
RAAFT

Roof Terrace Guide

We make outstanding terraces through creative, versatile systems.

Behind our intuitive system, there's an innovative team.

Our team of technical consultants, project managers, product designers and construction professionals, all backed up by an invaluable support team work together to give you a complete service.

RAAFT

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RAAFT

Our Story

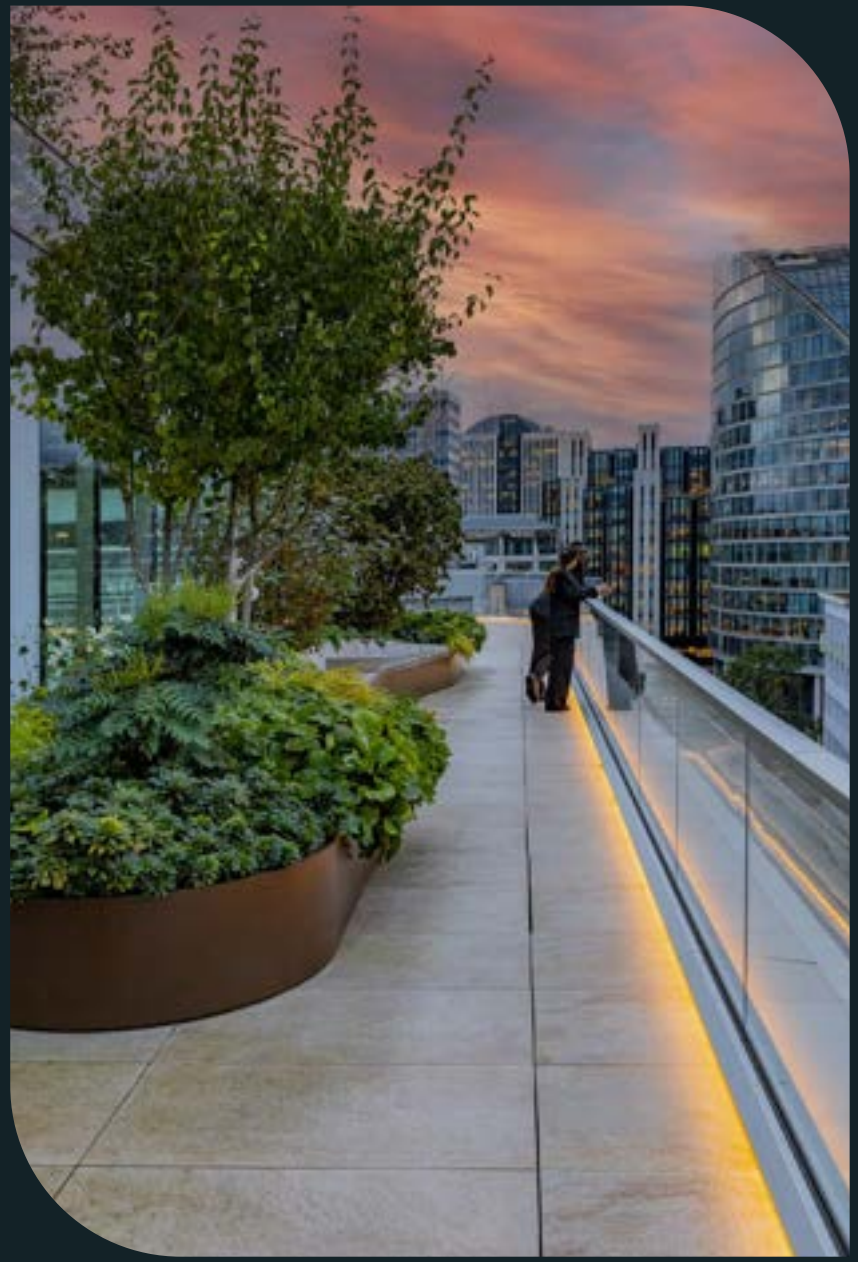
Raaft has been creating amazing outdoor spaces since 2008. We don't just want to improve how things are done, we want to solve new challenges by turning a problem on its head and exploring new and interesting ways to fix it. We continue to move forward and stay at the forefront of innovation.

The sustainable upgrading of urban environments has always been one of our top priorities. We continually research, develop and improve our products to deliver environmentally sustainable spaces.

bsi. ISO 9001 Quality Management
FS 696700

positive planet Certified Planet Positive

RAAFT

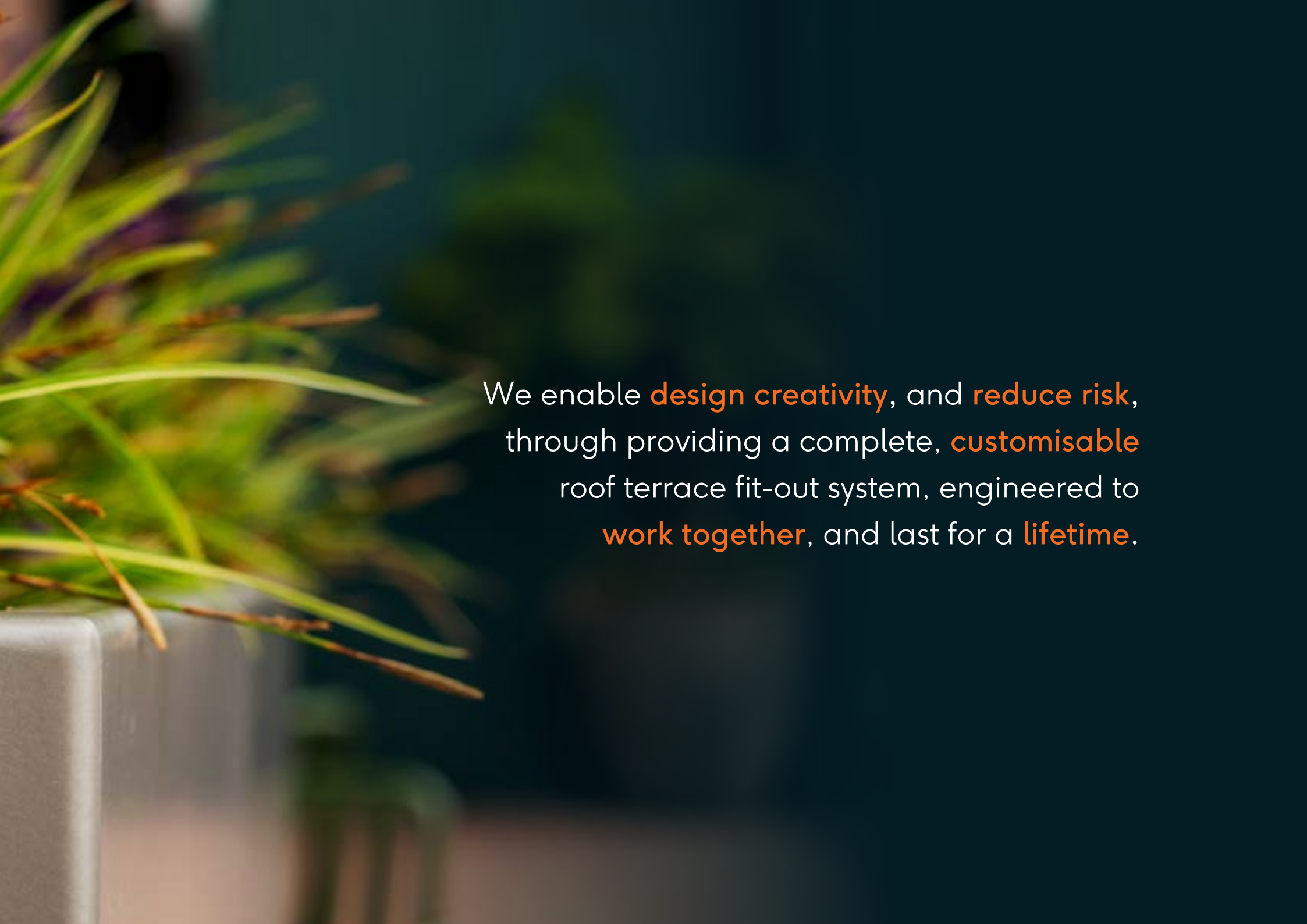


Our Vision

Raaft terrace systems will be the first choice for commercial terrace fit-out globally.

