property keeps plants hydrated whilst its high permeability allows drainage preventing water logging and keeps roots aerated. Beneficial bacterial activities are also promoted with this mix.

PlanterCell® Pumice Stone

Technical Specifications		UOM	PlanterCell® Pumice Stone	
Product Code			PUG-MS-STNP-S1	PUG-MS-STNP-S2
Grain Size		mm	1 to 11	5 to 15
Pack Size		/	40	
pH value			6.97	
Electrical Conductivity		mS/cm	0.22	
Nitrogen		mg/kg	140	
Soluble				
	Phosphorus	mg/L	0.19	
	Potassium	mg/L	9.55	
	Calcium	mg/L	7.74	
	Magnesium	mg/L	3.95	
	Sodium	mg/L	18.00	
	Iron	mg/L	0.00	
Nutrient				
	Copper	mg/L	0.04	
	Manganese	mg/L	0.02	
	Zinc	mg/L	0.02	
Organic Matter		%	1.18	
Carbon Nitrogen Ratio			50	
CEC		cmol/kg	7.8	

PlanterCell® Pumice Stone is composed of highly microvesicular glass pyroclastic with very thin, translucent bubble walls of extrusive igneous rock. Pumice is highly porous, giving its excellent water and air holding properties that permit ample roots aeration as well as optimum moisture entrapment which encourages beneficial bacterial activities. Pumice stones is one of the recommended substrate for extensive green roof according to the FLL German Guidelines for Rooftop Greening. It is also suitable for use in vertical landscape planting mix.

Pumice stones provide numerous advantages when use in planting mix. The porous nature of pumice allows it to hold vital nutrients in the microscopic surface pores, which helps regulate fertilizer feedings. It can even be supercharged with nutrients before it is added to the growing medium. It helps loosens the density of heavy clay garden soils, letting in the air and water plants need. It also increases water retention in light and sandy soils. It holds moisture in the soil, reducing watering requirements, yet pumice will not compact or become soggy. Pumice is pH neutral and does not attract or host fungi, nematodes, or insects. Being inorganic, it will not decompose or compact over time, meaning it functions continuously and can be recycled and reused.

Grain Size: 1-11mm

Grain Size: 5-15mm

PlanterCell® Edge Profile 150

Recycled PP

(1) Roof Slab
(2) Root Resistant Waterproofing Membrane
(3) PlanterCell® Edge Profile 150
(4) PlanterCell® Green Roof System

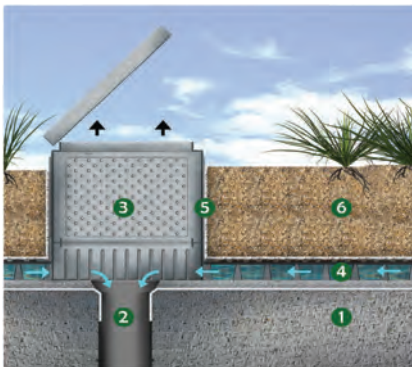
PlanterCell® Edge Profile 150 is designed as a stopper for the PlanterCell® Green Roof systems. It acts as an end wall at the edge of a green roof holding the tray, planting media and plants in place.

The L-shaped profile is a single-piece injection moulding with slots on its sides to accommodate the walls of the tray and facilitate drainage of excess water. It can also be interlocked.

There is also stainless steel version which the slots facilitate connection of the profiles to one another.

Technical Specifications		UOM	PlanterCell® Edge Profile 150	
Product Code			PUG-PE-P150-09	PUG-PE-P150-PP-NR PUG-PE-P150-PP-FR
Material			Stainless Steel	Recycled PP
Finish			Brush Finish	
Size:	Thickness	mm	1.2	4
	Profile	mm	150 x 80	150 x 100
	Length	mm	2000	1000

uniseal® Inspection Chamber



(1) Roof Slab
(2) Rain water downpipe
(3) Inspection Chamber
(4) PlanterCell® 30
(5) Insu® Felt
(6) PlanterCell® Planting Mix

The Uniseal® Inspection Chamber provides access for inspection of the water discharge system.

The chamber acts as a barrier to prevent clogging whilst allowing water to flow through to the discharge system.

The chamber is made-up of 3 parts viz. a base, body and a cover, fabricated from stainless steel. To facilitate water flow through the chamber into the discharge system, the flange of the base has slots and the walls of the body are perforated. The 3 parts are assembled together with fasteners.

Additional body units can be assembled to raise the height of the chamber.

Technical Specifications		UOM	Inspection Chamber
Product Code	Set		PUG-PE-IC25-09
Material			Stainless Steel
Finish			Brush Finish
	Height	mm	350
	Width	mm	250
	Length	mm	250

PlanterCell® H_2O-R Moisture Mat

PlanterCell® H_2O-R Moisture Mat is manufactured from recycled polyproylene synthetic fibres.

It functions as a planting media, moisture retention and protection mat for green wall systems.

Technical Specifications		UOM	H_2O-R Moisture Mat
Product Code			PUG-PE-MMAT-12
Material			Recycled PE Fibre
Colour			Multi-Colour
Size:	Thickness	mm	6
	Width	m	2
	Length	m	50
Weight		g/m^2	400
Moisture Retention		l/m^2	5
Tensile strength		kPa	>8
Penetration Force		kN	2.4

urbanscape® Green Roll Substrate

Urbanscape® Green Roll Substrate is a lightweight green roof substrate that ensures excellent water retention and conservation in green roof applications. It is made from virgin rock mineral fibres specially needed to form a compact and dimensionally stable felt and its open structure promotes extensive root distribution and plant growth.

Urbanscape® Green Roll Substrate is 8-10 times lighter than regular green roof substrates and can hold up to 3-4 times more water per its volume. Urbanscape® Green Roll Substrate provides for fast and long term stable water re-absorption and water retention performance. Depending on the climate zones, different types of green roof substrates are used.

Technical Specifications		UOM	Green Roll Substrate
Product Code			PUG-PE-GR20-15-FR
Material			Rock Mineral Fibre
Size:	Thickness	mm	20
	Width	mm	1000
	Length	mm	6000
Density		kg/m^3	100 to 110
Water Retention		l/m^2	17
Water Retention Characteristics		%	72
Initial Water Absorption		times	8.3
Initial Water Absorption (under 700N/m^2 pressure)		times	7.7
Thermal Conductivity		W/mK	0.04
Reaction to fire			Euroclass A1

Insu® Board

Insu® Board is a lightweight, heavy-duty PVC board used in the fabrication of PlanterCell® H_2O-R Panel Green Wall System. It is resistant to weathering elements and is suitable for outdoor applications.

Technical Specifications		UOM	Insu® Board
Product Code			PUG-PE-BD12-S0
Material			Polyvinylchloride
Colour			White
Size:	Height	mm	12
	Width	mm	1220
	Length	mm	2220
Density		kg/m^3	3000
Tensile Strength		MPa	12 to 20
Elongation @ Break		%	15 to 20
Impact Strength		kJ/m^2	15 to 28
Modulus Elasticity		MPa	800 to 900

Insu® Net

Made of UV stabilised HDPE with shade efficiency of 70% or 80%, the net is used in the fabrication of PlanterCell® H_2O-R Panel Green Wall System, holding the system and plant in place whilst providing protection, generating plant growth and allowing proper aeration.

Technical Specifications	UOM	Insu® Net
Product Code		PUG-PE-NT70-01-S3
		PUG-PE-NT80-01-S0
Material		UV Stabilised HDPE
Colour		Black
Size:	m	2.6 W x 100 L
	m	2.0 W x 100L
Weight	g/m^2	180
Mesh Pore Size	mm	0.5 W x 1.0 L
Shade Efficiency	%	70
		80
UVR Block	%	95

PlanterCell® Grow Light B100 / Grow Light R150

B100

R150

PlanterCell® Grow Lights are production lights for professional green houses, developed in co-operation with leading growers and horticultural research institutes.

The lights produce a unique wide spectrum light containing the right amount of the different wavelengths to stimulate plant growth. The superior light spectrum enables energy saving, faster growth and better quality plants. With efficient and high performance LEDs, heat radiation is minimised, enabling close proximity of lights with the plants and the lights have a long life span.

The bar shaped B100 is suitable for multi-layer, inter-lighting and green house installations whilst the R150 is a high power light with minimal shadow suitable for large scale installations.

Technical Specifications	UOM	Grow Light B100	Grow Light R150
Product Code		PUG-PE-LITE-S1	PUG-PE-LITE-S2
Spectrum		AP67	AP67
Proximity to plants	cm	50 to 150	100 to 400
Ambient Operating Temp.	°C	0 to 35	0 to 35
Expected light intensity decay @ 30,000 hours @ 25°C		max. 10%	max. 10%
Power Consumption	W	100	185
Ingress Protection Rating		IP65	IP55
Dimensions			
Fixture	mm	65 x 74 x 1200	167 x 180 x 340
Power Unit	mm	326 x 77 x 46	
Weight	kg	6.1	7.1
Power Input		AC 220-240V / 50-60Hz	AC 220-240V / 50-60Hz
ROHS Compliant		Yes	Yes

PlanterCell® Grow Light 1416 / Grow Light Mini 285

1416

Mini 285

PlanterCell® Grow Lights are professional green houses designed to emit Photosynthetically Active Radiation, often abbreviated PAR, designates the spectral range (wave band) of solar radiation from 400 to 700 nanometers that photosynthetic organisms are able to use in the process of photosynthesis.

The effective grow light uses high performance LEDs that promote healthier plant growth and enhance the sustainability of plants in low lighting environment.

The bar shaped 1416 model is powerful grow light that provides long range coverage, suitable for multi-layer, inter-lighting and green house installations whilst the 285 model is suitable for typical indoor spaces with low ceiling height.

Technical Specifications	UOM	Grow Light 1416	Grow Light Mini 285
Product Code		PUG-PE-LITE-00-S3-A0	PUG-PE-LITE-00-S4-A0
Spectrum	nm	380 to 730	
Power			
Consumption	W	300	50
Input Voltage		AC200-240V	
Frequency	Hz	50/60	
Supply		Meanwell	CE Driver
Efficiency	%	>90	
Ingress Protection Rating		IP67	
Dimensions	mm	143 x 85 x 1416	143 x 85 x 285
Weight	kg	8.2	2.1
LED Type		SMD3030	
LED Quantity	pcs	350	70
Lens		PMMA	
PPFD	µmol/0.5cm	789	190
Luminous Flux		9000LM	1750LM
Beam Angle		40°, 60°, 90°, 150x75°	
Housing Colour		White / Black	
Housing Material		Aluminium	
Working Temperature	℃	-20 ~ +45	
Life Span	hours	>50000	
Certification		CE RoHS	

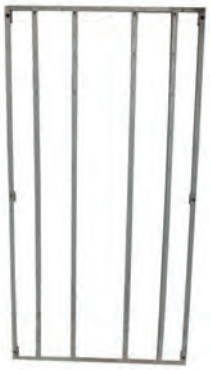
Frames

Steel frames in various configurations designed to build partitions utilising PlanterCell® Green Wall products. This product is also suitable for DIY enthusiasts.

PK2x1 Frame

Material		Hot -dipped G.S.
Size:		
Thickness	mm	3
Height	mm	2000
Width	mm	1000

Recommended Application:
• PlanterCell® 170



PKS2 Frame

Material		Hot -dipped G.S.
Size:		
Thickness	mm	3
Length	mm	2000

Recommended Application:
• PlanterCell® 170



PM2x1 Frame

Material		Hot -dipped G.S.
Size:		
Thickness	mm	3
Height	mm	2000
Width	mm	1000

Recommended Application:
• PlanterCell® 170



PP2x1 Frame

Material		Hot -dipped G.S.
Size:		
Thickness	mm	3
Height	mm	2000
Width	mm	1000

Recommended Application:
• PlanterCell® 75

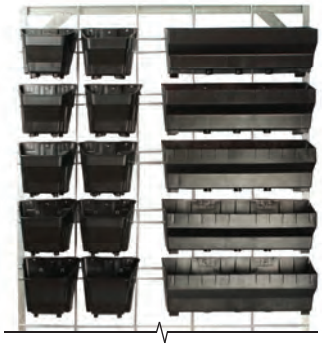


Frames

BRC B6 Mesh Frame

Material		Hot -dipped G.S.
Size:		
Height	mm	1000
Width	mm	2000

Recommended Application:
- PlanterCell® 170
- PlanterCell® 170 Mini
- PlanterCell® 150
- PlanterCell® 150 Mini



PH Mini Frame

Material		Cold-applied G.S.
Size:		
Height	mm	1000
Width	mm	400

Recommended Application:
- PlanterCell® 170 Mini
- PlanterCell® 150 Mini

PMG Frame

Material		Stainless Steel
Size:		
Height	mm	2150
Width	mm	1000

Recommended Application:
- PlanterCell® H_2O-R Panel

PT4 Frame

Material		Hot -dipped G.S.
Size:		
Height	mm	900
Width	mm	500
Length	mm	1000

Recommended Application:
- PlanterCell® 70
- PlanterCell® 130

idGreen

Cabinets in various configurations designed to build partitions utilising PlanterCell® Green Wall products. This product is also suitable for DIY enthusiasts.

idGreen 10

Size:		
Length	mm	440
Width	mm	205
Height	mm	1100
Pcs per unit	nos.	10

idGreen 15

Size:		
Length	mm	640
Width	mm	205
Height	mm	1100
Pcs per unit	nos.	15

idGreen 20 [1]

Size:		
Length	mm	900
Width	mm	205
Height	mm	1100
Pcs per unit	nos.	20

idGreen 20 [2]

Size:		
Length	mm	440
Width	mm	205
Height	mm	2000
Pcs per unit	nos.	20

idGreen

Cabinets in various configurations designed to build partitions utilising PlanterCell® Green Wall products. This product is also suitable for DIY enthusiasts.

idGreen 30

Size:		
Length	mm	640
Width	mm	205
Height	mm	2000
Pcs per unit	nos.	30

idGreen 40

Size:		
Length	mm	900
Width	mm	205
Height	mm	2000
Pcs per unit	nos.	40

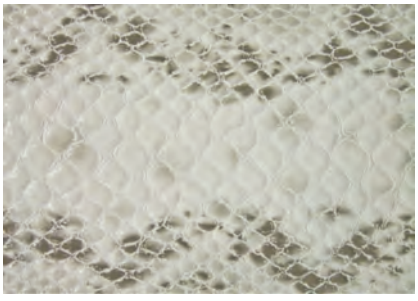
Finishes:

G7-N03 Lantscap DB

F-N432 Breo

G6-3299 Cliff Brownique

F-N432 Miro



F-N440 Martina

G4-S40 Croc B

Ecological

Managing scarce water resources in the urban landscape is a challenging and urgent task.

Disruptions to the hydrological cycle as a result of urbanisation and reduced forest cover are having an adverse impact on the environment. Heavier storm and increase in storm water runoff over impervious surfaces cause floods and erosion.

Pollution contributes to the deterioration of water resources. Together storm water runoff and pollution affect both the quantity and quality of water available to the population.

Storm water management seeks to mitigate the quantity of storm water runoff, improve its quality and channel waste water for reuse. In the process, the landscape may be beautified through greening.

Various governments have recognised the need for storm water management and started initiatives to promote and implement them. In Singapore, the Public Utilities Board (PUB) launched the Active, Beautiful, Clean Waters (ABC Waters) Program. Australia has its Water Sensitive Urban Design (WSUB); the United States has the Low Impact Development (LID) whilst the United Kingdom has its Sustainable Urban Drainage Design (SUDS).

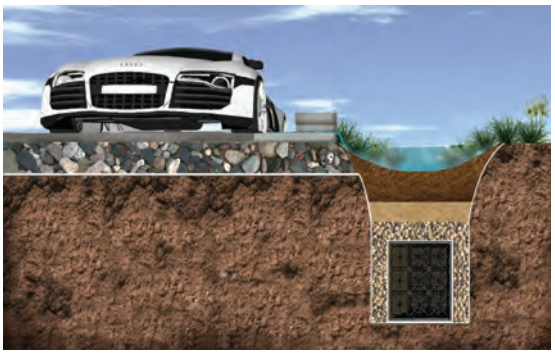
An important element in the storm water management is the construction of bio-retention areas integrated into the landscape within built-up areas.

Landscape engineering such as turf and slope stabilization complements these efforts.

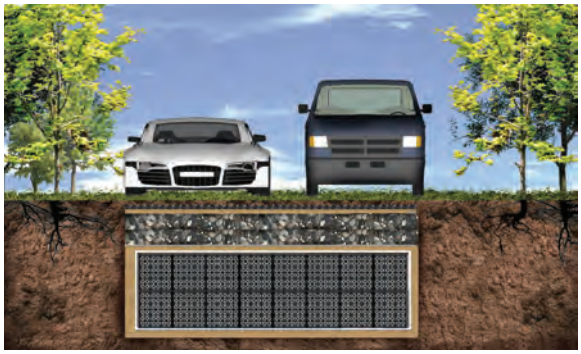
Manufactured from recycled polypropylene, our ecological products[1] are "Green Label" certified by the Singapore Environment Council (SEC) reinforcing our commitment to a green environment. Additionally, the products[1] are certified "Green Products" by the Singapore Green Building Council (SGBC).