Our Mission

Making outstanding terraces through creative, versatile systems.


We enable design creativity, and reduce risk,
through providing a complete, customisable
roof terrace fit-out system, engineered to
work together, and last for a lifetime.


CLASS A
FIRE RATED

Fire-safe Terrace System

When does a terrace need to be fire-rated?

The Grenfell Tower fire of 2017 revealed serious deficiencies in fire safety regulations relating to external construction materials, particularly cladding. Amended regulations introduced the following year apply to all buildings with residential or institutional accommodation 18 metres or more above ground level. Further amendments mean the regulations now apply to roof terraces at a height of 11 metres or more.

According to the regulations, all materials used on the exterior of the building must comply with Euroclass A1 fire rating – non-combustible materials that make no contribution to the fire. To attain this rating, the materials must demonstrate under test that they do not produce smoke or burning droplets when exposed to fire.

Subsequent changes in 2019 placed external fire performance under the European classification system BS EN 13501-5. To comply with this standard, products are exposed to thermal attack with burning brands, wind and radiant heat to gauge external fire spread and penetration by fire.

To achieve BROOF(t4) classification, materials must show no fire penetration within 60 minutes. It must also show no flame spread of more than 0.38 metres across the surface, and burn for less than 5 minutes after the test flame is withdrawn from the sample.

While Raaft terrace systems provide solutions that fully comply with these regulations, architects should always seek advice from fire engineers assigned to the project to ensure compliance.

The materials considered as reaction for fire Classes A provided in Decision 94/611/EC without the need for testing include:
Natural stone
Porcelain (including pressed and extruded products, glazed or unglazed)
Aluminium and aluminium alloys
Iron, steel, stainless steel with an inorganic surface coating (e.g. zinc)
Powder-coating compounds used on aluminium and steel contain no volatile organic compounds (VOCs) so they still fall within Class A2.

Designing Roof Terraces

Design considerations and common challenges.

WIND UPLIFT

When air passes across a horizontal surface it creates a pocket of negative air pressure. If this is lower than the air pressure below the surface, a force may be generated that is capable of lifting the surface; this is the science behind how aircraft wings function.

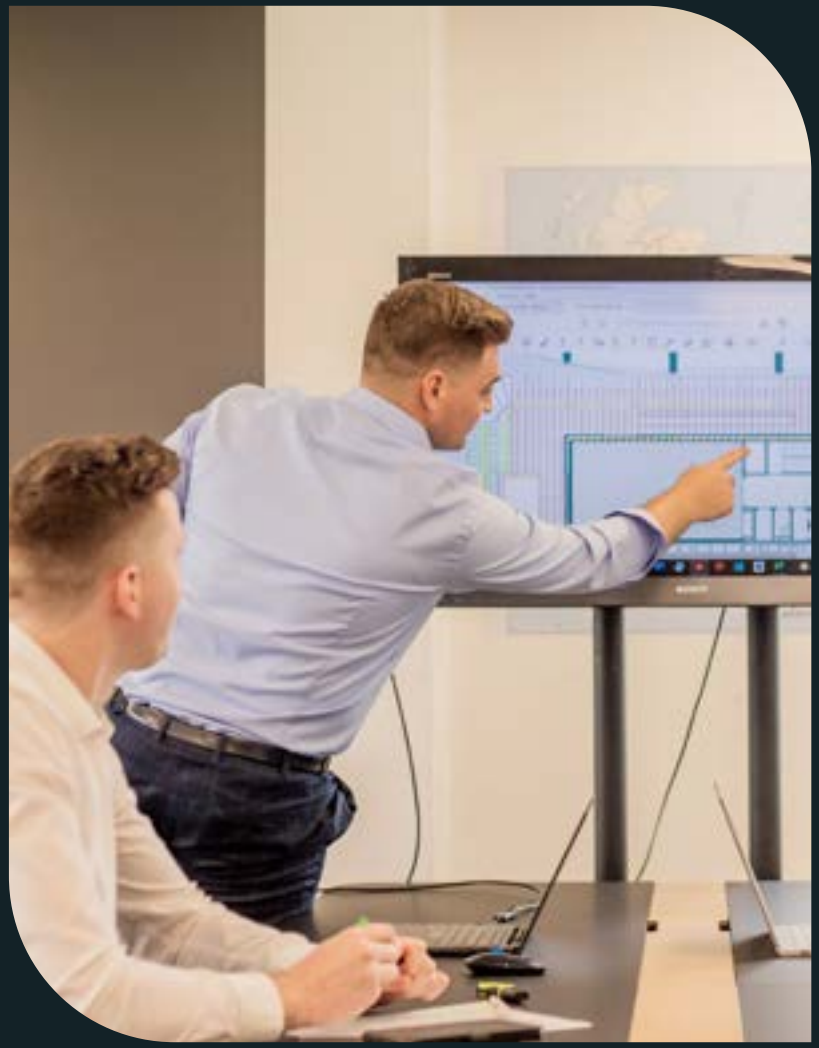
Flat roofs are often fitted with an inverted insulation or warm roof layer which can be subjected to wind uplift. To prevent this, the layer should be weighted down at a rate of 80kg per square metre using ballast, sand bags or heavy pavers.

Wind uplift can also create challenges where decking or tiles are laid on a supporting framework, particularly if the location is exposed to wind currents such as on high-rise buildings.

This can be partly mitigated by using heavier decking products, but these limit the choice of products available and increase the bearing weight on the roof structure.

Raaft porcelain decking and tile products feature a groove cut unobtrusively into the edge of the product. When used in combination with Raaft design-protected stainless steel or Nylon 12 RP anti-uplift clips, this provides sufficient resistance to the levels of wind uplift commonly experienced in the UK.

Refer to page 48.



WATERPROOFING AND DRAINAGE

When installing landscaping products on a roof terrace or podium, it is important that the integrity of the structure's waterproofing is not compromised by drill-through fixings, and that water from precipitation and irrigation is allowed to drain freely.

The Raaft system is designed to make terraces appear fully integrated within the building's construction without fixings. All components, from the decking and tiles to the support panels beneath planters and raised planter areas, are designed to allow efficient drainage across the entire terrace.

WEIGHT LOADING

Some landscaping products, particularly large planters with soil at full saturation level, can exert large downward forces. To mitigate localised weight loading, the Raaft system spreads the weight of landscaping products across a framework of load-bearing joists and support pedestals. With data provided by your project's assigned structural engineer, we can help you calculate safe weight loading and distribution across your terrace.

SERVICE ACCESS

Following installation of a terrace system, access to the space below will still be required for servicing and maintaining rooftop mechanical and electrical equipment and supply systems, checking and repairing insulation and waterproofing layers and cleaning out drainage gullies.

The Raaft system has been designed so that all components - even heavy planters - can be easily removed to enable full access to all areas under the terrace for servicing, maintenance and cleaning.