[1]except GrasCell® G-Web®

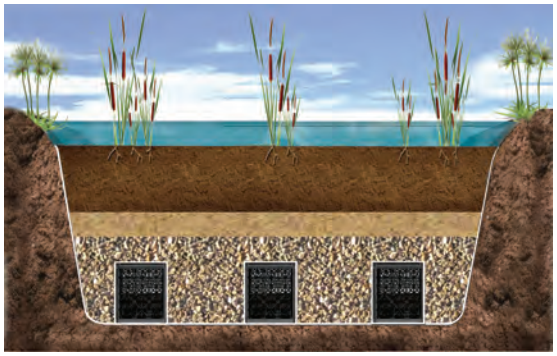
Storm Water Management Systems



ROADWAY RETENTION SWALE

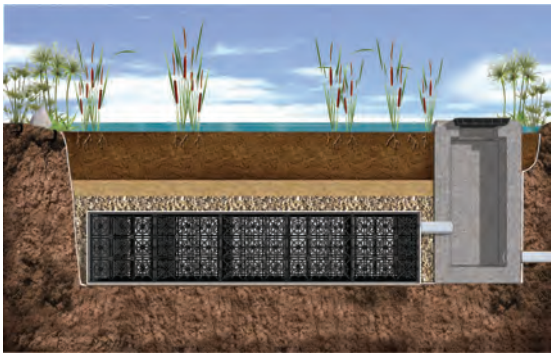


INFILTRATION SYSTEM



BIO-RETENTION SWALES

INFILTRATION TRENCH



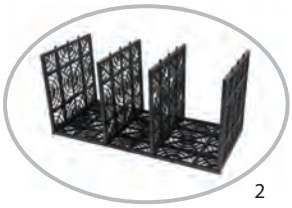
BIO-RETENTION BASIN (Rain Garden)

DEEP PLANTERS

PlanterCell® SW Tank 1000


1


4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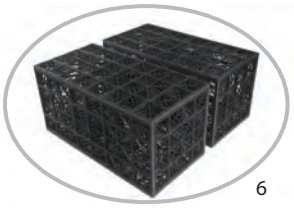
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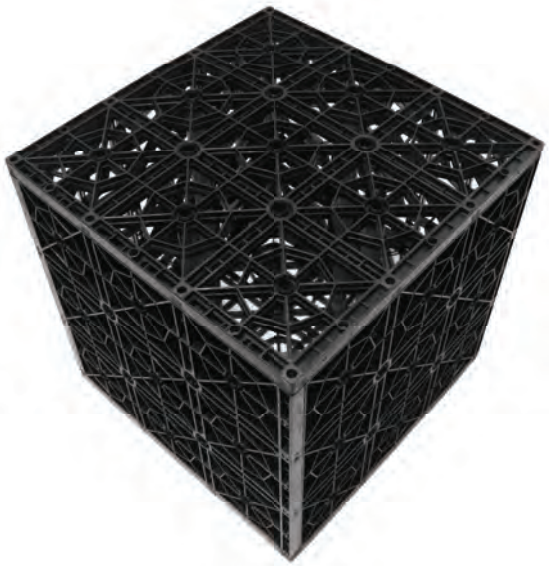
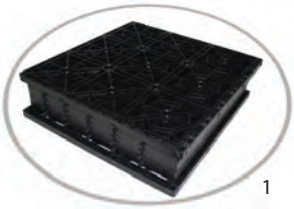
PlanterCell® SW Tank 500

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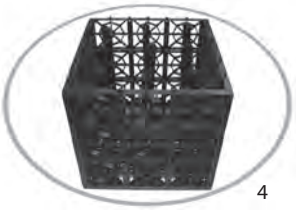
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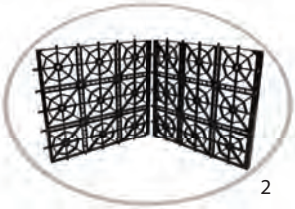
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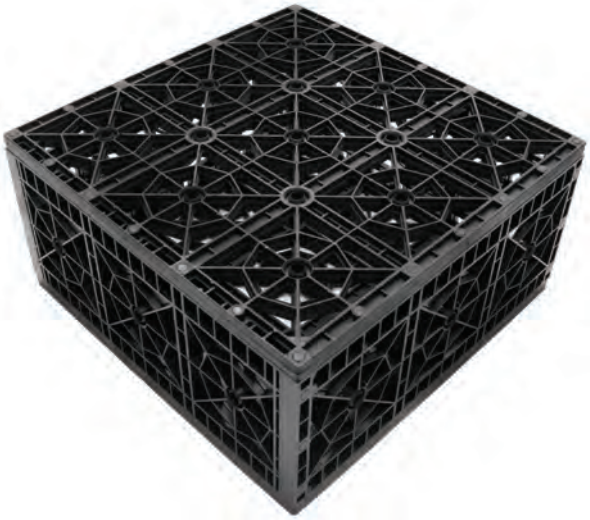
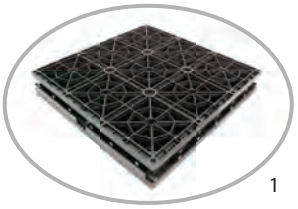
3

6

Fire resistant version available. Please contact us for more information.

PlanterCell® SW Tank 250

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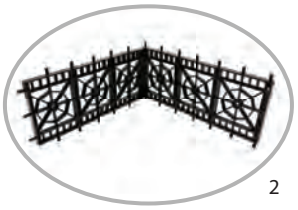
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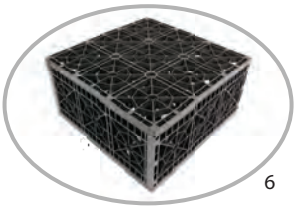
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PlanterCell® SW Tank Mini


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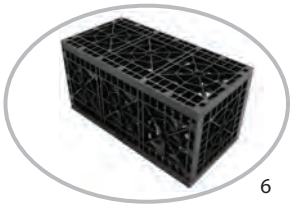
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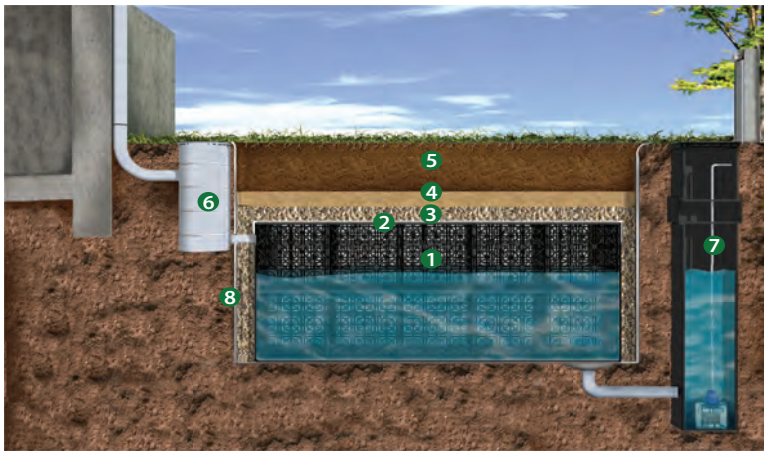
Fire resistant version available. Please contact us for more information.

PlanterCell® SW Tank

PlanterCell® SW Tank is a modular storm water management system designed for storm water filtration, detention, or retention underground. It is constructed using our proprietary plastic injection-moulded panels.

The panels, a single piece injection moulding, are designed with 40% to 52% void area for water catchment. The tank comes in four (4) models. Model 1000 consists of two (2) differently-sized panels to form the top/bottom, sides, and slider. Whilst model 500 consists of six (6) identical panels. The panels are assembled together through an interlocking system to construct a modular tank. Similarly , models 250 and Mini are smaller versions of our PlanterCell® SW Tank series to satisfy various tank size requirements and design configurations. Both consists of three (3) pairs of differently-sized panels to form the top/bottom, and sides.

Models 1000, 500, 250, and Mini, respectively, creates a tank of approximately 0.25m^3, 0.125m^3, 0.063m^3, and 0.031m^3 in volume. The strength of the tank can be reinforced with the insertion of sliders (Model 1000), I-Beam Support (Model 500), and PVC pipe inserts (Models 250 and Mini) within the tank, strengthening the walls.



PlanterCell® SW Tank
(Rain Water Retention)

(1) PlanterCell® SW Tank 1000/500/250/Mini
(2) Insu®Felt
(3) Drainage Layer (gravel)
(4) Transition Layer (coarse sand)
(5) Filter Media (sandy loam)
(6) Filtration Sump/Pollutant Trap
(7) Filtered Water Pump
(8) Waterproofing Membrane

Technical Specifications		UOM	PlanterCell® SW Tank			
			Mini	250	500	1000
Product Codes			PEM-SW-TKMI-01-NR	PEM-SW-TK25-01-NR	PEM-SW-TK05-01-NR	PEM-SW-TK10-01-NR
			PEM-SW-TKMI-01-FR	PEM-SW-TK25-01-FR	PEM-SW-TK05-01-FR	PEM-SW-TK10-01-FR
SEC Green Label			Yes	Yes	Yes	Yes
SGBC Green Product			✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓
Material			Recycled PP	Recycled PP	Recycled PP	Recycled PP
Colour			Black	Black	Black	Black
Tank Size:	Height	mm	250	250	500	500
	Width	mm	250	500	500	500
	Length	mm	500	500	500	1000
Panels per tank	Side	pc	2	4	4	2
	top/bottom		2	2	2	2
	Sliders		2			4
Nominal Weight	per tank	kg	3.0	4.6	6.1	12.1
Surface Void		%	40.86	47.70	52.58	51.40
Internal Void		%	90.38	90.24	94.88	94.80
Net tank Capacity		m^3	0.030	0.059	0.119	0.238
Compressive Strength		tonnes$_f$/m^2				
without support			27.5			
w/1 I-beam support					16.8	
w/4 I-beam support				30.8	21.6	
w/5 I-beam support					21.8	
w/8 I-beam support					27.2	
w/9 I-beam support					30.6	
w/11 I-beam support					36.1	
w/13 I-beam support					40.2	
w/ 4 sliders						12.3
w/ 5 sliders						15.1
w/ 7 sliders						20.2

SEC = Singapore Environment Council

SGBC = Singapore Green Building Council

Fire resistant version available. Please contact us for more information.

SW Tank Installation...

1) Excavation and preparation of lean concrete base as per PE specifications.

2) Laying and levelling of sand layer.

3) Laying of the Insu® Felt geotextile at the tank base and PlanterCell® SW Tank perimeter.

4) Subsequent laying of the PlanterCell® SW Tank. The tanks are secured beside each other using cable ties.

5) PlanterCell® SW Tank laying completed. The Insu® Felt geotextile upturn are bonded on the sides of the tank with adhesive.

6) Subsequent laying of the PlanterCell® SW Tank.

7) Completed Insu® Felt geotextile on top of detention tank.

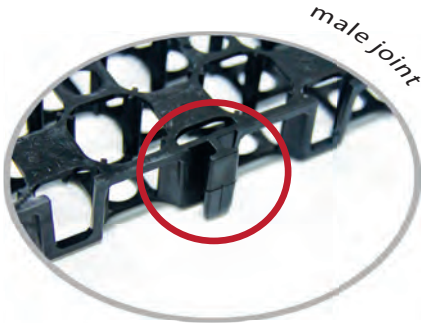
8) The perimeter is filled with sand to aid in filtering the water draining out at the sides of the tank.

9) A sand layer will be also laid on top of the tank to filter rain water percolating from the carpark floor.

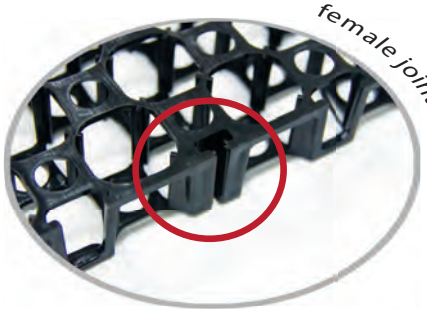
10) Soil backfill compaction progress photos.

Project: Detention Tank, Global Indian International School Carpark, Punggol, Singapore

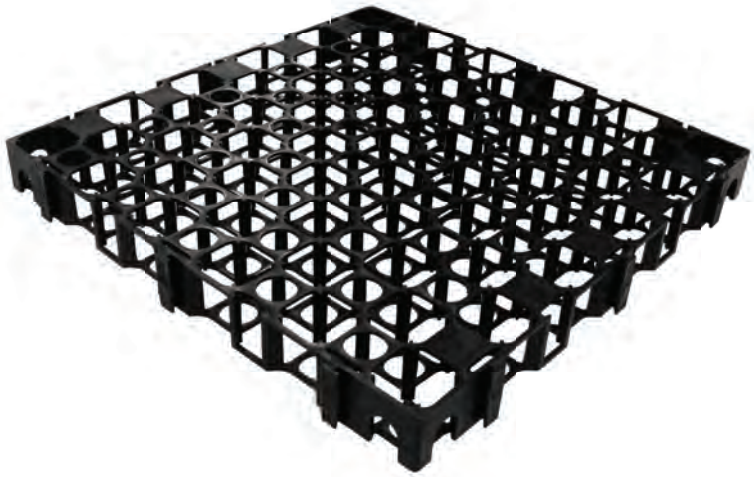
GrasCell® DC20

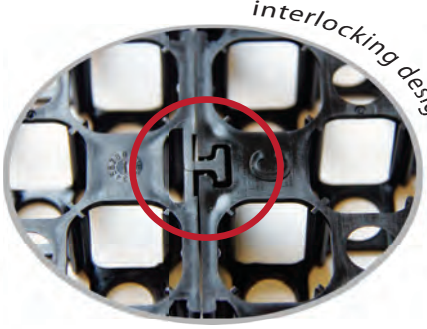


GrasCell® DC30



GrasCell® DC50





Fire resistant version available. Please contact us for more information.

GrasCell® DC20/DC30/DC50

GrasCell® DC drainage mats are designed for lightweight yet sturdy sub-soil drainage to replace the traditional use of granite aggregates for sub-soil drainage. It also acts as a protection medium for waterproofing membrane in applications such as roof decks and planter boxes.

The mat, a single piece injection moulding, designed with large surface void area of approx. 60% for DC20, approx. 71% for DC30, and approx. 68% for DC50. It is suitable for applications where high water capture and discharge rates are required. In addition, its high compresssive strength allows it to support soil and plants on it as well as human traffic. The mats are available in various thickness of 20mm, 30mm, and 50mm. These mats can be stacked up to suit various height requirements.

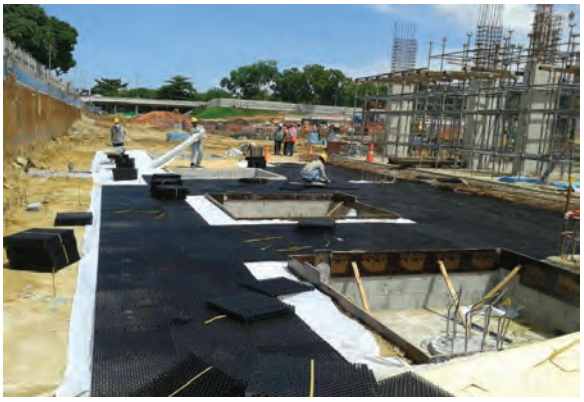
These mats have male/female interlocking system at the sides that allow the mat to be laid out securely to form a platform for planting.

The mats come in standard and fire-rated versions.