The Value of Roof Terraces

As the demand for housing continues to rise across the UK and available land is becoming scarcer and more expensive, developers are choosing to build higher rather than wider. But this also brings new challenges as architects strive to create healthy, attractive residential environments where every square metre needs to be accounted for. One feature that many high-rise buildings commonly share is flat roof spaces. Once neglected, these areas are now enjoying popularity for their potential as roof gardens and terraces. In May 2016 the magazine Horticulture Week reported that green roof spaces in London doubled in the previous three years. So, what are the factors driving this expansion?

- ADDED VALUE
  Developers want to maximise the return on their investment and to do that they must boost the value of the property. In 2015, estate agent Marsh & Parsons suggested that a roof garden could add as much as 12% to the value of a property in London, rising even to 25% in Chelsea – excellent return from a space once ignored and neglected.

- RESIDENT ACQUISITION AND RETENTION
  In a competitive, active housing market, developers and landlords must stay ahead of the curve if they are to win and keep residents. Once considered a luxury affordable only to the wealthy, roof gardens are now becoming a common feature on the checklist of apartment-living buyers and tenants

- RESIDENT BENEFITS
  Access to a private or communal outdoor space within the bounds of the property enhances residents' lifestyle experience through a feeling of connection with nature and separateness from the bustle, crowding and lack of privacy of the urban environment.

- ENVIRONMENT
  A roof garden can contribute so much positively towards improving the environment in urban areas, providing ecological habitats and wildlife corridors, better air quality and rainwater harvesting.

- SOCIAL BENEFITS
  Access to outdoor green spaces is a key factor in improving and maintaining mental and physical well-being for everyone living or working in high density urban areas, but it is easy to neglect this important time if every visit to the nearest green space involves a long walk and preparation. Having these amenities on the doorstep – or rooftop – means they can be enjoyed for brief periods throughout the day to maximise their therapeutic value.

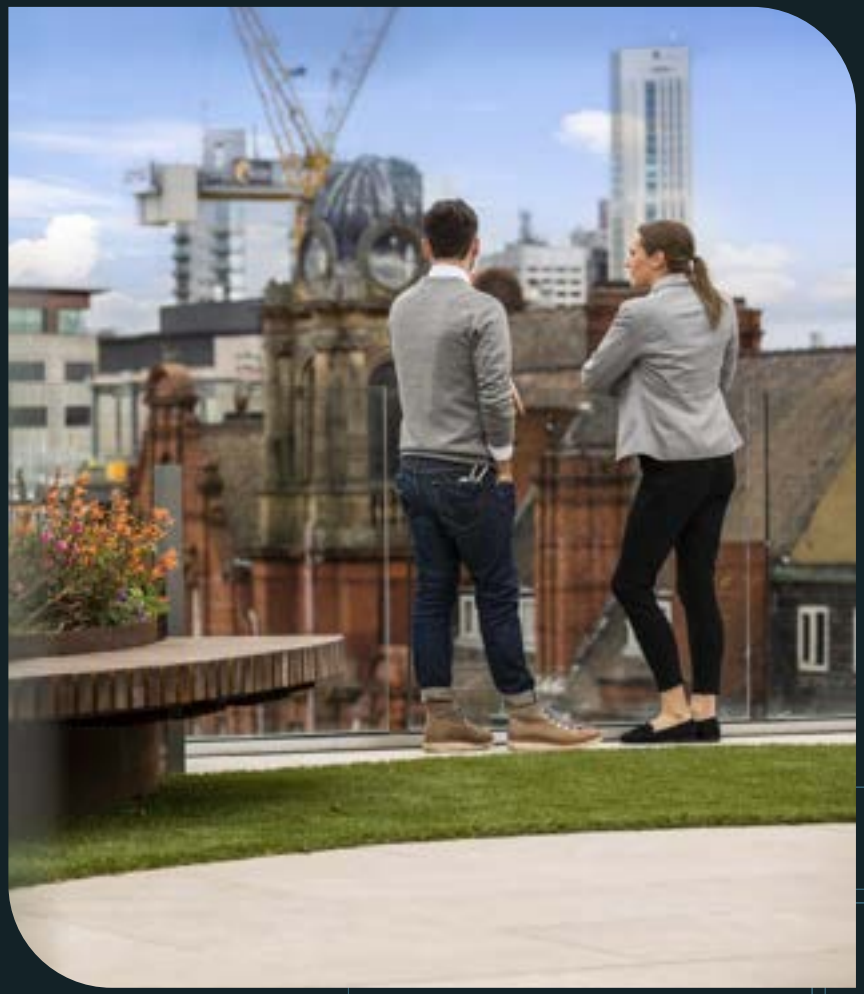
Economic Impact

Adding a roof terrace will generally add value to commercial or residential developments, both in terms of property value and tenant retention.

Designed to be retrofitted to an existing or new building, the Raaft modular roof terrace system is quick and easy to install without disturbing or damaging the building's fabric or requiring structural alterations. It is also a very sturdy system that promises a long, low-maintenance product lifetime thanks to its extruded aluminium support frame and durable composite and porcelain decking and tile options.

Raaft terrace systems are designed and manufactured to give many years of hard-wearing, low-maintenance commercial and residential use that will repay the initial investment time and again.

Social Impact



For office workers and residents of apartment buildings without gardens, a roof terrace can provide a relaxing outdoor space to enjoy living plants, fresh air and natural sunlight. With proper planning, it can combine secluded areas where privacy is preferred with communal space for socialising.

A roof terrace incorporated into a commercial building can provide an area where employees can enjoy work breaks, lunchtimes and socialising with colleagues or clients in a pleasant environment, away from the desk but still on the premises. The advantages are clear – where there's a better work environment, productivity increases and lost workdays are fewer.

Residential developments can incorporate roof terraces as communal or private areas used for outdoor recreation, entertaining and socialising.
Raaft terrace systems have been used in a wide variety of commercial and residential development projects, creating outdoor areas for relaxation and socialising that complement their surroundings.

Environmental Impact

Installing roof terraces with planters can have a positive impact on the environment

- Plants absorb and store carbon, helping to reduce air pollution.
- Planted roof terraces can help to regulate the temperature of buildings and reduce the amount of energy used for heating and air conditioning.
- Plants and planted areas also absorb rainfall and release it more slowly than hard surfaces, reducing the risk of flooding.
- They can restore biodiversity, habitats for pollinators and create wildlife corridors to heavily developed urban areas.
- They can even be used to grow edible plants, reducing the carbon footprint of the weekly food supply.

The Raaft terrace system is also designed and manufactured with the environment in mind, using recyclable extruded aluminium for the support frame and a choice of low-maintenance composite and porcelain decking materials and tiles.

The Urban Greening Factor

What is the Urban Greening Factor?

London's Urban Greening Factor (UGF) ensures future development in the capital includes green landscaping of sufficient quantity and quality to contribute to its vision of a Green Infrastructure (GI) - a "network of green spaces... planned, designed and managed to deliver a range of benefits". These include:

- healthy living
- flood mitigation
- improved air and water quality
- urban cooling
- enhanced biodiversity and ecological resilience

Based on similar schemes implemented elsewhere in the UK and internationally, the UGF aims to ensure green cover is incorporated into all built environment development design and planning from the outset.

How do roof terraces contribute to the Urban Greening Factor?

The Urban Greening Factor delivers offset greening (mandatory under the Biodiversity Net gain policy) at the place of development where there might be insufficient ground-level footprint for traditional green spaces such as parks and gardens.