Technical Specifications		UOM	GrasCell® DC20	GrasCell® DC30	GrasCell® DC50
Product Codes			PEM-LE-DC20-01-NR PEM-LE-DC20-01-FR	PEM-LE-DC30-01-NR PEM-LE-DC30-01-FR	PEM-LE-DC50-01-NR PEM-LE-DC50-01-FR
SEC Green Label			Yes	Yes	Yes
SGBC Green Product			✓✓✓✓	✓✓✓✓	✓✓✓✓
Material			Recycled PP	Recycled PP	Recycled PP
Colour			Black	Black	Black
Mat Size:	Height	mm	20	30	50
	Width	mm	500	500	500
	Length	mm	500	500	500
Pieces per m² Area		pc	4	4	4
Nominal Weight		kg/m²	2.48	2.52	3.60
Surface Void Area		%	60	71	68
Water Flow Rate		l/m².s	11.0	16.5	27.5
Compressive Strength		$tonnes_f/m^2$	103.7	131.0	91.2
Planting			Intensive Artificial Carpet Grass	Intensive	Intensive

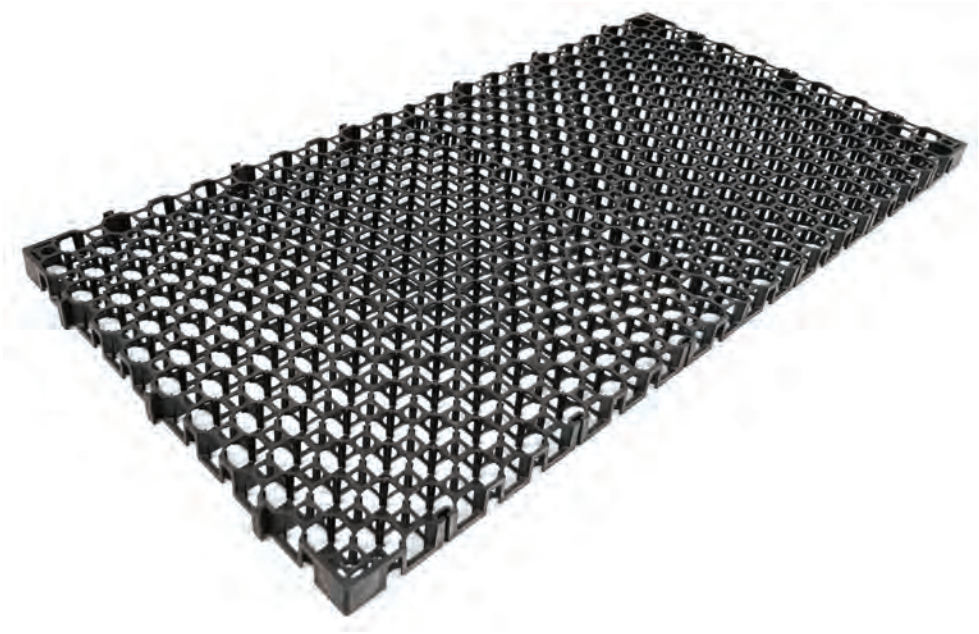
SEC = Singapore Environment Council

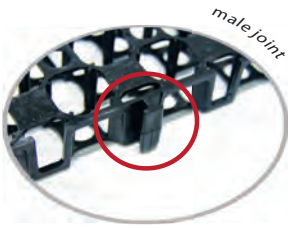
SGBC = Singapore Green Building Council

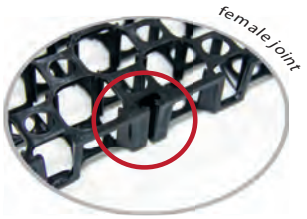


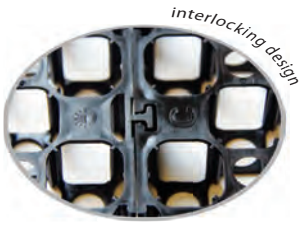
Fire resistant version available. Please contact us for more information.

GrasCell® DC30 1000









GrasCell® DC 30 1000 drainage mats is designed for lightweight yet sturdy sub-soil drainage to replace the traditional use of granite aggregates for sub-soil drainage. It also acts as a protection medium for waterproofing membrane in applications such as roof decks and planter boxes.

The mat, a single piece injection moulding, designed with large surface void area of approx. 71% is suitable for applications where high water capture and discharge rates are required. In addition, its high compressive strength allows it to support soil and plants on it as well as human traffic. The mat comes with thickness of 30mm and is able to stacked up to suit various height requirements. The new large size drainage mat reduces installation time on site and provide cost-saving benefit.

Male/female interlocking system at the sides allows the mat to be laid out securely to form a platform for planting.

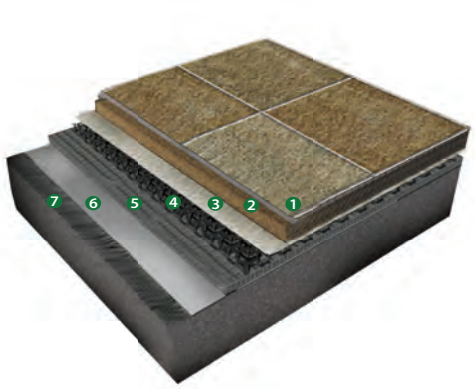
The mats come in standard and fire rated versions.

Technical Specifications		UOM	GrasCell® DC30 1000
Product Codes			PEM-LE-DC3Z-01-NR
			PEM-LE-DC3Z-01-FR
SEC Green Label			Yes
SGBC Green Product			✓✓✓✓
Material			Recycled PP
Colour			Black
Mat Size:	Height	mm	30
	Width	mm	500
	Length	mm	1000
Pieces per m² Area		pc	2
Nominal Weight		kg/m²	2.52
Surface Void Area		%	71
Water Flow Rate		l/m².s	16.5
Compressive Strength		$tonnes_f/m^2$	131.0
Planting			Intensive

SEC = Singapore Environment Council
SGBC = Singapore Green Building Council

Fire resistant version available. Please contact us for more information.

GrasCell® DC20 / DC30 / DC30 1000 / DC50 Application

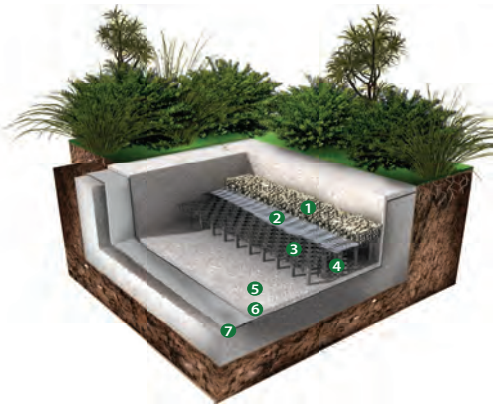


PLAZA DECK DRAINAGE

(1) Pavers
(2) Sand
(3) Insu® Felt
(4) GrasCell® DC20/30/30 1000/50
(5) Protection Screed
(6) Waterproofing Membrane
(7) R.C. Slab

WEEP HOLE COVER

(1) R.C Drain
(2) Weep Hole
(3) GrasCell® DC20/30/30 1000/50
(4) Insu® Felt
(5) Soil

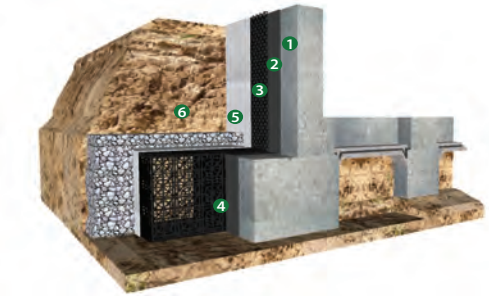


POND INFILTRATION SYSTEM

(1) Gravel
(2) Netting
(3) GrasCell® DC20/30/30 1000/50
(4) Pipe Supports
(5) Protection Screed
(6) Waterproofing Membrane
(7) Pond Structure

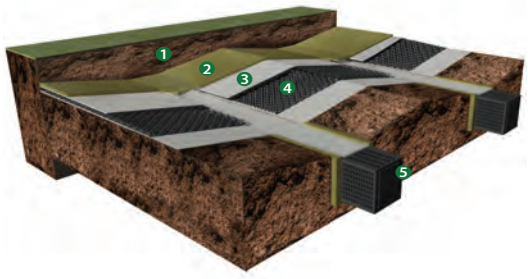
LANDSCAPE DECK SYSTEM

(1) Roof Slab
(2) Root-Resistant Waterproofing Membrane
(3) Protection Screed
(4) GrasCell® DC20/30/30 1000/50
(5) Insu® Felt
(6) Sand
(7) PlanterCell® Planting Mix
(8) Selected Plants



BASEMENT WALL

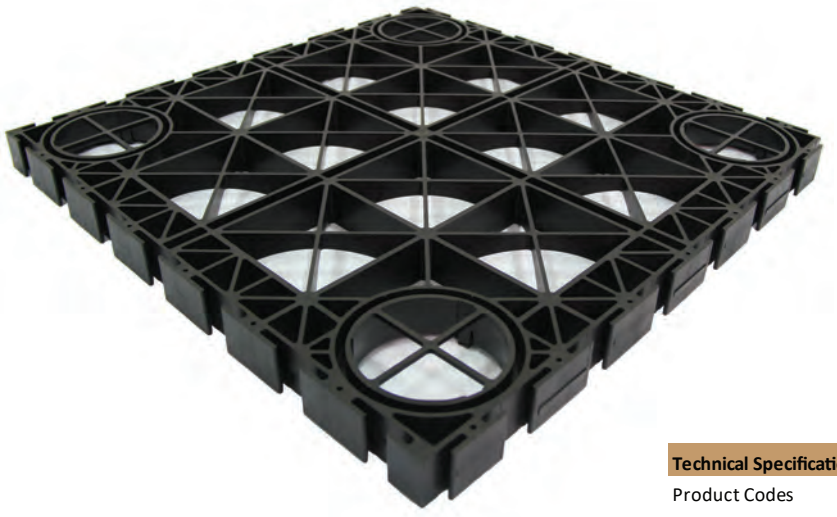
(1) Basement Wall
(2) Waterproofing Membrane
(3) GrasCell® DC20/30/30 1000/50
(4) PlanterCell® SW Tank 1000/500
(5) Insu® Felt
(6) Soil



SPORTS FIELD DRAINAGE

(1) Soil
(2) Sand
(3) Insu® Felt
(4) GrasCell® DC20/30/30 1000/50
(5) PlanterCell® SW Tank 1000/500/250/Mini

GrasCell® RC 550



GrasCell® RC 550 is a high-strength modular tree root protection and pavement system manufactured from recycled polypropylene that allows for multi-tier, width, and length configurations to suit site conditions.

Technical Specifications		UOM	GrasCell® RC 550
Product Codes			PEM-LE-RC55-01-NR
			PEM-LE-RC55-01-FR
SEC Green Label			Yes
SGBC Green Product			✓✓✓✓
Material			Recycled PP
Colour			Black
Panel Size	Height	mm	38
	Width	mm	550
	Length	mm	550
Compressive Strength		$tonnes_f/m^2$	
@ deck height	400mm		110
@ deck height	500mm		104
@ deck height	600mm		101

SEC = Singapore Environment Council

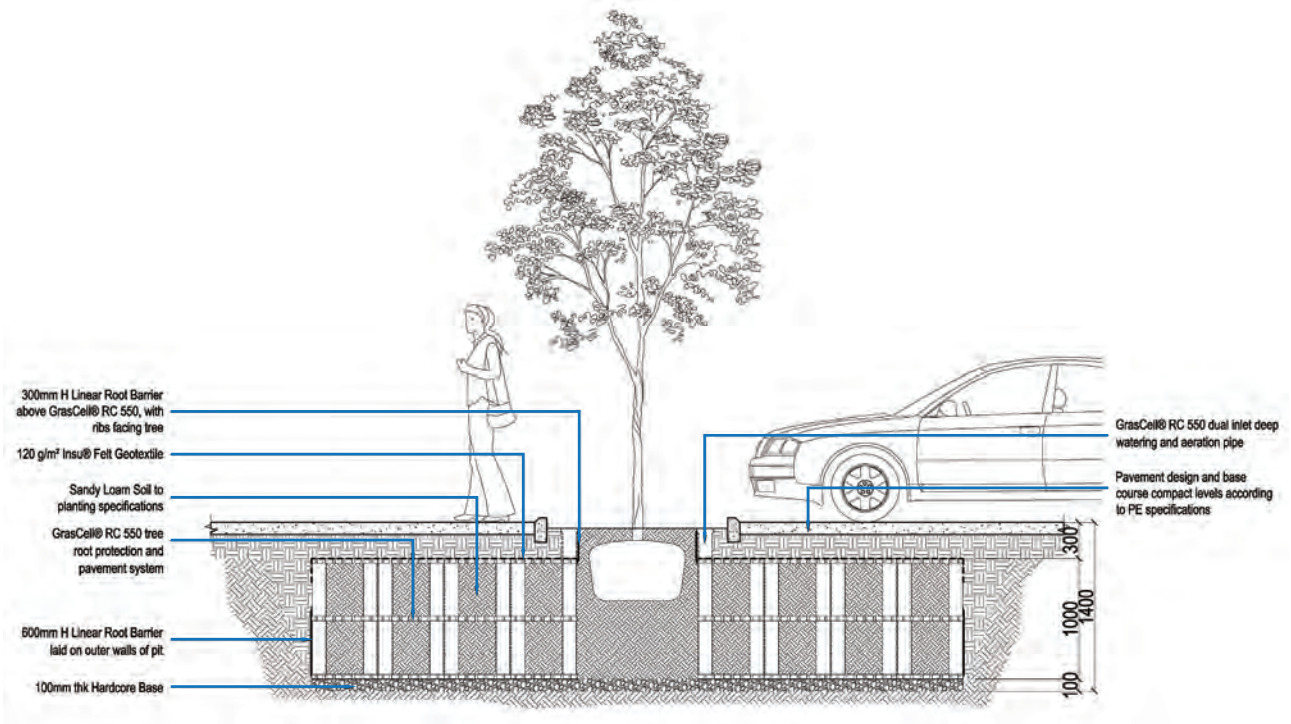
SGBC = Singapore Green Building Council

Assembly...

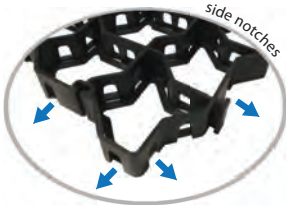
Fire resistant version available. Please contact us for more information.

When assembled and installed, the units form a structural "permeable frame" around the tree roots creating a protected growth zone for the roots and storm water management for the surrounding area. The structural integrity of the framework allows for vehicular and pedestrian traffic on top, making it suitable for pavement applications.

The space within the framework can be utilised to lay service pipes and conduits, aeration mechanisms, etc. where required.



GrasCell® GP40



GrasCell® GP40 is lightweight high strength turf stabilisation paver, designed to protect the root zones of grass and stabilise the surrounding soil when subjected to vehicular traffic. GrasCell® GP40 is designed to withstand heavy vehicular loadings and the system conforms to truck access requirements. It can also be applied in the construction of porous pavements for car parks when filled with gravel chips instead of soil.

The paver, a single piece injection moulding, designed with a 90% open base area, provides space for good root establishment. The inter-locking cells have notches at the top and bottom, allowing roots and runners to grow multi-dimensional, minimising root confinement and creating healthy turf growth. In addition, the cells form a load-bearing grid to accommodate and evenly distribute loads from vehicular traffic to the underlying compacted bed. The pervious mat structure allows rainwater to percolate through minimising water logging problems.

Male/female interlocking system at the sides allows the mat to be laid out securely to form a platform for continuous turfing and the mat is flexible enough to accommodate gentle undulation of the ground.

GrasCell® GP40 build-up

(1) Grass
(2) Soil
(3) GrasCell® GP40
(4) Levelling Sand
(5) 200-500mm thk Compacted Crushed Stones
(6) Subgrade Soil

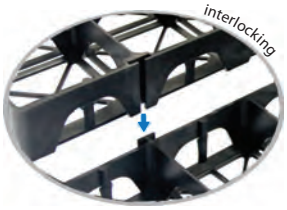
Technical Specifications		UOM	GrasCell® GP40
Product Codes			PEM-LE-GP40-01-NR PEM-LE-GP40-01-FR
SEC Green Label			Yes
SGBC Green Product			✓✓✓✓
Material			Recycled PP
Colour			Black
Paver Size:	Height	mm	40
	Width	mm	453
	Length	mm	453
Pieces per m² Area		pc	4.87
Nominal Weight		kg/m²	4.73
Base Void Area			90%
Compressive Strength	Unfilled	$tonnes_f/m^2$	258.3
	Filled		6795.8

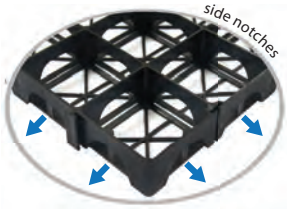
SEC = Singapore Environment Council

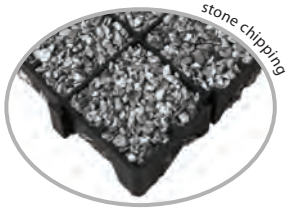
SGBC = Singapore Green Building Council

Fire resistant version available. Please contact us for more information.

GrasCell® GP40 LW







GrasCell® GP40 LW is a lightweight, high-strength turf stabilisation paver, designed to protect the root zones of grass and stabilise the surrounding soil when subjected to vehicular traffic. It can also be applied in the construction of porous pavements for car parks when filled with gravel chips instead of soil.

The paver, a single piece injection moulding, designed with more than 55% open base area, provides space for good root establishment. The inter-locking cells have side notches, allowing roots and runners to grow multi-dimensional, minimising root confinement and creating healthy turf growth. In addition, the cells form a load-bearing grid to accommodate and evenly distribute loads from vehicular traffic to the underlying compacted bed. The pervious mat structure allows rainwater to percolate through minimising water logging problems.

Male/female interlocking system at the sides allows the mat to be laid out securely to form a platform for continuous turfing and the mat is flexible enough to accommodate gentle undulation of the ground.