The Raaft Commitment to Environmental Sustainability

Architectural design and construction are both innovating and returning to traditional products and methods that place a lighter burden on the planet's natural resources, reduce carbon footprint and ensure long-term sustainability. As we strive to become a global market leader, we recognise our responsibility to provide roof terrace and podium systems that support these goals and to contribute towards a better environment for the future of our communities.

All Raaft products are developed and manufactured with the environment at their heart, using materials chosen for their:

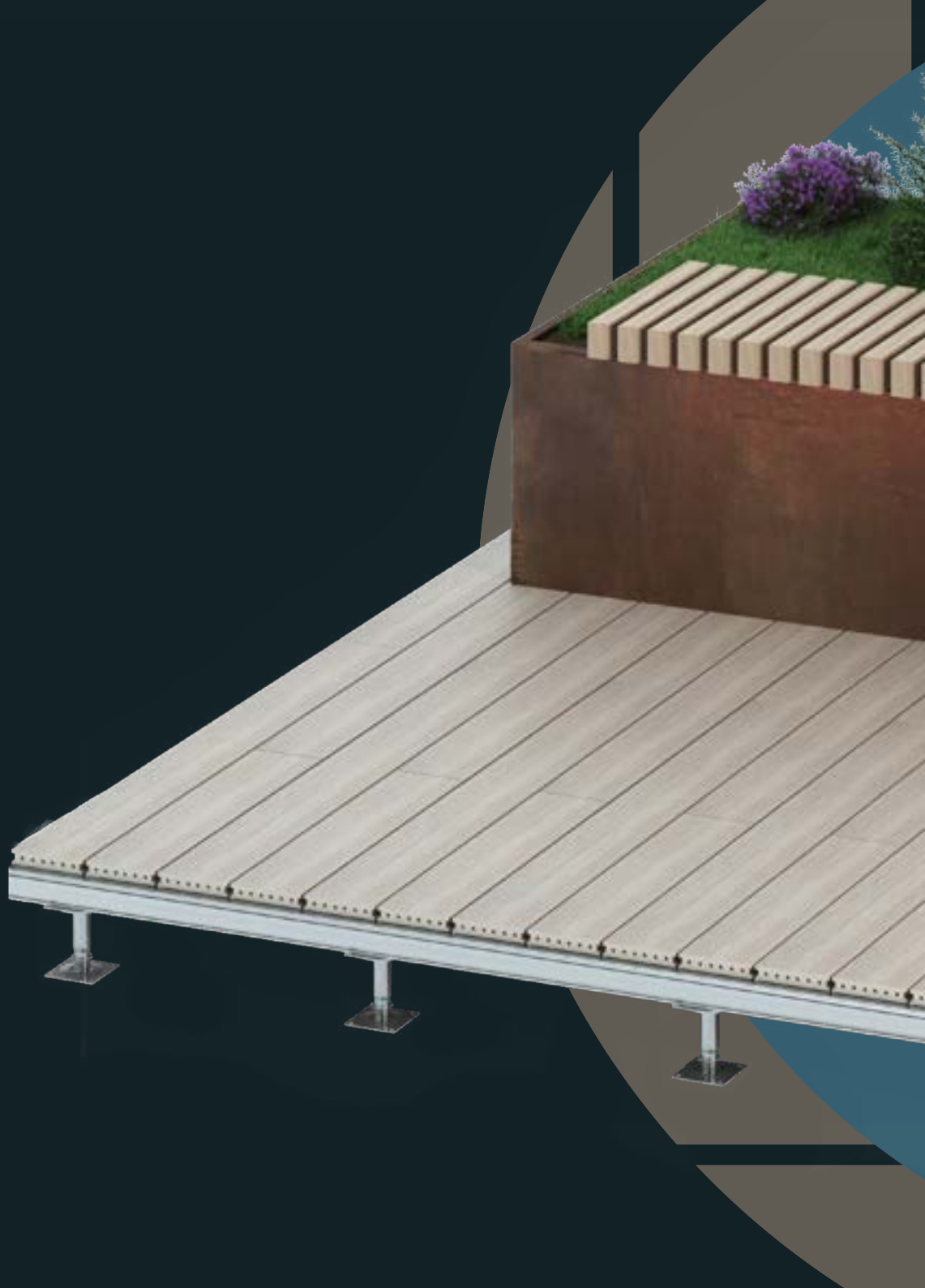
- durability – to reduce the frequency of replacement due to damage or wear and tear
- renewability – to decrease the use of finite natural resources
- proximity – to reduce carbon footprint before, during and after manufacture
- recyclability – to ensure a high percentage can be reprocessed at the end of the products' lifespan

We are committed to achieving net-zero carbon emissions across all our commercial operations, and we donate a percentage of our profits to support tree-planting programs as our contribution towards reforestation, improving air quality, and increasing carbon dioxide absorption.

The Complete Terrace System

Our flexible terrace system comprises of recyclable products that are engineered to work together so you can build what's right for your space. From a class A fire rated sturdy base to the perfect decking and tile combination and finishing with fabulous planters brimming with natural beauty.

Our team of experts will guide you through every step in creating the perfect terrace space in your next project.



The System

STEP KEY

1 **Support Structures:** Building a good base

2 **Surfaces:** Choosing your surface

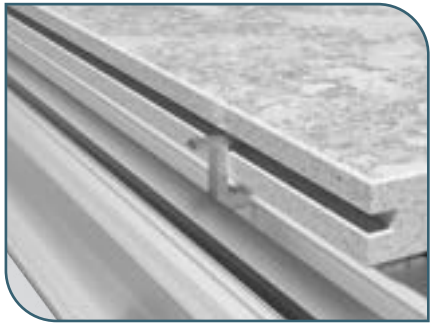
3 **Planters:** Adding dimension

Built in a Simple 3 Step Process

Step 1

Building a good base

A good quality support structure is key to creating a sturdy, safe terraced area. As roofs are rarely flat or level, our Raaft system is the perfect solution.



Step 2

Choosing your surface

Our surfaces include Terrafina Composite Decking, Atria Porcelain Tiles, and Farrino Porcelain Decking and are available in many styles, colours, effects and finishes.

Step 3

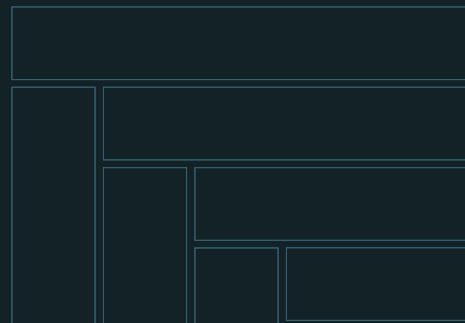
Adding dimension

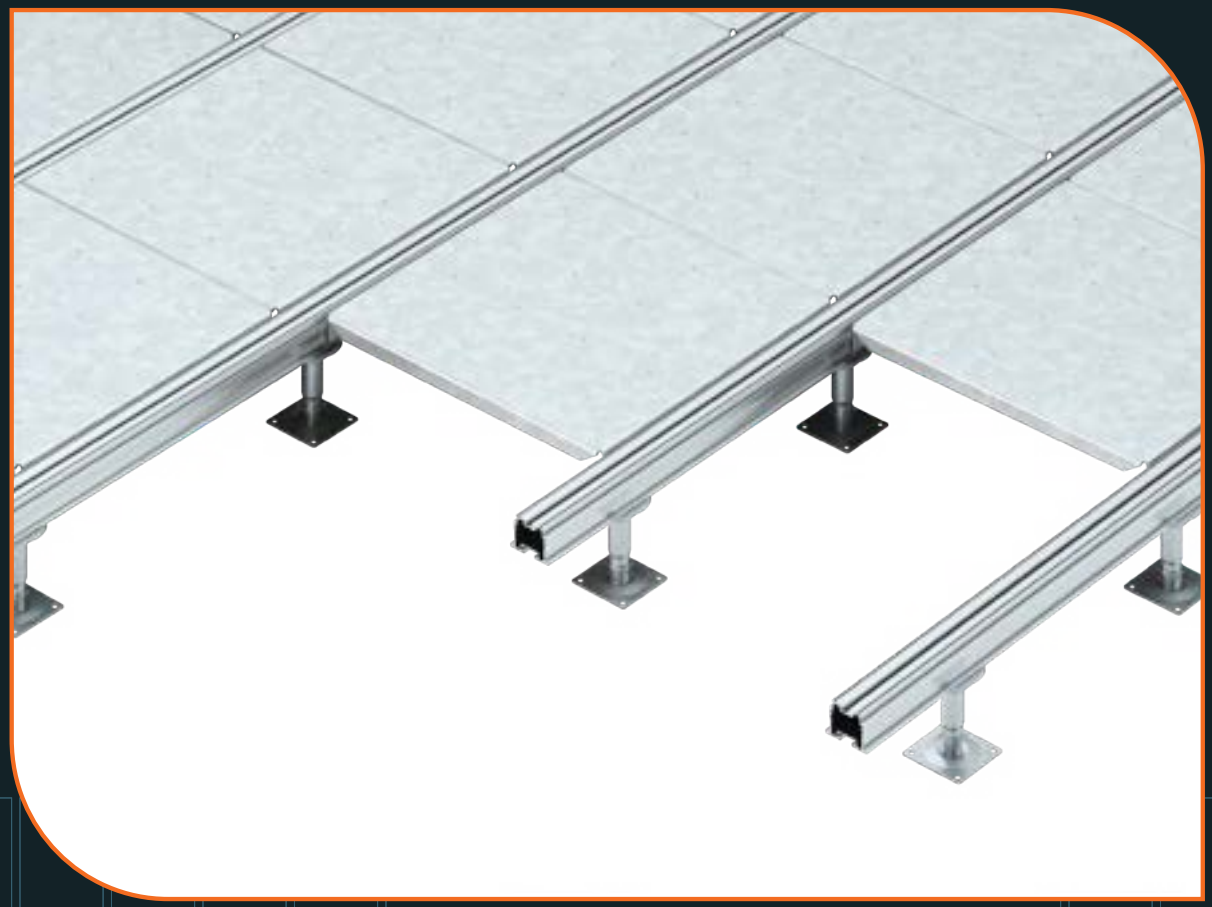
A terrace can easily be transformed into a garden with layers of interest and a feeling of permanence by adding planters.

Step 1

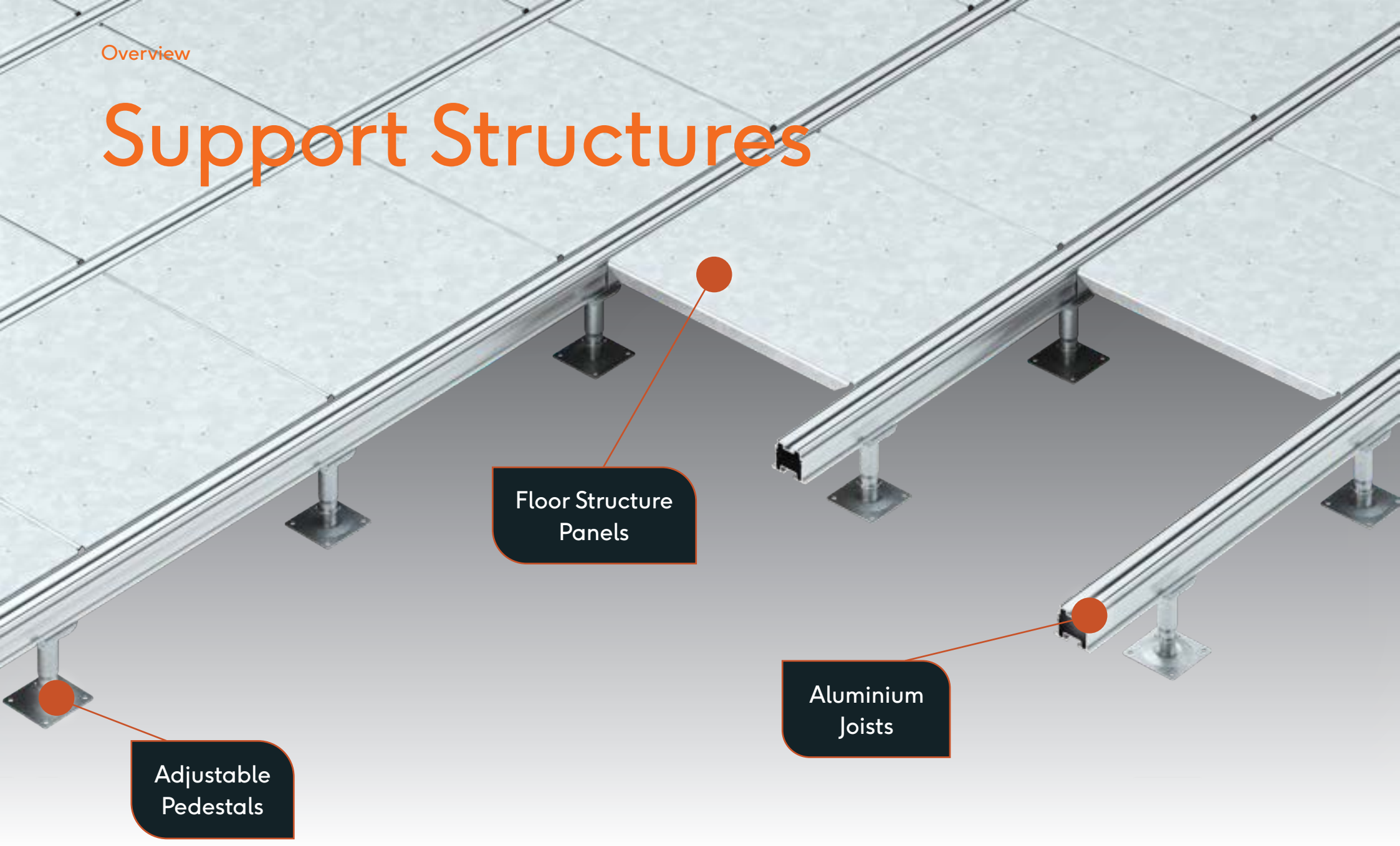
Building a Good Base.

A good quality support structure is key to creating a sturdy, safe terraced area. As roofs are rarely flat or level, our Raaft system is the perfect solution.





Support Structures



Adjustable Pedestals

Our range of height adjustable decking and paving pedestals are easy to use and engineered for high performance. While they have been designed to complement the Terrafina and Atria external flooring systems, they also work with other types of decking and paving. The Adjustable Pedestals are height and slope-adjustable making them suitable for almost any environment.