GrasCell® GP40 LW build-up

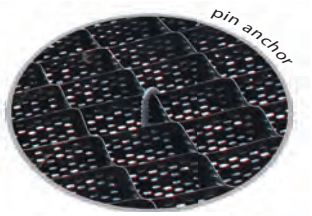
(1) Grass
(2) Soil
(3) GrasCell® GP40 LW
(4) Levelling Sand
(5) 200-500mm thk Compacted Crushed Stones
(6) Subgrade Soil

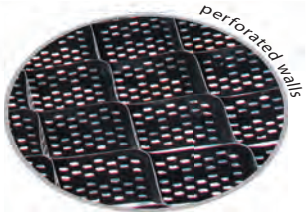
Technical Specifications		UOM	GrasCell® GP40LW
Product Codes			PEM-LE-GP4L-01-NR PEM-LE-GP4L-01-FR
SEC Green Label			Yes
Material			Recycled PP
Colour			Black
Paver Size:	Height	mm	40
	Width	mm	500
	Length	mm	500
Pieces per m² Area		pc	4
Nominal Weight		kg/m²	2.71
Base Void Area			55%
Compressive Strength	Unfilled	$tonnes_f/m^2$	86.0

SEC = Singapore Environment Council

Fire resistant version available. Please contact us for more information.

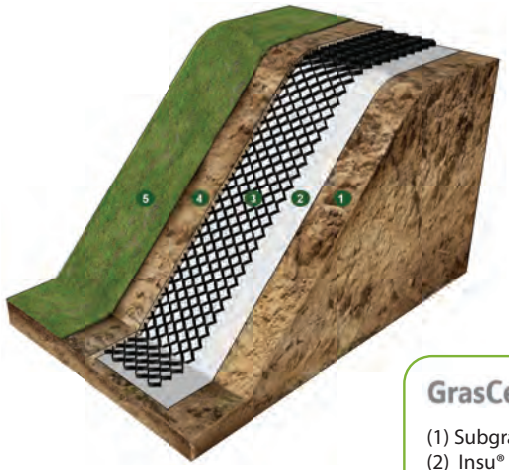
GrasCell® G-Web®





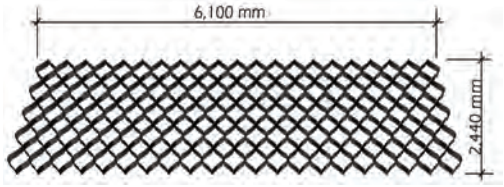
GrasCell® G-Web® is a lightweight load bearing cellular confinement system, designed to stabilise the ground especially in slopes, acting as a barrier to soil erosion.

Manufactured from high-density polyethylene (HDPE) perforated strips, ultrasonically welded together to form a matrix of flexible honeycomb structures, the paver can be collapsed or expanded like an accordion to suit site conditions. The honeycomb structures stabilises the earth infill, protects roots and distribute loads evenly whilst the perforated walls facilitate water drainage and multi-dimensional root growth.



GrasCell® G-WEB® : SLOPE PROTECTION

(1) Subgrade Soil
(2) Insu® Felt
(3) GrasCell® G-Web®
(4) Soil in-fill
(5) Vegetation



EXPANDED SECTION

Regular Cell

Technical Specifications		UOM	GrasCell®			
			G-Web 75	G-Web 100	G-Web 150	G-Web 200
Product Codes			PEM-LE-G075-S0	PEM-LE-G100-S0	PEM-LE-G150-S0	PEM-LE-G200-S0
			PEM-LE-G075-S1	PEM-LE-G100-S1	PEM-LE-G150-S1	PEM-LE-G200-S1
Material			HDPE	HDPE	HDPE	HDPE
Colour			Black	Black	Black	Black
Expanded Size:	Height	mm	75	100	150	200
	Width	mm	2440	2440	2440	2440
	Length	mm	6100	6100	6100	6100
Coverage		m^2	14.9	14.9	14.9	14.9
Cell Size:	Width	mm	203	203	203	203
	Length	mm	244	244	244	244
Wall Thickness		mm	1.3	1.3	1.3	1.3
Carbon Black Content		%	1.2 to 2.0	1.2 to 2.0	1.2 to 2.0	1.2 to 2.0
Seam Peel Strength		N/cm	200	199	185	185
		N	1500	1990	2775	3700

Green Engineering

We complement our Urban Greenery, Ecological Management and Waterproofing portfolio with a range of Green Engineering products for building works via:

»Composite Panels
Pre-fabricated lightweight and modular elements, replaces the traditional in-situ wet works method of roof construction, which is subjected to the vagaries of weather, inconsistent work quality and longer construction time.

This improves on-site productivity and is cost and time saving. In addition pre-fabrication eliminates wet works on site; reduces noise and dust pollution, wastage and logistics. The modular nature, allows non-destructive investigation and maintenance of roof decks reducing the carbon footprint.

Incorporating thermal insulation and water drainage properties in the slab makes this a truly innovative invention.

»Level Raising Systems
An easy to assemble, lightweight raised floor system, designed to accommodate timber or stone panel raised decks. The products are fire rated to meet the Singapore Civil Defence Force requirements for use in buildings.

»Insulating / Isolating Products
This range of products provides thermal and isolating/protection properties between two different materials that may react against each other.

Composite Slabs

Pre-fabricated lightweight and modular elements, replaces the traditional in-situ wet works method of roof construction, which is subjected to the vagaries of weather, inconsistent work quality and longer construction time.

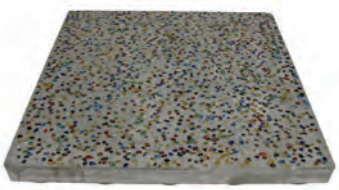
This improves on-site productivity and is cost and time saving. In addition pre-fabrication eliminates wet works on site; reduces noise and dust pollution, wastage and logistics. The modular nature, allows non-destructive investigation and maintenance of roof decks reducing the carbon footprint.

Incorporating thermal insulation and water drainage properties in the slab makes this a truly innovative invention.


Cement Finish


Pebble Wash (AB5) Finish

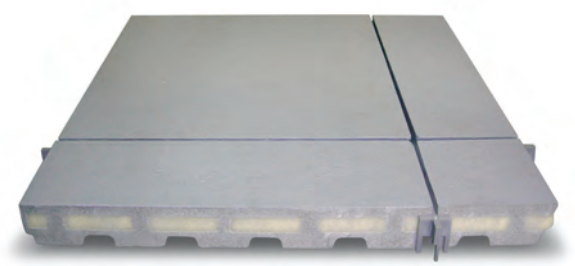

Pebble Wash (Brown) Finish


Recycle Glass Stones (Colour) Finish


Timber Finish


Reflexology Stones Finish

Insu®Slab 500



Spacer

Benefits:
- Pre-fabricated and modular
- Incorporate thermal insulation
- Incorporate water drainage
- Improves on-site productivity considerably
- Reduce on-site construction time
- Lightweight
- Simple to install and non-destructive maintenance
- Immediate foot trafficable
- Cost savings – logistics, storage, installation
- Allow for formation of graphic patterns on roof
- Result in a consistent and better quality roof
- Improve housekeeping

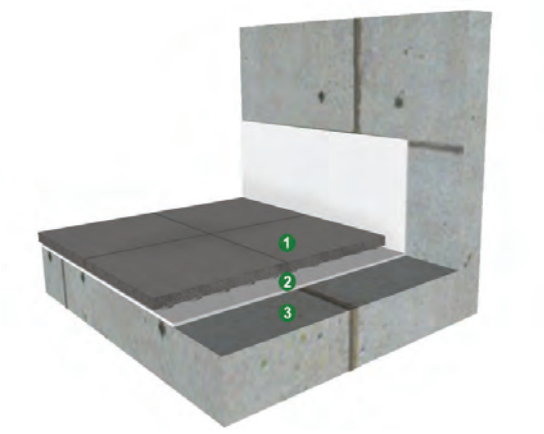
Insu® Slab is a patented pre-fabricated, lightweight, composite slab made of high strength mortar and polyurethane foam board. It is used on concrete roof decks as a thermal insulating medium, protection slab for underlying waterproofing membrane, and incorporates a water drainage system. It is also foot trafficable.

The slab consists of a high strength cement outer casing with a polyurethane foam core that provides excellent thermal insulation properties.

A series of 25 stumps on the underside of the slab creates a medium to drain water and vent any residual moisture, minimizing water stagnation and relieving pressure on the slab from underneath. The stumps also ensure stability of the slab for foot traffic.

Technical Specifications		UOM	Insu® Slab 500
Product Codes		Panel	PGE-CP-INV1-F0-NR
		Spacer	PGE-CP-INS1-01-NR
			PGE-CP-INS1-01-FR
Material			Hi-Strength Mortar
			Insu® Foam
Finish:	Standard		Cement
	Enquiry		Other Finishes
Panel Size:	Height	mm	50
	Width	mm	500
	Length	mm	500
Weight per piece		kg	15
Compressive Strength		$tonnes_f/m^2$	248.4
Thermal Conductivity		W/m. °K	0.02587

Recommended Applications:
- Protection of waterproofing membrane on roof
- Walkways
- Incorporate into PlanterCell® Green Roof as maintenance path / walkway



(1) Insu® Slab
(2) Waterproofing Membrane
(3) Roof Slab

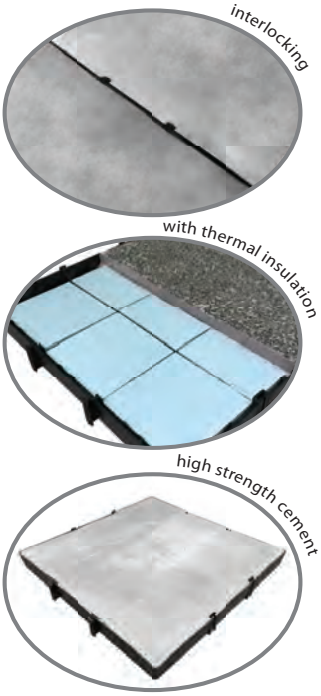
Insu®Slab Spacer

Insu® Slab Spacer is an accessory to align the pre-fabricated slabs during installation.

It is cross shaped and manufactured from recycled plastic.

The spacers are inserted at the junctions of the mosaic of Insu® Slab.

Multitray™



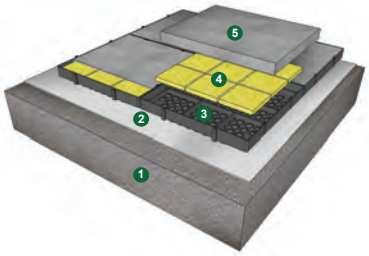
Multitray™ is a multi-functional tray which can be used as a green roof tray or precast composite slab applications.

The tray is a single piece injection moulding manufactured from recycled polypropylene and designed with a series of 87 pedestals at the bottom to facilitate efficient water drainage.

Insu®Slab 500 Plus is a pre-fabricated composite panel constructed from high strength mortar with polystyrene foam board core cast within the Multitray™. It is used on concrete roof decks as a thermal insulating medium, protection slab for underlying waterproofing membrane, and incorporates a water drainage system. It is also foot trafficable.

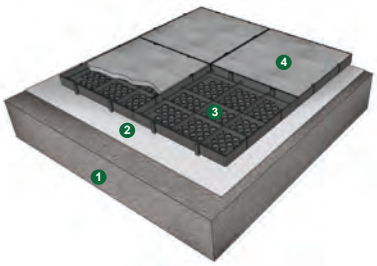
Insu®Slab 500 HD (heavy-duty) is a pre-fabricated, lightweight, composite panel constructed from cement cast into the Multitray™ with a geotextile at the bottom. It is used for maintenance pathways and as stone decking for raised floor system.

Insu®Slab 500 Plus



Insu®Slab 500 Plus System
(1) Roof Slab
(2) Root-Resistant Waterproofing Membrane
(3) Multitray™
(4) Polystyrene foam core
(5) High strength cement

Insu®Slab 500 HD



Insu®Slab 500 HD System
(1) Roof Slab
(2) Root-Resistant Waterproofing Membrane
(3) Multitray™
(4) High strength cement

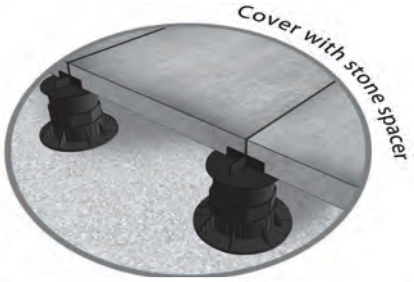
Technical Specifications		UOM	Insu® Slab 500 Plus	Insu® Slab 500 HD
Product Codes		Panel	PGE-CP-INPX-F0-NR PGE-CP-INPX-F0-FR	PGE-CP-INHD-F0-NR PGE-CP-INHD-F0-FR
SEC Green Label			Yes	Yes
SGBC Green Product			✓✓	✓✓
Material			Hi-Strength Mortar Insu® Foam Multitray™	Hi-Strength Mortar Insu® Felt Multitray™
Finish:	Standard Enquiry		Cement Other Finishes	Cement Other Finishes
Panel Size:	Height Width Length	mm mm mm	70 500 500	70 500 500
Weight per piece		kg	14.1	15
Compressive Strength		$tonnes_f/m^2$	46.7	145.9

SEC = Singapore Environment Council

SGBC = Singapore Green Building Council

Fire resistant version available. Please contact us for more information.

Insu®Jac

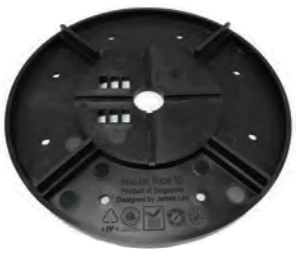


Insu®Jac is a lightweight, high strength adjustable pedestal level raising system designed to replace the traditional method of raising the floor level. The system consists of a base, body, cover and spacer with options to raise the level to various heights up to 1,500mm with an "extender" and alignment of stone or wooden decking elements.

The base, body and cover are all single piece injection mouldings manufactured from recycled PP, offering high compressive strength for various height combinations. uPVC pipes are used as extenders. Fire resistant pedestals complying with local fire department's requirement are available for installation on rooftop, sky terraces and indoor areas.

Insu®Jac is suitable for various decking material ranging from timber, tiles, traditional stringer and plank, natural stone, composites to concrete. The number of Insu®Jac required is based on the specified live and dead loads of the platform and its designed configuration. Special application under fire engine access lane or driveway can be achieved with approved engineering design.

Insu®Jac 2



Insu®Jac 10

Insu®Jac 10 is a 10mm thick base and Insu®Jac 2 is a 2mm thick shim which are use for low height applications using the stacking method height adjustment ranging from 10 to 50mm.

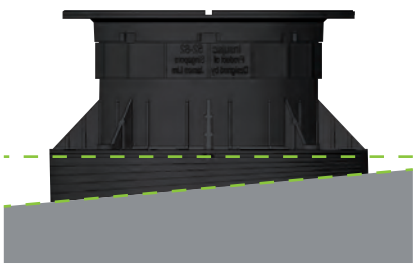
Insu®Jac Slope Corrector

Tongue & groove interlock with Insu®Jac system base

The Insu®Jac system also has a wedge-shaped slope corrector graded 1° a piece and is stackable up to 7 pieces or up to 7° slope, while maintaining a flat level on top of your timber decking or stone floor.

The Insu®Jac system base can be stack on top of the slope corrector through its tongue & groove profile.

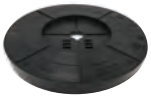
Insu®Jac 10 on a 5° slope



Insu®Jac 52 / 82 on a 5° slope

Fire resistant version available. Please contact us for more information.

Insu®Jac Height Selection Chart

1) Insu®Jac 10 - 50 (Set D)		Insu®Jac 10		+	Insu®Jac 2		
2) Insu®Jac 45 - 75 (Set A)		Base 35		+	Double Body (Centre)		+ Double Body (Top) 
3) Insu®Jac 52 - 1500 (Set E)		Base 44		+	Cover		+ 4.5mm thk Pipe Extender** 
4) Insu®Jac 75 - 95 (Set B)		Base 45		+	Body 		
5) Insu®Jac 82 - 102 (Set F)		Base 44		+	Body (with Extender)		+ Cover 
6) Insu®Jac 82 - 1500 (Set F)		Base 44		+	Body (with Extender)		+ Cover  + 4.5mm thk Pipe Extender** 
7) Insu®Jac 95 - 120 (Set C)		Base 45		+	Body (with Extender)		+ Cover 
8) Insu®Jac 95 - 1500 (Set C)		Base 45		+	Body (with Extender)		+ Cover  + 4.5mm thk Pipe Extender** 

Accessories


Wood Holder


Stone Spacer


4.5mm thk Pipe Extender


Insu®Jac 2


Insu®Jac 10


Slope Corrector

Fire resistant version available. Please contact us for more information.

Insu®Jac Range

Insu®Jac 10 - 50
(Set D)

Insu®Jac 45 - 75
(Set A)

Insu®Jac 75 - 95
(Set B)

Insu®Jac 82 - 102
(Set F)

Technical Specifications	UOM	Insu®Jac 10-50	Insu®Jac 45-75	Insu®Jac 75-95	Insu®Jac 82-102
Product Codes:	set	PGE-RF-SETD-01-NR PGE-RF-SETD-01-FR	PGE-RF-SETA-01-NR PGE-RF-SETA-01-FR	PGE-RF-SETB-01-NR PGE-RF-SETB-01-FR	PGE-RF-SETF-01-NR PGE-RF-SETF-01-FR
SEC Green Label		Yes	Yes	Yes	Yes
SGBC Green Product		✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓
Material		Recycled PP	Recycled PP	Recycled PP	Recycled PP
Colour		Black	Black	Black	Black
Height	mm	10 to 50	45 to 75	75 to 95	82 to 102
Compressive Load*	kg/unit		3,000 to 7,000	3,000 to 7,000	3,000 to 7,000

*Varies with different model and height configuration.

SEC = Singapore Environment Council

SGBC = Singapore Green Building Council

Insu®Jac 95 - 120
(Set C)

Insu®Jac 52 - 1500
(Set E)

Insu®Jac 82 - 1500
(Set F)

Insu®Jac 95 - 1500
(Set C)

Technical Specifications	UOM	Insu®Jac 95-120	Insu®Jac 52-1500	Insu®Jac 82-1500	Insu®Jac 95-1500
Product Codes:	set	PGE-RF-SETC-01-NR PGE-RF-SETC-01-FR	PGE-RF-SETE-01-NR PGE-RF-SETE-01-FR	PGE-RF-SETF-01-NR PGE-RF-SETF-01-FR	PGE-RF-SETC-01-NR PGE-RF-SETC-01-FR
SEC Green Label		Yes	Yes	Yes	Yes
SGBC Green Product		✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓
Material		Recycled PP	Recycled PP	Recycled PP	Recycled PP
Colour		Black	Black	Black	Black
Height	mm	95 to 120	52 to 1500	82 to 1500	95 to 1500
Compressive Load*	kg/unit	3,000 to 7,000	3,000 to 7,000	3,000 to 7,000	3,000 to 7,000

*Varies with different model and height configuration.

SEC = Singapore Environment Council

SGBC = Singapore Green Building Council

Pipe Extender Length Calculation

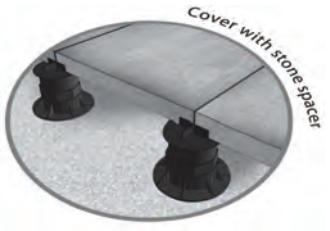
Insu®Jac Model	Example	Formula
Insu®Jac 52 - 1500 (Set E)	For example, if you require pedestal height to be 500mm	Required pedestal height minus 7mm 500mm - 7mm = 493mm Then your required pipe extender length will be 493mm
Insu®Jac 82 - 1500 (Set F)	For example, if you require pedestal height to be 500mm	Required pedestal height minus 52mm 500mm - 52mm = 448mm Then your required pipe extender length will be 448mm
Insu®Jac 95 - 1500 (Set C)	For example, if you require pedestal height to be 500mm	Required pedestal height minus 60mm 500mm - 60mm = 440mm Then your required pipe extender length will be 440mm

Fire resistant version available. Please contact us for more information.

Insu®Jac Application using Stone Spacer

a) for Stone / Slab Decking Installation

* 1 Unit = Base, Body and Cap
** 4.5 mm thk Pipe Extender - ID 105mm Ø ; OD 115mm Ø



1) Setting out pre-assembled Insu® Jac pedestals

2) Utilising Pipe Extender to achieve raised levels of 95mm to 1500mm

3) Installing granite slabs

4) Checking completed floor levels

5)Testing the system by filling the fountain with water

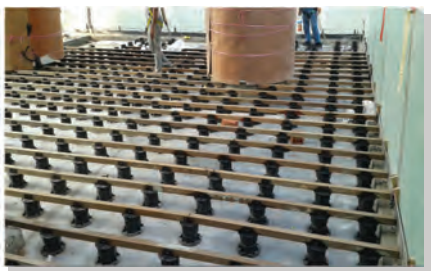
6) Insu® Jac submerged in water

Insu®Jac Application using Wood Holder

b) for Wood / Bamboo Decking Installation

* 1 Unit = Base, Body and Cap
** 4.5 mm thk Pipe Extender - ID 105mm Ø ; OD 115mm Ø

1) Setting out pre-assembled Insu® Jac pedestals



2)Align pedestals with wood battens and Insu® Jac Wood Holder

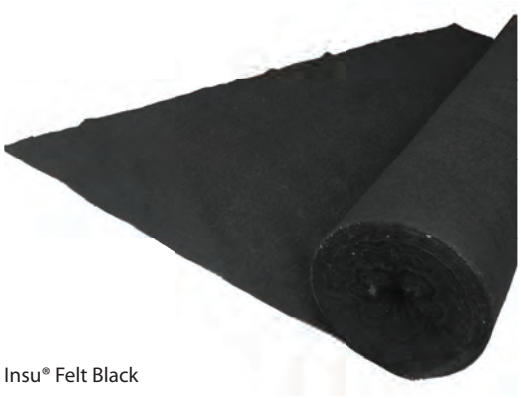
3) Mark raised floor level

4) Secure wood battens onto Insu® Jac Wood Holder using screws

5) Installation of bamboo decking

6) Insu® Jac pedestal level raising system below bamboo decking

Insu® Felt



Insu® Felt Black

Insu® Felt White

Insu® Felt is a non-woven geotextile made of polypropylene needle punched fabrics.

In waterproofing applications, it acts as a separation fleece protecting the waterproofing membrane and Insu® Foam from damage by screed.

In PlanterCell® Urban Greenery systems, its' high permeability allow water to flow relatively freely acting as a filter layer to prevent the planting media from getting into the water reservoirs / sub-surface drainage systems. It also serves to continuously hydrate the roots of plants via capillary action drawing water from the reservoirs.

Insu® Felt is resistant against acids, alkalis and biological attack and is environmentally friendly. It is also UV stable and can adapt to irregular surfaces.

Recommended Applications:
- Waterproofing applications with Insu® Foam
- PlanterCell® Urban Greenery systems
- Storm Water management systems

Technical Specifications		UOM	Insu® Felt Black	
Product Code			PGE-OT-T100-S0-NR	PGE-OT-T150-S0-NR
Material			Polypropylene	
Colour			Black	
Size per roll	Width	m	2.0	
	Length	m	150.0	
Thickness		mm	0.9	1.3
Nominal Weight		g/m²	100	150
Tensile Strength		kN/m	2.5	4.5
Elongation @ Break		%	25 to 100	
CBR Mullen Burst Strength		N	0.3	0.6
Tear Strength		kN	0.08	0.12
Vertical Permeability		cm/s	K=1.0-9.9	

Technical Specifications		UOM	Insu® Felt White	
Product Code			PGE-OT-T120-S1-NR	PGE-OT-T300-S1-NR
Material			Polypropylene	
Colour			White	
Size per roll	Width	m	2.2	2.2
	Length	m	150.0	75.0
Nominal Weight		g/m²	120	300
Tensile Strength	DM	kN/m	1.15	4.00
	DT	kN/m	1.35	4.89
Elongation @ Break	DM	%	25	35
	DT	%	30	40
Static Puncture		N	250	820
Pore Opening Size		µm	100	75
Water Permeability		m/s	$63 \cdot 10^{-3}$	$43 \cdot 10^{-3}$
Horizontal Water Flow Capacity		m²/s	$4.50 \cdot 10^{-7}$	$1.69 \cdot 10^{-5}$

Waterproofing

Protection of building envelopes against water maintains the longevity and integrity of buildings, leading to a living and working environment that is conducive.

Waterproofing is generally applied to the roofs, walls, floors, wet areas, basements, decks and water retaining structures such as water tanks and swimming pools.

Waterproofing systems are generally classified according to their form and selected according to site conditions and design requirements.

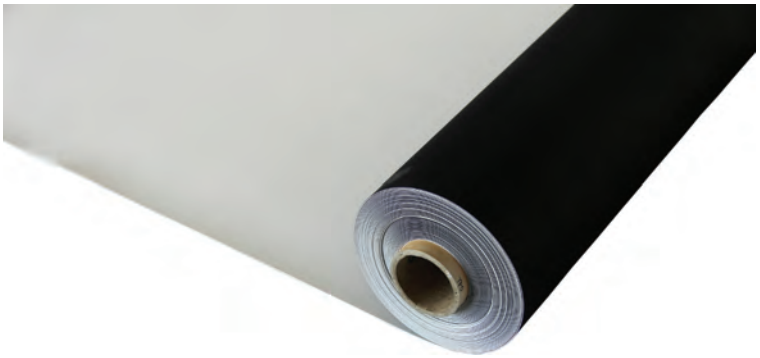
- Liquid Applied
- Cementitious
- Pre-formed Membrane

The integrity of the waterproofing depends both on the quality of the product, design and installation/application of the system. Adopt best practices in safety, surface preparation and application procedures for a good quality waterproofing system.

Uniseal offers a comprehensive range of different forms of waterproofing systems and peripherals to meet most requirements.

A selection of our product offerings contribute to the green environment. Our Uniseal® Acrylic Membrane, WB Polyurethane, Insucoat, Flex and Insu® Drain US6P are eco "Green Label" certified by the Singapore Environment Council (SEC), whilst Uniseal® Root Shield, WB Polyurethane, Flex, PVC Membrane and Insu® Drain US6P are certified "Green Products" by the Singapore Green Building Council (SGBC).

uniseal® TPO



Benefits:
- High UV resistance
- Chemical resistant
- Light reflective
- High puncture resistant
- Low and easy maintenance

Uniseal® TPO is a single-ply thermoplastic polyolefin membrane with a woven polyester reinforcement.

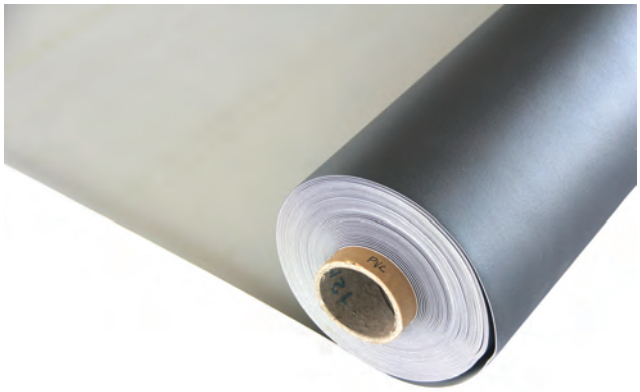
It is a durable, strong and flexible membrane that can fully adhere to roof surfaces and stands out for its superior performance.

Pre-formed membranes are suitable for large uninterrupted areas with minimal detailing. This product being UV, chemical and puncture resistant and light reflective is generally applied as an exposed system.

Technical Specifications	UOM	Uniseal® TPO	
Product Code		PWP-PM-TP15-00 PWP-PM-TP15-05	PWP-PM-TP12-00
Material		Thermoplastic Polyolefin	Thermoplastic Polyolefin with 1mm fleece back
Colour	Standard	White, Grey	White
Size: Thickness	mm	1.5	1.2 + 1
Width	m	2.1	2.1
Length	m	20	25
Weight	kg/m²	1.4	1.35
Artificial Weathering	UV	No Surface Cracks	No Surface Cracks
Tensile Strength @ break		9 MPa	1100 N/5cm
Elongation @ break	%	550	15
Tear Resistance	N	165	300
Root Resistance		Yes	Yes
Resistance to Impact	mm	800	450
Resistance to Static Punching	kg	20	20
Dimensional Stability	%	0.5	0.5
Cold Foldability	°C	-40	-40

Recommended Applications:
- Large uninterrupted areas with minimal detailing
- Roofs
- Patio decks

uniseal® PVC



Benefits:
- High UV resistance
- High puncture resistance
- Excellent flexibility

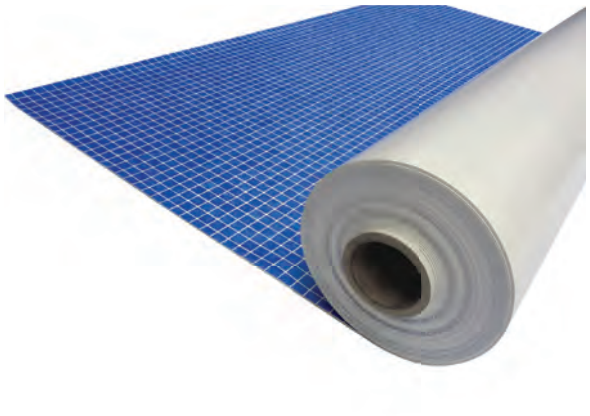
Uniseal® PVC is a single-ply polyvinylchloride membrane with non-woven glass fibre reinforcement. It is a durable, strong and flexible membrane that can fully adhere to roof surfaces. It is generally suitable for large uninterrupted areas with minimal detailing.

This product can be used as a green roof membrane as it has high puncture resistance.

Technical Specifications	UOM	Uniseal® PVC
Product Code		PWP-PM-PV15-05
Material		Single-ply PVC
Colour	Standard	Grey
Size: Thickness	mm	1.5
Width	m	2.1
Length	m	20
Weight	kg/m²	1.8
UV Exposure 1000hrs		Pass
Tensile Strength @ break	MPa	9
Elongation @ break	%	200
Tear Resistance	N	135
Joint Peel Resistance	N/50mm	200
Joint Shear Resistance	N/50mm	540
Static Puncture Resistance	kg	20
Impact Resistance	%	800
Root Resistance		Yes
Artificial Aging		Pass
Cold Foldability	°C	-25
Water Vapour Transmission	μ	20

Recommended Applications:
- Large uninterrupted areas with minimal detailing
- Roofs
- Patio decks

uniseal® Pool Liner



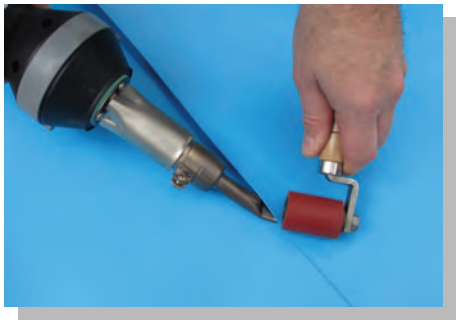
Features:

- High resistance to atmosphere agents and UV rays
- High resistance against microorganisms
- High mechanical resistance
- Insensibility to hot / cold cycles
- Resistance against punching
- Excellent welding capacity
- Resistance against standard chemicals for water treatment in swimming pools covered with PVC liner.

Uniseal® Pool Liner is a PVC Liner conceived to waterproof, protect and decorate swimming pools, the perfect solution for new structures and refurbishment of existing ones.

The product is good for any supporting element of the swimming pool concrete, prefab concrete and prefab with metal panels. It is used for pools and water parks.

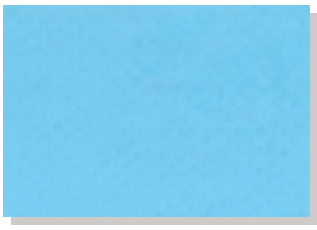
Technical Specifications	UOM	Uniseal® Pool Liner
Product Code		PWP-PM-TL15-F1
Material		PVC
Colour	Standard	53594/AB
Size: Thickness	mm	1.5
Width	m	1.6
Length	m	25
Flatness	mm	<10
Straightness	mm	<30
Slipping Resistance	°	24
Micro-Organism Resistance	%	5
Chlorine Resistance		> degree 3
Staining Resistance		> degree 2
Elongation @ break	%	15 to 30
Tear Resistance	N	180
Joint Peel Resistance	N/50mm	80
Joint Shear Resistance	N/50mm	1100
Cold Foldability	°C	-25



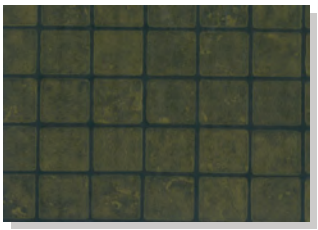
The diverse looks of Uniseal® Pool Liner give the desired aspect to your swimming-pool's water and fully integrate in the surrounding environment.