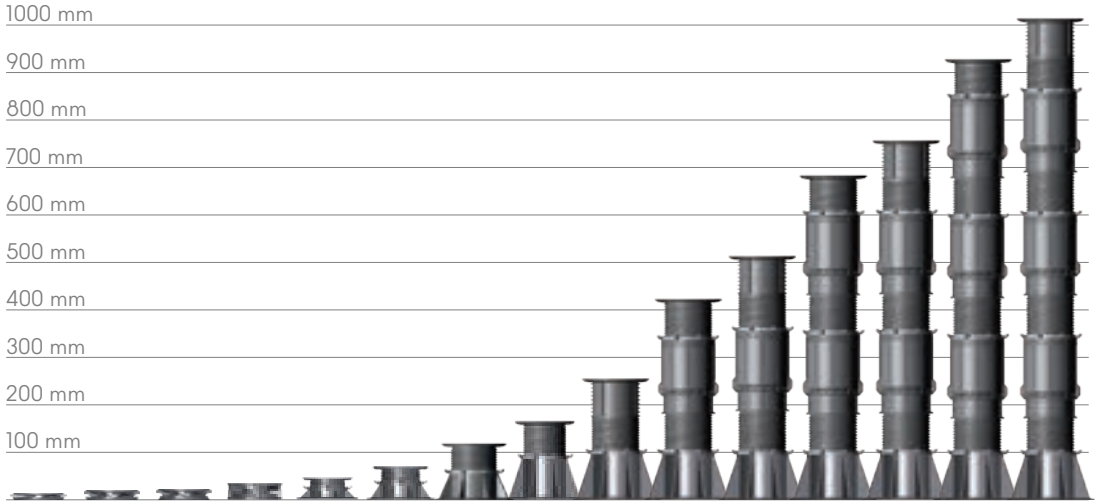
Suitable For

- Use with paving or decking.
- Excellent load bearing capability.

Benefits

- Easy to install, and lightweight.
- Supports Green Building certification.
- Made from recycled plastics.
- Progressive height increments.
- Top and/or bottom slope correctors.
- Easily removed and reused.
- Gradient adjustable.

Plastic Pedestals Height variations



Fire-rated Pedestals

Raaft Fire-rated Adjustable Pedestals are simple to install and will provide the ideal support for the Raaft Fire-rated Terrace System, Class A Fire-Rated modular terrace system. These height-adjustable metal pedestals are designed for supporting Raaft aluminium Joists in the external terrace support structure system. Engineered to support pavers and decking, reducing material, construction, and lifestyle costs.

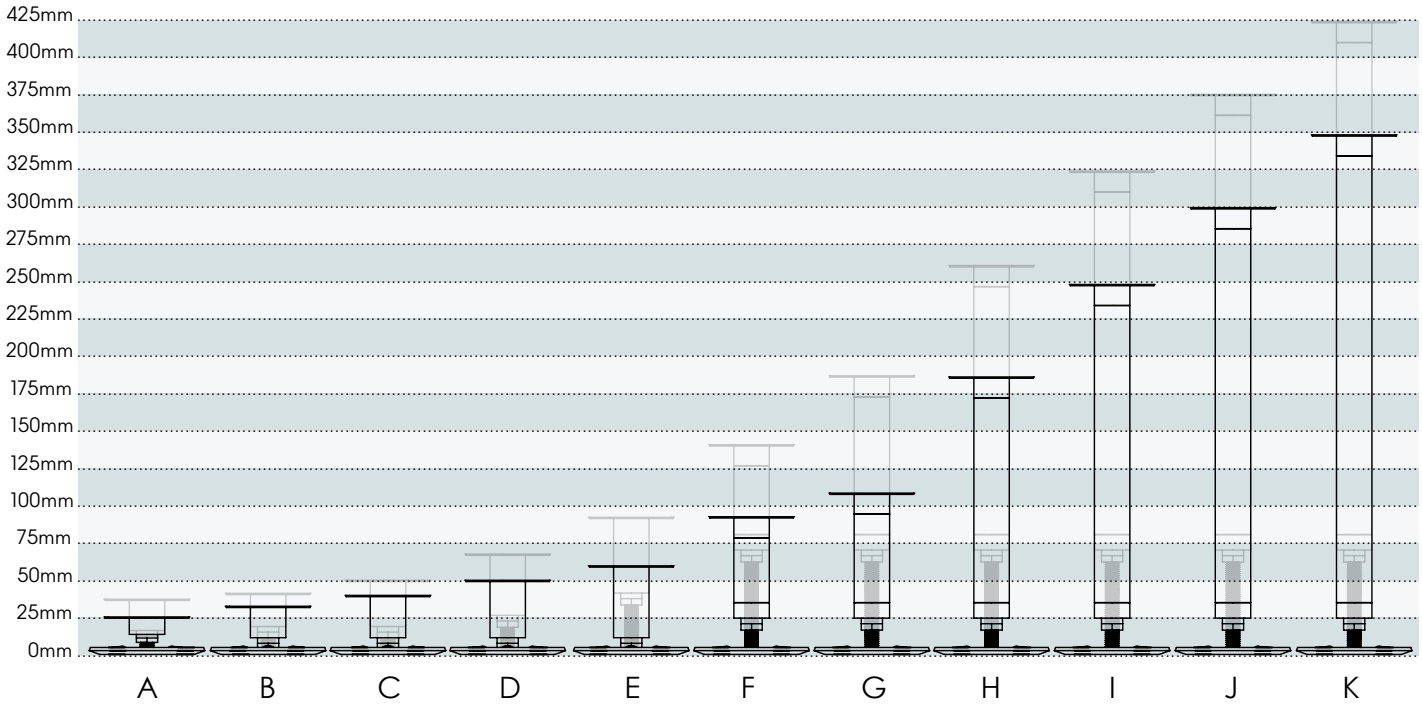
Fire-rated pedestals are made from zinc-coated steel and are available in a range of eight adjustable heights. The flat base diameter ensures an even load distribution. Each pedestal height is easily adjustable to suit the substrate conditions. An integral locking ring provides ultimate stability. The pedestals are non-combustible and corrosion-resistant.

Benefits

- Class A Fire-rated.
- Made from fire and corrosion-resistant zinc-coated steel.
- Easy to install.
- Flat base diameter ensure an even load distribution.
- Available in a range of progressive height increment.
- Easily removed and reuse.

CLASS A
FIRE RATED

Available in a Range of Progressive Height Increments



KEY HEIGHT

A: 26-35 mm
B: 30-40 mm
C: 40-50 mm
D: 50-70 mm
E: 60-90 mm
F: 90-140 mm
G: 110-185 mm
H: 185-260 mm
I: 250-325 mm
J: 300-375 mm
K: 350-425 mm

Suitable For

- Use with the entire Raaft Fire-Rated Terrace System for the ultimate non-combustible fully modular terrace.
- Use with paving or decking.
- Excellent load bearing capability.

We understand that every project is unique and requires flexibility. Therefore, we offer lower pedestal heights to meet your needs.

Speak to one of our specification team members to discuss your requirements.

Joists

Raaft Aluminium Joists are available in three different height profiles to provide a platform for decking, paving, and other surfaces. Our Joists feature an innovative rail design which greatly increases the speed of installation.

These rails reduce the need for pedestals which greatly increases the speed of installation. All joists are available in a cost-effective mill finish.

Suitable For

- Raaft Terrace System.
- Decking Products.
- Natural / Porcelain Tile Products.
- Steel Planter Systems.
- Floor Structure Panels.
- Artificial Grass.

CLASS A
FIRE RATED

30 mm Joist with
adjustable pedestal.

50 mm Joist with
adjustable pedestal.

Benefits

- Simple to install.
- Supports Green Building certification.
- Reduces need for ground levelling or steps.
- Reduces quantity of pedestals.
- Lightweight.