Swatches:


PWP-PM-TL15-F1


PWP-PM-TL15-F2

PWP-PM-TL15-F3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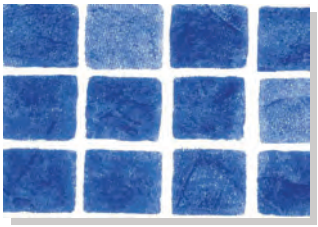
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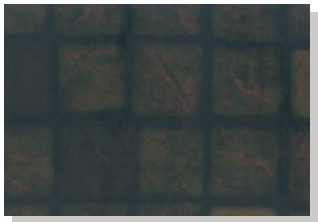
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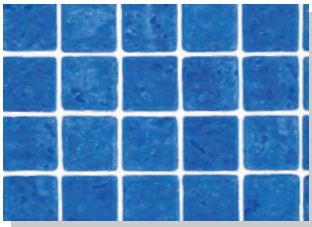
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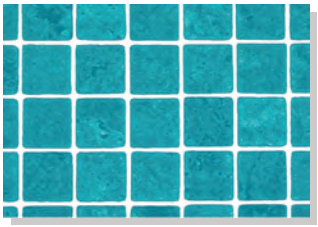
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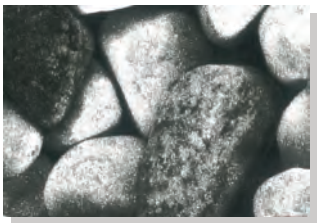
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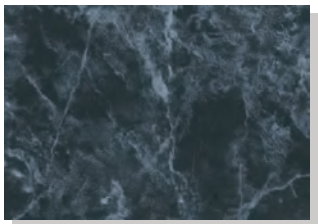
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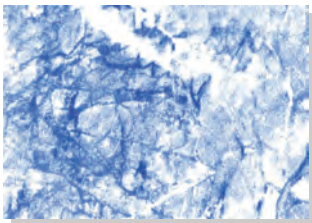
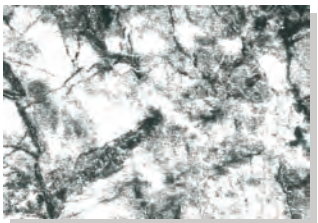
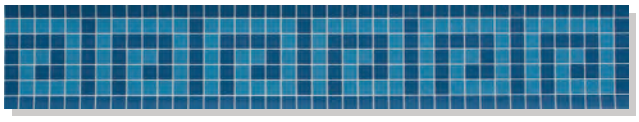

PWP-PM-TL15-G2


PWP-PM-TL15-G3

*Other colours available

Decorative Borders:


PWP-PM-TEXB-F1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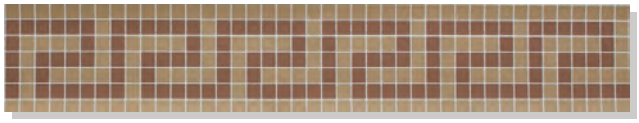
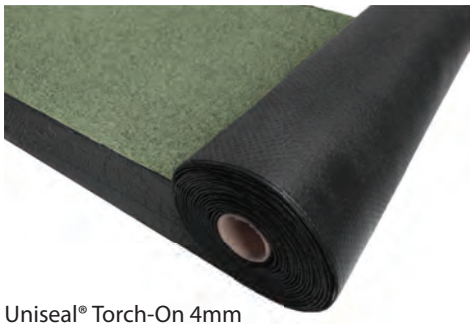

PWP-PM-TEXB-F3


PWP-PM-TEXB-F4

*Other colours available

uniseal® Torch-On



Uniseal® Torch-On 4mm

Benefits:
- Exposed or concealed system
- Low flammability
- Low vapour permeability
- Good mechanical strength
- Foot trafficable
- High UV resistance
- Good ageing properties

Uniseal® Torch-On 3mm

Uniseal® Torch-On is a fully bonded pre-formed membrane suitable for large areas with minimal detailing. It is made of modified bituminous compound, reinforced with a layer of non-woven polyester base fabric for optimum mechanical strength.

Uniseal® Torch-On is formulated using selected grades of bitumen and atactic polypropylene (APP) to achieve superior ageing properties and high temperature resistance. It is also foot trafficable.

Its UV protection, superior ageing and foot trafficable properties allow it to be applied as an exposed system.

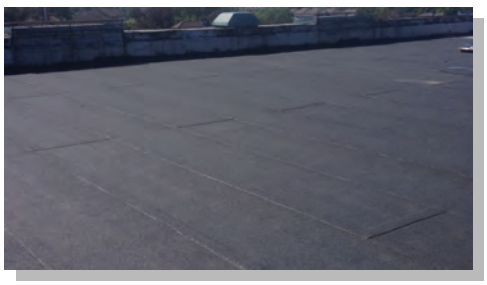
Technical Specifications	UOM	Uniseal® Torch-On
Product Code		PWP-PM-TO40-03
SGBC Green Product		✓✓✓✓
Material		Modified Bituminous Compound
Colour	Standard	Green
Size: Thickness	mm	4.0
Width	m	1
Length	m	10
Water Vapour Transmission	g/m²/24-hr	3.6
Water Absorption	%	<1
UV Exposure 1000hrs		No disintegration, blisters, peeling
Tensile Strength @ break	MPa	0.44 Long / 0.85 Lat
Elongation @ break	%	46 Long / 32 Lat
Cold Foldability	°C	-5
Softening Point	°C	143
Heat Stability	°C	120

SGBC = Singapore Green Building Council

Technical Specifications	UOM	Uniseal® Torch-On
Product Code		PWP-PM-TO30-01
SGBC Green Product		✓✓✓✓
Material		Modified Bituminous Compound
Colour	Standard	Black
Size: Thickness	mm	3.0
Width	m	1
Length	m	10
Maximum Load @ Break	N/50 mm	
Longitudinal		750
Transversal		500
Elongation @ Break	%	
Longitudinal		40
Transversal		40
Resistance to Impact Loading	mm	900
Resistance to Static Loading	kg	10
Tensile Tearing Strength	N	
Longitudinal		400
Transversal		250
Dimensional Stability	%	±0.3
Cold Flexibility	°C	-5
Flow Resistance @ Elevated Temperature	°C	120
Water Vapour Properties	μ	20

SGBC = Singapore Green Building Council

Recommended Applications:
- Large uninterrupted areas with minimal detailing
- Roofs
- Patio decks



uniseal® Self-Adhesive

Benefits:
- Fully bonded
- High puncture resistant
- Chemical resistant
- Easy installation

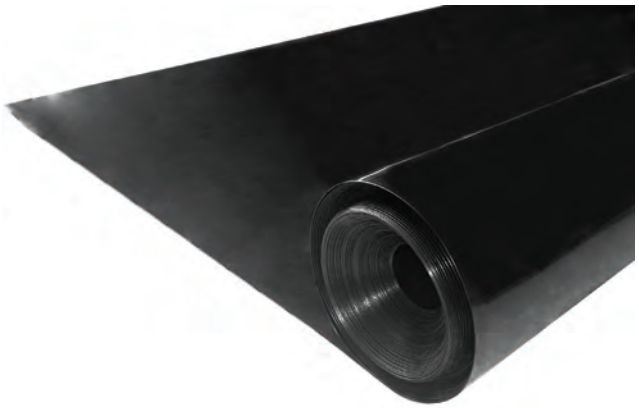
Uniseal® Self-Adhesive is a fully bonded Styrene-Butadiene-Styrene (SBS) modified bituminous membrane with high tack resins on its surface to provide strong adhesion to prepared concrete surfaces.

It is suitable for application in large uninterrupted areas. It's strong mechanical strength and puncture resistant makes it suitable for a tough installed environment such as retaining walls.

Technical Specifications	UOM	Uniseal® Self-Adhesive
Product Code		PWP-PM-SA15-01
Material		Fully Bonded SBS Modified Bituminous
Colour	Standard	Black
Size: Thickness	mm	1.5
Width	m	1
Length	m	20
Water Vapour Transmission	m (S_d)	≥ 8.2
Tensile Strength @ break	N/50mm	
Longitudinal		270 ± 70
Transversal		270 ± 70
Elongation @ break	%	
Longitudinal		250 ± 50
Transversal		220 ± 50
Tear Strength (nail)	N	
Longitudinal		180
Transversal		140 ± 50
Flexibility @ low temperature	℃	≤ -15

Recommended Applications:
- Large uninterrupted areas with minimal detailing
- Retaining walls
- Ground floor slab
- Planter boxes

uniseal® HDPE

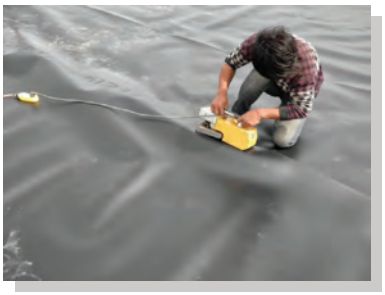


Uniseal® HDPE is a High Density Polyethylene geomembrane cum waterproofing membrane that is vapor permeable and plant root resistant. It is a durable, strong and flexible membrane that can fully adhere to roof surfaces as well as laid on prepared ground surfaces as a pond liner. It can also protect underground services, hardscapes and properties from damages by tree roots intrusions. It is generally suitable for large uninterrupted areas with minimal detailing and can be joined with hot air welder.

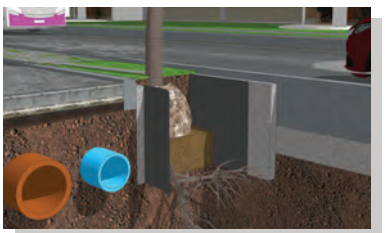
Technical Specifications	UOM	Uniseal® HDPE	
Product Codes		PWP-PM-HD1X-01	PWP-PM-HD2X-01
Material		High Density Polyethylene	High Density Polyethylene
Colour		Black	Black
Size: Thickness	mm	1.0	2.0
Width	m	3	1.5
Length	m	50	50
Density	g/cm^3	≥ 0.94	≥ 0.94
Depth	mm		1,450
Tensile Yield Strength (Vertical and Horizontal)	N/mm	≥ 15	≥ 29
Tensile Breaking Strength (Vertical and Horizontal)	N/mm	≥ 27	≥ 53
Elongation (Vertical and Horizontal)	%	≥ 12	≥ 12
Elongation @ Break (Vertical and Horizontal)	%	≥ 700	≥ 700
Tearing Load @ Right Angle (Vertical and Horizontal)	N	≥ 125	≥ 250
Anti-puncture Strength	N	≥ 320	≥ 540
Tensile Load Stress Cracking (Tensile method of dead load of the cut)	h	≥ 300	≥ 300
Carbon Black Content	%	2.0 to 3.0	2.0 to 3.0
Carbon Black Dispersion		The number of Level 3 among 10 data is not more than one Level 4 and Level 5 are not allowed	
Oxidation Induction Time (OIT)	min		
Under Normal Pressure		≥ 100	≥ 100
Under High Pressure		≥ 400	≥ 400
85°C Thermal Aging (retention rate of OIT under normal pressure after 90days)	%	≥ 55	≥ 55
Ultraviolet Resistance (retention rate of OIT after 1600hr ultraviolet irradiation)	%	≥ 50	≥ 50

Benefits:
- High puncture resistance
- Vapor permeable
- Root resistance

Recommended Applications: 1mm
- Waterproofing for concealed roof system
- Root barrier layer for roof gardens and green roofs
- Pond liner
- Liner for rainwater harvesting tanks or stormwater detention tanks



Recommended Applications: 2mm
- Protection of underground services
- Protection of hardscapes
- Protection of properties



uniseal® Anti-Skid

Benefits:
- Single component
- Water-base, non-flammable, non-hazardous, non-toxic
- Low odor, near zero VOC
- Dust, dirt and stain resistant
- Withstand light vehicular traffic
- Hard wearing, attractive floor finish
- Durability in outdoor conditions

Uniseal Anti-Skid Floor Protection System is a single component, water-base, modified acrylic protective floor coating suitable for use on concrete surfaces, metal surfaces, asphalt driveways.

The system has near-zero VOC, is easy to use, non-hazardous, and requires no site mixing. Addition of selected additives and pigments enhances its performance and effectiveness. Non-slip aggregates sprinkled onto the membrane whilst applying, creates an excellent abrasion resistance against foot traffic.

The system is used on new floors, maintenance, repair and renovation of existing floors and coated surfaces can be easily repaired or re-coated. Coated surfaces are easy to clean and maintain and are relatively dust, dirt and stain resistant.

Fully cured the system adheres strongly to properly prepared surfaces and substrates and is tough enough for light vehicular / fork-lift traffic.

Technical Specifications	UOM	Uniseal® Anti-Skid
Product Code		PWP-LR-SKID-05
Material		Modified Acrylic
Colour	Standard	Grey
	Enquiry	Others
Pack Size	/	20
Viscosity @ 25°C	cP	9000
Water Vapour Transmission	g/m²/hr	3 to 5
UV Exposure	Grey Scale	No blistering (1000hrs)
Chemical/Bacterial Resistance		Algae, Fungi resistant
Application:		5 coats
Nominal Film Thickness	mm	1
Tensile Strength	MPa	12 (w/mesh)
Elongation @ break	%	110 (w/mesh)
Hardness	Shore A	>75
Adhesion Strength	MPa	1.3
Application Temperature	°C	10 to 70
Drying Time:	hr	1/2 to 3/4
Curing Time	hr	4 to 5

Recommended Applications:
- Concrete Floors

uniseal® Acrylic

Benefits:
- Trafficable
- High tensile strength, flexibility, elongation
- Fire retardant
- UV, weathering, algae and fungi resistant
- Fast curing
- Seamless application
- Can be applied over most types of substrates
- Green label certified

Uniseal® Acrylic Membrane is a single component, non-toxic and fire retardant liquid applied waterproofing formulation, suitable for areas with many details and difficult access. It is an exposed system. This membrane cures rapidly within 1 to 2 hours to form a seamless and tough elastic film that has excellent resistance against weathering, algae, and fungus growth, colour fade and is trafficable for light human traffic.

The membrane waterproof and at the same time allow the roof deck to breathe. It is formulated for exterior use to enhance the aesthetic of old and new roofs. It seals joints and cracks to give roofs a seamless and mildly textured finish. It can be applied over virtually all fully supported substrates including concrete, plywood, metal sheets and even existing membranes and built-up roofing. When a 3 coat system is applied, the area is good for light human traffic.

This product is recognised as environmentally friendly having achieved the "Green Label" certification by the Singapore Environment Council.

Technical Specifications	UOM	Uniseal® Acrylic	
Product Code		PWP-LR-ACRY-05	
SEC Green Label		Yes	
Material		Acrylic	
Colour	Standard	Grey	
	Enquiry	Others	
Pack Size	/	20	
Water Vapour Transmission	g/m²/hr	1.5	
Flash Point		Non-Flammable	
Flexibility (Mandrel)	mm	3	
UV Exposure	Grey Scale	5 (2000 hours)	
Application:		3 coats	5 coats
Nominal Film Thickness	mm	0.5	1.2
Nominal Coverage	m²//	1.2	0.75
Tensile Strength	MPa	2.5	26.5
Elongation @ break	%	388	100
Hardness	Shore A	>72	>72
Adhesion Strength	MPa	1	0.96
Crack Bridging	mm	No cracks	No cracks
Solid Content	%	50	60
Viscosity @ 25°C	cP	> 8000	> 28000
Application Temp	°C	-10 to 35	-10 to 35
Drying Time:	hr	Touch-up = 2	Touch-up = 6
Curing Time	hr	Re-coat = 4	Re-coat = 12

SEC = Singapore Environment Council

Recommended Applications:
- Areas with many detailing, difficult access
- R.C., tile, metal roof
- Gutter
- Roof flashings
- External walls
- Joints and seams

uniseal® WB PU

Benefits:
- Concealed or exposed system
- Water based, non-flammable
- Single component
- Good stretching properties
- Non-toxic
- Seamless application
- Tile direct membrane
- Green label certified

Uniseal® WB PU is water based modified polyurethane liquid applied waterproofing formulation, suitable for areas with many details, difficult access and concrete substrate. It is a single component product that can be applied directly from container and is recommended for use as a concealed waterproofing system. The membrane is stretchable allowing it to accommodate floor movement and vibration.

The product is non-toxic and non-flammable and is ideal for application in wet areas prior to any direct tiling with compatible adhesive.

This product is recognised as environmentally friendly having achieved the "Green Label" certification by the Singapore Environment Council.

Technical Specifications	UOM	Uniseal® WBPU
Product Code		PWP-LR-WBPU-05
SEC Green Label		Yes
Material		Water based modified Polyurethane
Colour	Standard	Grey
Pack Size	/	20
Water Vapour Transmission	g/m²/hr	0.4 to 1.04
UV Exposure	Grey Scale	No disintegration, blisters, peeling, swelling, cracks or crazing (1000 hrs)
Application:		2 coats
Nominal Film Thickness	mm	0.7
Nominal Coverage	m²//	1.2
Tensile Strength	MPa	2.3
Elongation @ break	%	378
Hardness	Shore A	70
Adhesion Strength	MPa	1.3
Crack Bridging	mm	2
Application Temp	℃	10 to 45
Drying Time:	hr	1
Curing Time	hr	24

SEC = Singapore Environment Council

Recommended Applications:
- Areas with many detailing, difficult access
- Kitchens
- Balconies
- Planter boxes
- Roof terraces
- Concrete roofs

uniseal® Root Shield

Benefits:
- Root resistant
- Good tensile strength, elongation
- High flexibility
- Seamless

Uniseal® Root Shield Membrane is a single component, liquid applied waterproofing formulation that is moisture cured to form a seamless and tough elastomeric membrane. It is specially formulated for green roof applications, where its root resistant property minimise possible puncture of the waterproofing membrane by the roots of plants.

It is a concealed system suitable for concrete substrates in a tough environment with a Green Roof system sitting on it.

The membrane, when cured, is a durable, strong and flexible membrane that bonds excellently to concrete substrates whilst having excellent expansion and contraction properties to accommodate lateral movements.

Technical Specifications	UOM	Uniseal® Root Shield
Product Code		PWP-LR-ROOT-01
Colour	Standard	Black
Pack Size	/	20
Viscosity @ 25°C	cP	4500
Water Vapour Transmission	g/m²/hr	0.8
Application:		3 coats
Nominal Film Thickness	mm	1.2 to 1.5
Nominal Coverage	m²/l	1.25
Tensile Strength	MPa	2.2
Elongation @ break	%	600
Hardness	Shore A	35
Crack Bridging	mm	2
Root Resistance		Yes
Tear Strength	N/mm²	20
Water Penetration		No
Drying Time:	hr	2 to 3
Curing Time	hr	7 days

Recommended Applications:
- Concrete Roofs
- Roof Terraces
- Planter Boxes

uniseal® MS PU

Benefits:
- Good expansion and contraction properties
- Seamless application
- Good adhesion to concrete substrates

Uniseal® MS PU is a single component bitumen modified polyurethane based liquid applied waterproofing formulation that is moisture cured to form a seamless and tough elastomeric membrane. It is a concealed system suitable for concrete substrates in a tough environment.

The membrane, when cured, bonds excellently to concrete substrates whilst having excellent expansion and contraction properties to accommodate lateral movements.

Technical Specifications	UOM	Uniseal® MSPU
Product Code		PWP-LR-MSPU-01
Material		Bitumen modified Polyurethane
Colour	Standard	Black
Pack Size	/	20
Density	kg//	1.1
Solid Content	%	85
Viscosity @ 25°C	cP	5500
Water Vapour Transmission	g/m²/hr	1.2
UV Exposure	Grey Scale	No loss in general properties (3000 hours)
Application:		2 coats
Nominal Film Thickness	mm	1
Nominal Coverage	m²//	1.1
Tensile Strength	MPa	1.2
Elongation @ break	%	1343
Hardness	Shore A	35
Adhesion Strength	MPa	0.84
Crack Bridging	mm	2
Drying Time:	hr	2 to 4
Curing Time	day	7

Recommended Applications:
- Concrete substrates in tough environment
- Lift pits
- Basements
- Retaining walls
- Planter Boxes
- Car park decks
- Concrete roofs
- External walls
- Wet areas

uniseal® Insucoat

Benefits:
- Trafficable
- Heat insulation and UV resistant properties
- UV, weathering, algae and fungi resistant
- Water based
- Single component
- Seamless application
- Decorative
- Green label certified

Uniseal® Insucoat is a single component, water based, liquid applied waterproofing formulation that comes with high performance thin film heat insulation properties. The system is formulated from three single component water based terpolymer.

The 3-coat system bonds well with metal, tile and concrete substrates and provide a tough but flexible membrane with heat insulating and UV resistant properties. It is foot trafficable when applied with an embedded reinforcement mesh and comes in a range of colours to provide an aesthetic finish.

This product is "Green Label" certified by the Singapore Environment Council (SEC), reinforcing our commitment to a green environment.

Technical Specifications	UOM	Uniseal® Insucoat
Product Code		PWP-LR-COAT-05
SEC Green Label		Yes
Material		Water based
Colour	Standard	Grey
Pack Size	/	20
Water Vapour Transmission	g/m²/hr	No water penetration
UV Exposure	Grey Scale	No disintegration, blisters, peeling, swelling, cracks or crazing (1000 hrs)
Thermal Conductivity	W/m°K	0.7
Solar Reflectance	W/m°KD	99
Application:		3 coats
Nominal Film Thickness	mm	1
Nominal Coverage	m²//	1.1
Tensile Strength	MPa	2.8
Elongation @ break	%	147
Adhesion Strength	MPa	1.9
Crack Bridging	mm	2
Drying Time:	hr	1 to 2
Curing Time	day	7

SEC = Singapore Environment Council

Recommended Applications:
- Roofs with many detailing & difficult access
- R.C., tile, metal roofs
- Gutter

uniseal® Wall Coating

Benefits:
- Good waterproof and weatherproof properties
- Heavy duty and high build-up
- Covers hairline cracks
- Durable and flexible
- Algae, fungi and dirt pick-up resistant
- Anti-carbonation protection
- Vapour permeable
- Decorative colours

Uniseal® Wall Coating System is a 100% water based acrylic, elastomeric coating with both waterproofing and decorative properties for exterior use.

The 5-coats system consisting of a primer, 2 body-coats and 2 topcoats is highly durable and covers hairline cracks well. It comes in a full decorative colour range for a pleasing aesthetic look.

Technical Specifications	UOM	Uniseal® Wall Coating
Product Code		PWP-LR-WALL-00
Material		Water based
Colour	Standard	White
	Enquiry	Others
Pack Size	/	20
Flexibility (Mandrel)	mm	3
Impact Resistance	kg/m²	1.04
Water Vapour Transmission	g/m²/hr	1.04
Flash Point	°C	No Flammable
UV Exposure	Grey Scale	No disintegration, blisters, peeling, swelling, cracks or crazing (1000 hrs)
Chemical/Bacterial Resistance		Resistant from Algae, Fungi, Dilute organic acids, mineral & vegetable oil
Application:		5 coats
Nominal Film Thickness	mm	0.36
Nominal Coverage	m²/l	1.4
Tensile Strength	MPa	4
Elongation @ break	%	90.8
Adhesion Strength	MPa	1.4
Drying Time:	hr	1/2 to 1
Curing Time	day	7

Recommended Applications:
- Brick walls
- Concrete walls
- Plaster and masonry walls

uniseal® Slurry+

Benefits:
- Foot trafficable when cured
- Easy and fast application
- Anti-hydrostatic pressure
- Seal porous surfaces
- Non- toxic, non-corrosive
- Non-flammable, non-combustible

Uniseal® Slurry+ is a waterproofing formulation of cement, quartz sand and activating chemicals. The Slurry, when applied, penetrates into the capillary tracts of the concrete through the process of osmosis. It reacts with the moisture and free lime within the concrete forming crystals which seals the capillaries and pores, thereby providing the waterproofing effect. It can breach hairline cracks of up to 0.3mm.

The slurry works equally well when applied to or against the water pressure and can be used as an exposed or concealed system, but should not be used where movement and cracking is anticipated.

Slurry+ can be applied in liquid form or powder form via dry sprinkle into lean concrete before pouring, for horizontal surfaces.

Technical Specifications	UOM	Uniseal® Slurry+	
Product Codes		PWP-CR-SLRY-05	
Material		Cement, Quartz Sand, Activating Chemicals	
Colour:		Grey	
Pack Size		25kg	
Density	kg//	3.2	
Shrinkage	microstrains	> 600	
Water Absorption	%	7.5	
Water Resistance		No penetration	
Chemical Resistance		Resists mild acids & caustic materials in pH range 3-12	
Application:		2 coats	Sprinkle
Mix Ratio		2 Powder : 1 Water	
Nominal Coverage	m^2/set	12.5	2.1
Initial Set @ 25°C	mins	20	

Recommended Applications:
- Basement walls, floors
- Tunnels
- Swimming pools
- Retaining walls
- Lift pits
- Underground shafts
- Foundation walls and footings

uniseal® Flex

Benefits:
- Abrasion resistant
- Applicable on damp surface
- No migration when tile direct
- Foot trafficable when cured
- Seal joints and holes easily
- Non-toxic
- Fast Application
- Green label certified

Uniseal® Flex is a two component flexible cementitious waterproofing system composing of high-grade acrylic polymer and pre-blended fined powder. The two components when mixed together, reacts chemically to form a heavy duty, durable and flexible membrane that provides excellent adhesion, tensile strength and crack bridging properties to substrates.

This is a concealed system and direct tiling, plastering or screeding onto the membrane is possible immediately after curing without affecting the bonding strength.

This product is non-toxic and recognised as environmentally friendly having achieved the "Green Label" certification by the Singapore Environment Council (SEC).

Technical Specifications	UOM	Uniseal® Flex	
Product Codes		PWP-CR-FLEX-05-PY PWP-CR-FLEX-05-PD	
SEC Green Label		Yes	
Material		Acrylic Polymer	
Colour:		Grey	
Pack Size		Polymer 17/ + Powder 25kg	
Water Penetration		No penetration	
Application:		2 coats	3 coats
Nominal Coverage	m²/set	28	20
Tensile Strength	MPa	1	1
Elongation @ break	%	407	407
Hardness	Shore A	53	53
Adhesion Strength	MPa	1	1
Crack Bridging	mm	3	3

SEC = Singapore Environment Council

Recommended Applications:
- Concrete floors, walls and slabs
- Basement walls and slabs
- Swimming pools and ponds
- Planter boxes
- Wet areas
- Water features
- Balconies and terraces

uniseal® Bonding Adhesive

Benefits:
- Strong adhesion to most substrates
- Fast drying
- Easy application

Uniseal® Bonding Adhesive is formulated for adhering smooth backed PVC membrane to approved substrate to form a fully bonded PVC membrane system onto the roof slab. It is made from polychloroprene rubber.

The adhesive has good bonding strength to most of the substrates. It is a high solid content product and resistant to heat and aging.

Technical Specifications	UOM	Uniseal® Bonding Adhesive
Product Codes		PWP-PA-ADBD
Colour		Yellowish
Pack Size	l	18
Solid Content	%	25
Viscosity @ 25°C	cP	5000
Flash Point	°C	<10
Auto-Ignition Temp	°C	>200
Odour		Light smell
Nominal Coverage	m²//	35 to 45

Recommended Applications:
- Concrete
- Metal
- PVC
- Plastic
- Cement board

uniseal® Concrete Strengthener

Benefits:
- Excellent adhesion
- Seals hairline cracks
- Applicable on damp surfaces
- Non-toxic
- Rapid curing
- Single component
- Easy application

Uniseal® Concrete Strengthener is a high grade polymer composing of modified styrene butadiene dispersion component that provides an effective barrier against moisture for walls, ceilings and floors. This water-based product is used as a primer, bonding agent or as waterproofing slurry after mixing with cement. It can also be injected into substrates to seal all capillary pores and strengthen the concrete slab.

Uniseal® Concrete Strengthener is compatible with wide range of cements and provides deep seal penetration and permanent protection against water under pressure.

Technical Specifications	UOM	Uniseal® Concrete Strengthener	
Product Codes:		PWP-PA-CSTR	
Material		Styrene-butadiene	
Colour:		Clear	
Pack Size	l	20	
Density	kg/l	1.16	
Flash Point	°C	Non-Flammable	
Application:		1 coat	2 coats
Mix Ratio		Add 10% water to polymer	
Nominal Coverage	m²/l	7	4
Depth of Absorption	mm	1 to 8 (Grade 20 concrete)	
Crack Bridging	mm	2	
Application Temp	°C	10 to 50	10 to 50
Drying Time: Thorough	hr	1 to 3	1 to 3

Recommended Applications:
- Concrete roofs, floors, walls, slabs and structures
- Balconies and terraces
- Swimming pools and ponds
- Planter boxes
- Wet areas
- Water features
- Water tanks

uniseal® WB Primer

Benefits:
- Water based
- Single component
- Easy application
- Excellent adhesion
- Exterior and interior applications

Uniseal® WB Primer is an environmental friendly water-based product. It is primarily used as a primer, sealer and bonding agent to prepare floor and wall surfaces to receive new waterproofing system.

It is suitable for use on both fresh plaster surface or over existing coated surface, brick and masonry surfaces, both interior and exterior.

Technical Specifications	UOM	Uniseal® WB Primer
Product Codes:		PWP-PA-PRWB
Material		Water Based
Colour:		Clear
Pack Size	l	20
Density	kg/l	1.01
Solid Content	%	30
Flash Point	°C	Non-Flammable
Application:		1 coat
Nominal Coverage	m^2/l	7
Drying Time	hr	1/2

Recommended Applications:
- Roofs – concrete, tile
- Walls – brick, concrete, plastered, masonry

uniseal® Anti-Corrosion Primer

Benefits:
- Water based, non-flammable
- Inherent flash rust resistance
- Excellent under-film corrosion protection
- Strong adhesion
- Forms a hard protective layer over the coated metal surface.
- Durability in outdoor conditions
- Excellent early moisture resistance
- Fast drying

Uniseal® Anti-Corrosion Primer is a single component, water-base primer formulated for use on ferrous metal surfaces.

Special performance functional fillers and pigments used in the product enhances its performance and effectiveness and provides multiple layers of defence against corrosion. The cured film is tough and adheres very strongly to properly prepared, cleaned surfaces.

The primer is non-flammable, has near zero VOC, and is also non-toxic and non-hazardous to users.

The primer is used in new fabrication, preventive maintenance and repair of metal surfaces such as structural steel and metal deck roofs. It is used direct fom the pail and is easy to apply by brush or roller.

Technical Specifications	UOM	Uniseal® Anti-Corrosion Primer
Product Codes:		PWP-PA-PRAC
Material		Water based
Colour:		Brownish Grey
Pack Size	/	18
Density	kg//	1.4
Solid Content	%	70
Viscosity @ 25°C	cP	9000 to 10500
Weathering		No rust detected (3000 hours)
Application:		1 coat
Nominal Coverage	m²//	6
Application Temp	°C	50 to 80
Drying Time: Touch-up	hr	1/2
Thorough	hr	3

Recommended Applications:
- Metals Roof
- Flashing & capping
- Gutter

Uniseal® Bitumen Primer

Benefits:
- Single compound
- Easy application
- Very good adhesion to concrete, masonry, plaster and metal
- Rapid solidification
- Resistant to deterioration

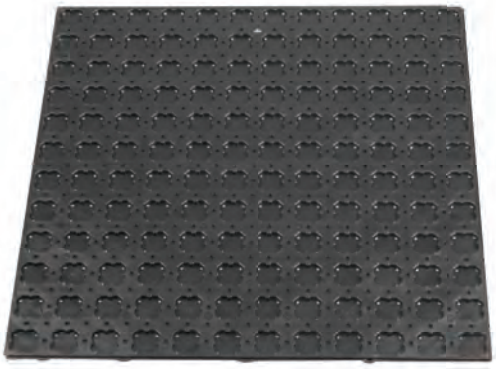
Uniseal® Bitumen Primer is a low viscosity bituminous compound used as a penetrating primer for better adhesion of its range of Pre-formed Membrane to substrates.

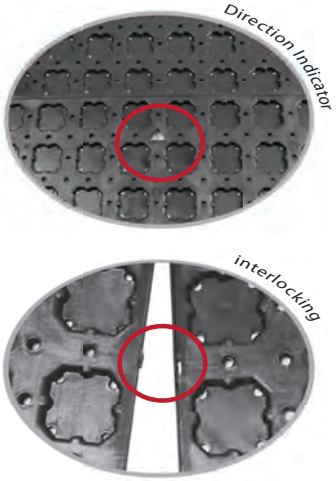
It also acts as protection for concrete against biological growth and polluted soil.

Technical Specifications	UOM	Uniseal® Bitumen Primer
Product Codes:		PWP-PA-PRBT
Material		Bituminous Compound
Colour:		Black
Pack Size	l	20
Density	kg/l	0.89
Solid Content	%	40
Viscosity @ 25°C	cP	50 to 100
Flash Point	°C	38
Application:		1 coat
Nominal Coverage	m²/l	6
Drying Time: Touch-up	hr	1/2
Thorough	hr	3

Recommended Applications:
- Roofs – concrete, tile
- Walls – brick, concrete, plastered, masonry

Insu® Drain US6P



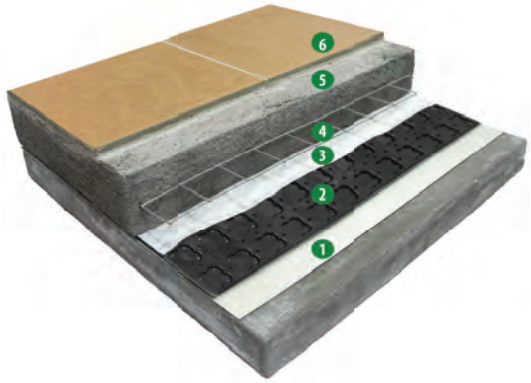


Benefits:
- Lightweight
- Good mechanical properties
- Easy installation
- Efficient Logistics (Lightweight and stackable)
- Reusable and recyclable
- Efficient water drainage
- Minimise efflorescence
- Protect waterproofing membrane
- Green label / Green product certified

Insu®Drain US6P is a lightweight mat for the protection of concrete substrates against efflorescence and cracking. Entrapped water in the substrate is the culprit as it reacts with water soluble salts and migrates upwards whilst its expansion from heat cause cracking. Although primarily a problem of aesthetic, efflorescence if untreated can cause concrete to spall.

The moulded mat is primarily installed between screeds and waterproofing membrane, allowing entrapped water to drain through the screed via small outlets, keeping the screed dry. It also protects the waterproofing membrane.

Manufactured from recycled UV-stabilised polypropylene, it is "Green Label" certified by the Singapore Environment Council (SEC), reinforcing our commitment to a green environment. Additionally, this product is certified "Green Product" by the Singapore Green Building Council (SGBC).