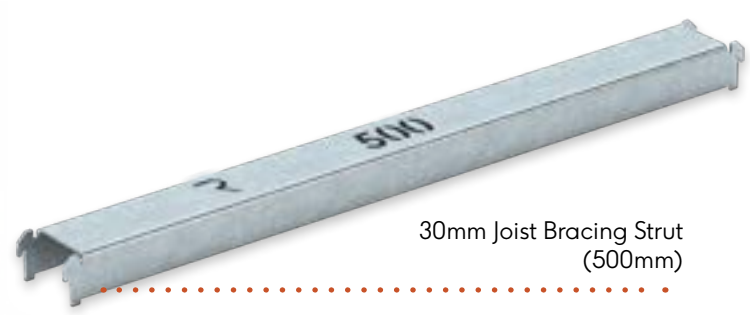
CLASS A
FIRE RATED

Aluminium joists are used ontop of adjustable pedestals to support the equal weight of porcelain tiles or decking, floor structure panels and planter systems. To the right, you can see Floor Structure Panels between the Joists while the internal Planter walls are installed into the support structure prior to filling the Planters with soil.

Above you are able to see the typical structure and placement of the support structure and flooring.

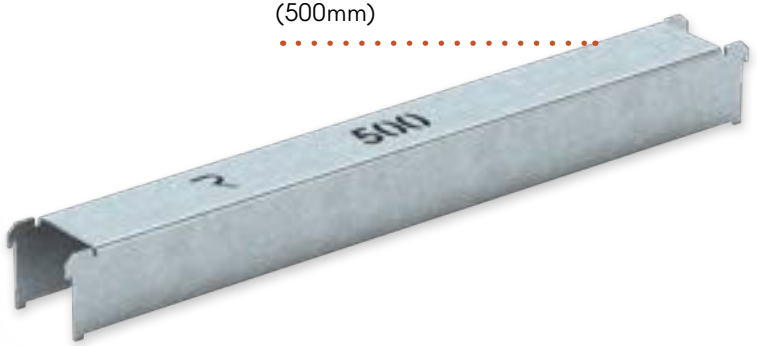
Bracing Struts

Steel bracing strut (also known as Noggin) for aluminium joists.



30mm Joist Bracing Strut
(500mm)

50mm Joist Bracing Strut
(500mm)



CLASS A
FIRE RATED

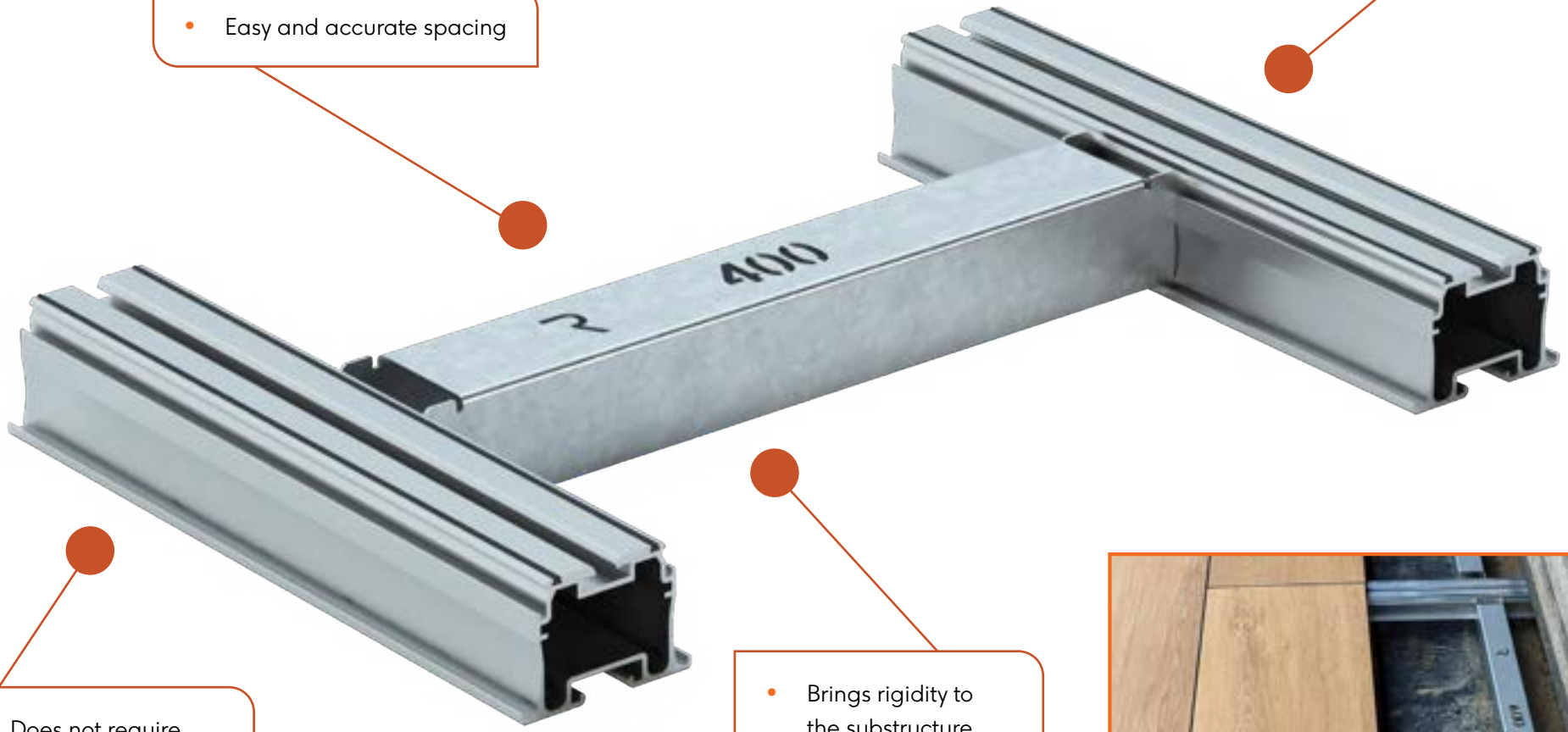
PRODUCT INFORMATION

BRACING STRUT HEIGHT	SIZE (mm)	WEIGHT (KG)	SKU	DIMENSION (L x W x H)	CARBON* (KG/CO_2)	MATERIAL SPECIFICATION
30 mm for Farrino	301	0.22	304021	250 x 40 x 27	0.62	Pre-galvanised Steel
30 mm	400	0.32	304018	350 x 40 x 27	0.97	Pre-galvanised Steel
	500	0.42	304016	450 x 40 x 27	1.27	Pre-galvanised Steel
	600	0.52	304015	550 x 40 x 27	1.52	Pre-galvanised Steel
50 mm for Farrino	301	0.37	304020	250 x 40 47	1.13	Pre-galvanised Steel
50 mm	400	0.51	304013	350 x 40 x 47	1.55	Pre-galvanised Steel
	500	0.66	304011	450 x 40 x 47	2	Pre-galvanised Steel
	600	0.82	304010	550 x 40 x 47	2.48	Pre-galvanised Steel

* **Carbon** - Basing the carbon embodiment (global warming potential) of 0.1-0.33KG equivalent per kilogram of steel, the results are as follows, using the calculation of (kg of steel/0.33).

The benefits to using Bracing Struts are:

- Available for both 30mm & 50mm joists.
- Easy and accurate spacing
- Does not require screws, nuts or bolts.
- Brings rigidity to the substructure.