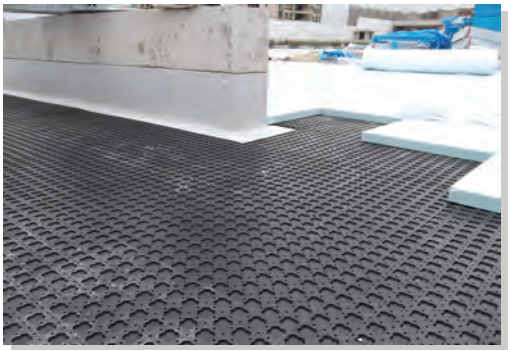
(1) Waterproofing Membrane
(2) Insu® Drain US6P
(3) Insu® Felt
(4) BRC Mesh
(5) Cement Sand Screed
(6) Floor Tile

Technical Specifications		UOM	Insu® Drain US6P
Product Code			PGE-OT-US6P-01-FR
SEC Green Label			Yes
SGBC Green Product			✓✓✓✓
Material			Recycled PP
Colour			Black
Size:	Thickness	mm	6
	Width	mm	500
	Length	mm	500
Pieces per m² Area		pc	4
Nominal Weight		kg/m²	1.52
Compressive Strength		$tonnes_f/m^2$	159
Chemical Resistance			Chemicals, Rot, Algae, Bacteria and Mold resistant
Fire Resistance			Class 2 (British Standard 476 : Part 7)

SEC = Singapore Environment Council

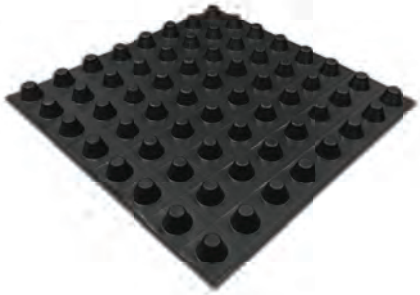
SGBC = Singapore Green Building Council

Recommended Applications:
- Under screed
- Balconies and terraces
- Podium and plaza decks
- Swimming pool decks
- Shower areas and washrooms
- Roof deck



Fire resistant version available. Please contact us for more information.

Insu® Drain 8 / 10 / 20



Insu® Drain 8

Insu® Drain 10

Insu® Drain 20

Benefits:
- Easy to install
- High compression strength
- Keep water from reaching the foundation wall
- Permanent air gap allows ventilation over the wall surfaces
- Air gap provides additional thermal insulation
- Protect waterproofing membrane from moisture and root penetration
- Manage and redirect water influx to sub-soil drainage system
- Flexible composite sheet conforms to different shape and size of building structures

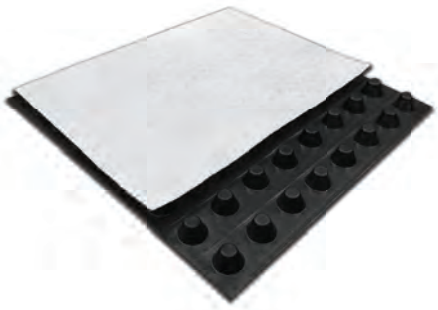
Insu®Drain 8 / 10 / 20 are dimpled drainage sheets designed as a damp proof cum protection layer for foundation and basement structures. The higher capacity Insu®Drain 20 is designed to cope with higher groundwater flow, providing efficient drainage in tunnels and other underground structures.

The dimpled profile creates a permanent air cavity between the damp soil and underground structures which provide protection to the waterproofing membrane and structures from the moisture.

The impermeable material of the dimpled drainage sheets is able to bridge across cracks and honeycomb, shielding the underground structures from the moisture.

Technical Specifications		UOM	Insu® Drain 8	Insu® Drain 10	Insu® Drain 20
Product Code			PGE-OT-DX08-01-NR	PGE-OT-DX10-01-NR	PGE-OT-DX20-01-NR
Material			High Density Polyethylene	High Density Polyethylene	High Density Polyethylene
Colour			Black	Black	Black
Size per roll	Width	m	3	3	3
	Length	m	15	15	10
Height of Dimple		mm	8	10	20
Thickness		mm	0.7	0.8	1.1
Grammage		g/m²	1000	1100	1500
Tensile Strength		N/5cm	350	350	350
Compressive Strength		kPa≥	300	300	300
Elongation Rate		%	80	80	80
Vertical Water Flow Rate		cm^3/s	10	10	15
Rind Penetration Strength		N≥	350	350	350
Bending at Low Temperature			Bending without crack at -35°C		

Insu® Drain 8 Geo / 10 Geo / 20 Geo



Insu® Drain 8 Geo

Insu® Drain 10 Geo

Insu® Drain 20 Geo

Benefits:

- Easy to install
- High compression strength
- Efficient drainage performance
- Permanent air gap releases hydrostatic pressure acting on waterproofing membrane
- Protect waterproofing membrane
- Flexible composite sheet conforms to different shape and size of building structures

Insu®Drain 8 Geo / 10 Geo / 20 Geo are dimpled drainage sheets with a thermal bonded geotexile filter fabric which are use as permeable protection layer for the waterproofing membrane in subsoil conditions as well as drainage layer for vertical and horizontal applications.

These high strength composite drainage sheets are widely use in basement walls, planter boxes, underground parking structures, retaining walls, green roofs, etc.

Technical Specifications		UOM	Insu® Drain 8 Geo	Insu® Drain 10 Geo	Insu® Drain 20 Geo
Product Code			PGE-OT-DG08-01-NR	PGE-OT-DG10-01-NR	PGE-OT-DG20-01-NR
Material			High Density Polyethylene Polypropylene	High Density Polyethylene Polypropylene	High Density Polyethylene Polypropylene
Colour			Black Sheet White Felt	Black Sheet White Felt	Black Sheet White Felt
Size per roll	Width	m	3	3	3
	Length	m	15	15	10
Height of Dimple		mm	8	10	20
Thickness		mm	0.7	0.8	1.1
Grammage		g/m²	1000	1100	1500
Tensile Strength		N/5cm	350	350	350
Compressive Strength		kPa≥	300	300	300
Elongation Rate		%	80	80	80
Vertical Water Flow Rate		cm^3/s	10	10	15
Rind Penetration Strength		N≥	350	350	350
Geotextile Nominal Weight		g/m²	200	200	200
Bending at Low Temperature			Bending without crack at -35°C		

uniseal® Flexi Tape

Benefits:
- Water and Air tightness
- Fits snuggly over irregular shape and contour
- Good adhesiveness on many surfaces
- Stretches in multi-direction
- Durable

Uniseal® Flexi Tape is developed for joints of different substrates that require water and air tightness and are irregular in shape and contour.

Its' construction of a deformable rubber substrate and butyl rubber adhesive, allows it to fit snuggly around irregular shapes with very good adhesiveness to most substrates, durability, water and air resistance and stretch in multi-directions making it a versatile tape for many applications.

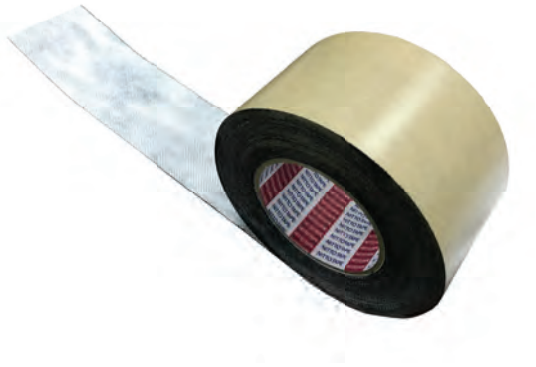
In applying the tape there should be a minimum 25mm on each edge from the joint.

Technical Specifications	UOM	Uniseal® Flexi Tape		
Product Code		PWP-AS-F345-01	PWP-AS-F375-01	PWP-AS-F320-01
Material		Butyl Adhesive EPDM sheet	Butyl Adhesive EPDM sheet	Butyl Adhesive EPDM sheet
Colour	Standard	Black	Black	Black
Size: Thickness	mm	1.3	1.3	1.3
Width	mm	45	75	200
Length	m	5	5	5
Tensile Strength (MD)	N/25mm	8	8	8
Elongation (MD)	%	1100	1100	1100
100% Modulus	N/25mm			
Initial (MD)		4	4	4
After 5 min (MD)		1.3	1.3	1.3
180° Peeling Adhesion	N/25mm			
Stainless Steel		9	9	9
Conifer Plywood		13	13	13
Vapour Permeability Waterproof Sheet		12	12	12

MD = Machine Direction

Recommended Applications:
- Any joints requiring Water and Air tightness
- Waterproofing Membrane joints
- Window and Wall edges

uniseal® E-Joint Tape



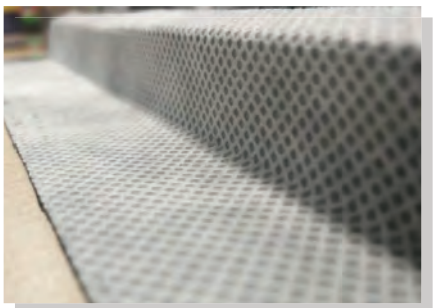
Benefits:
- Water and Air tightness
- Fits well over gaps
- Better adhesiveness than conventional products
- Does not soften with heat
- Durable

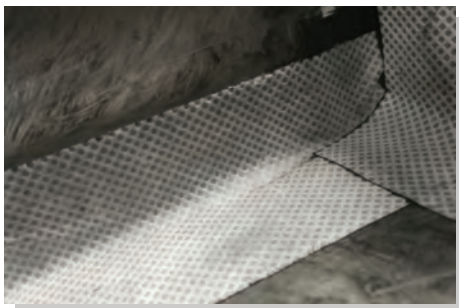
Uniseal® E-Joint Tape is developed for use in expansion joints which require water and air tightness.

Constructed of a non-woven fabric with a layer of butyl rubber adhesive, the tape adheres tightly over the gaps conforming to its contour and shape. The tape does not soften with heat, is water-resistant itself, is easy to work with and durable making it suitable for many other applications in addition to expansion joints.

In applying the tape there should be a minimum 25mm on each edge from the joint.

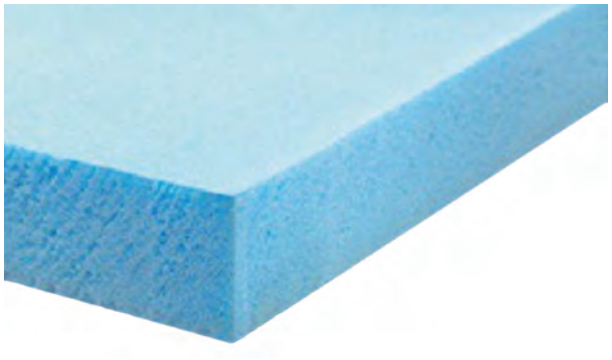
Technical Specifications	UOM	Uniseal® E-Joint Tape			
Product Code		PWP-AS-E450-00	PWP-AS-E475-00	PWP-AS-E410-00	PWP-AS-E415-00
Material		Butyl Rubber Adhesive Non-woven Fabric	Butyl Rubber Adhesive Non-woven Fabric	Butyl Rubber Adhesive Non-woven Fabric	Butyl Rubber Adhesive Non-woven Fabric
Colour	Standard	Black	Black	Black	Black
Size: Thickness	mm	0.4	0.4	0.4	0.4
Width	mm	50	75	100	150
Length	m	20	20	20	20
Tensile Strength	N/cm	43	43	43	43
Elongation	%	30	30	30	30
180° Peeling Adhesion	N/25mm				
Aluminium Plate		18	18	18	18
Softwood Plywood		17	17	17	17
Polystyrene Board		7	7	7	7
Room Temperature	°C	23	23	23	23
Peeling Speed	mm/min	300	300	300	300





Recommended Applications:
- Any joints requiring Water and Air tightness
- Expansion joints
- Waterproofing Membrane joints
- Window and Wall edges

Insu® Foam

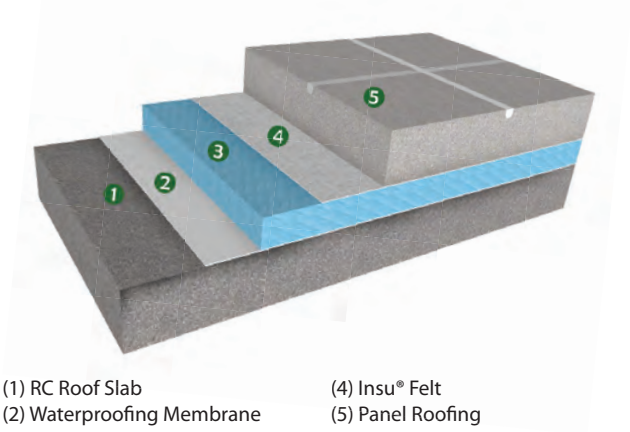


Benefits:
- Excellent thermal insulation
- Lightweight
- Uniform thickness
- Fire retardant
- Moisture resistant

Insu® Foam is an extruded polystyrene insulation foam board. It is formulated from polystyrene blowing agents, fire resistance chemicals, stabilizer compound and colouring agents, to achieve excellent insulating, fire and moisture resistant properties coupled with high compressive strength to weight ratio.

The extrusion process produces a uniform thickness throughout the board, resulting in a continuous even surface.

It is used as a heat insulation material for both metal and concrete roofs, walls of buildings and structures in a hot or cold environment. With its high compressive strength to weight ratio, it is also used as "filler" in casting concrete slabs, allowing designers to reduce dead load on building structures.



(1) RC Roof Slab
(2) Waterproofing Membrane
(3) Insu® Foam
(4) Insu® Felt
(5) Panel Roofing

Recommended Applications:
- R.C. and metal roofs
- Terraces, balconies
- Cold rooms
- LAN, server rooms
- As "filler" in concrete slabs

Technical Specifications		UOM	Insu® Foam	
Product Codes			PGE-OT-FE25-32-S1	PGE-OT-FE50-32-S1
			PGE-OT-FE25-32-S2	PGE-OT-FE50-32-S2
Material			Extruded Polystyrene	Extruded Polystyrene
Colour			Blue	Blue
Size:	Thickness	mm	25	50
	Size	mm	600 W x 1200 L	600 W x 1200 L
	Size	mm	1200 W x 2400 L	1200 W x 2400 L
Nominal density		g/m³	32	32
Compressive Strength	DM	kN/m	300	
Flammability		mm/min	100	100
Water Absorption		%	0.4 x self weight	0.4 x self weight
Thermal Conductivity		W/m. °K	0.0312	0.0312

Waterproofing Systems














Waterproofing Systems


















Urban Greenery : Green Roof













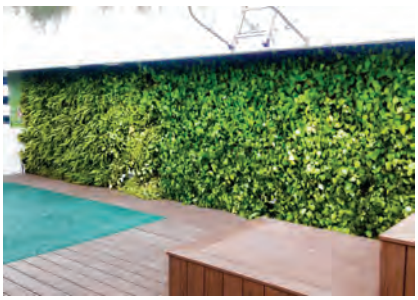





Urban Greenery : Green Wall

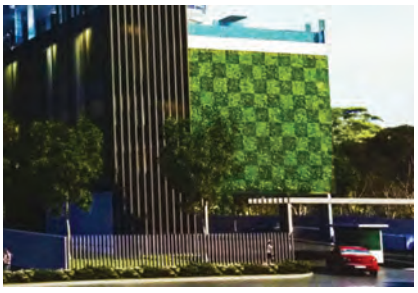
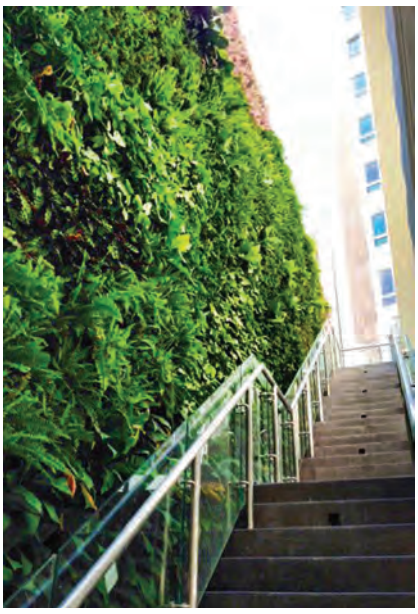
Urban Greenery : Green Wall







Green Wall Plants


Philodendron scandens green


Philodendron scandens variegata


Philodendron xanadu

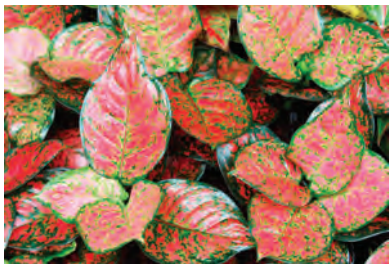

Philodendron imperial green


Philodendron erubescens gold


Philodendron 'burle marx'


Iris domestica


Xiphidium caeruleum


Aglaonema red


Dracaena song of india


Pilea nummulariifolia


Hemigraphis alternate


Euphorbia tithymaloides 'variegatus'


Nephrolepis exaltata bostoniensis


Davallia denticulate


Schefflera arboricola cultivar


Schefflera arboricola green


Phymatosorus scolopendria

Green Roof Plants


Pearl grass


Callisia repens


Wedelia trilobata


Dissotis rotundifolia


Arachis pintoi


Ficus deltoidea


Tradescantia spathacea


Sanseviera trifasciata


Pennisetum setaceum


Dentella repens


Alternanthera sessilis 'red'


Cyanotis cristata


Euphorbia hirta


Euphorbia thymifolia


Desmodium heterophyllum


Tridax procumbens


Spermacoce exilis


Lindernia antipoda