CLASS A
FIRE RATED

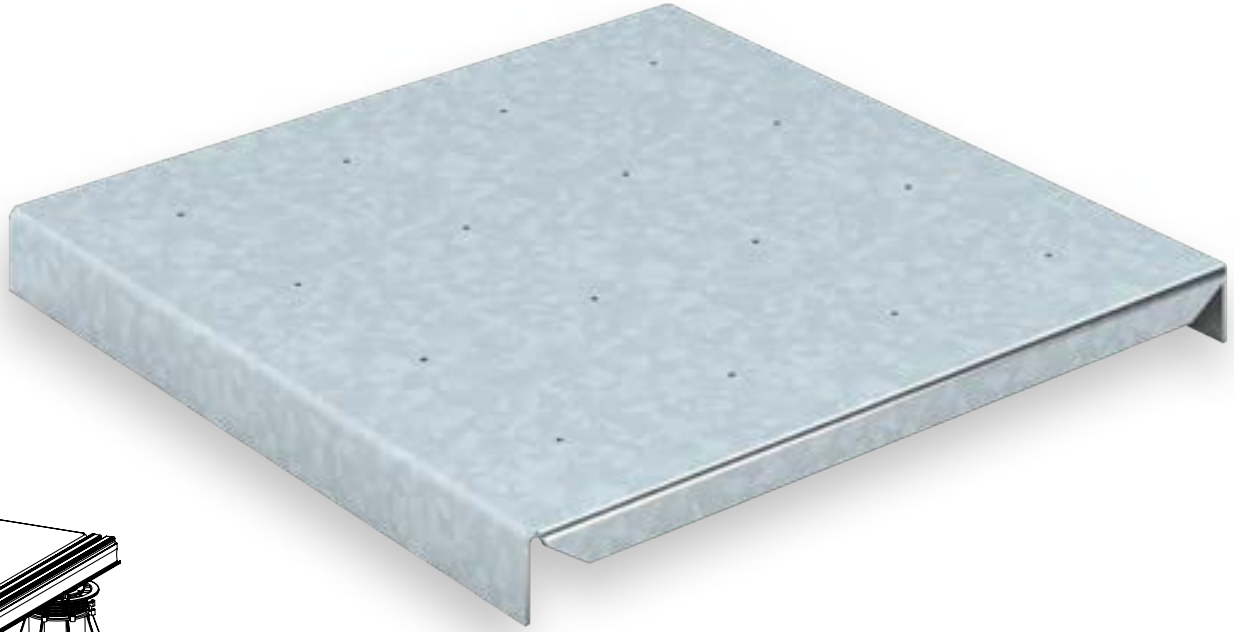
Floor Structure Panels

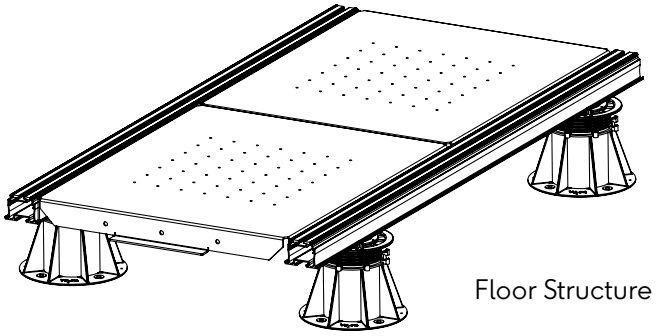
Available in ***28mm** and ****48mm depth profiles**, high-performance surface support tray system that provides a sturdy and permeable platform for laying surfaces and installing planters off the ground, eliminating the need for a solid construction such as concrete.

***to be installed on 30mm Joist**
****to be installed on 50mm Joist**

Suitable For

- Steel Planter Systems.
- Artificial Grass.
- Resin Bound Products.
- Rubber safety surfacing as another finish (i.e. for running tracks etc.).





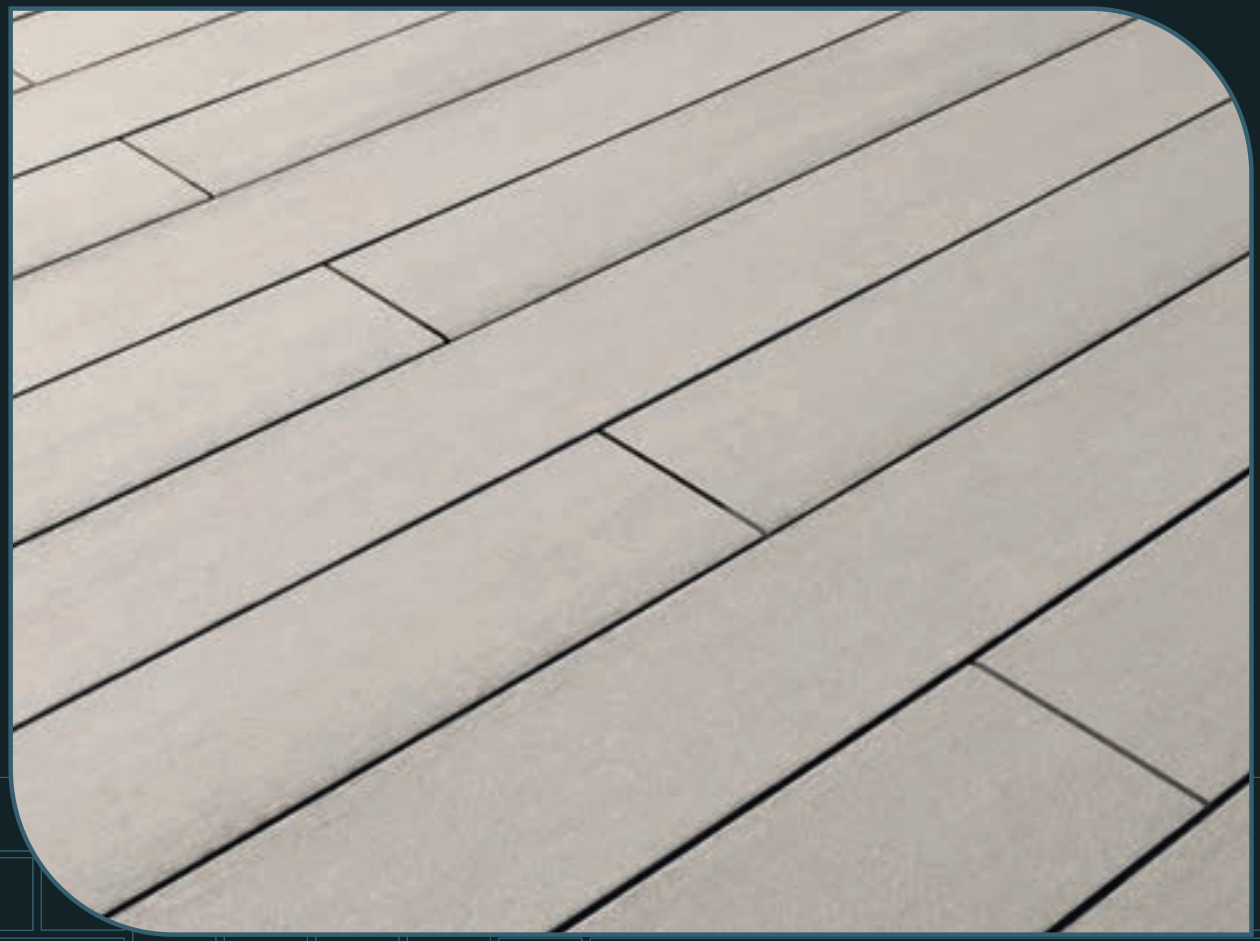
Floor Structure Panel

Manufactured from
3mm Galvanised Steel

CLASS A
FIRE RATED

Step 1

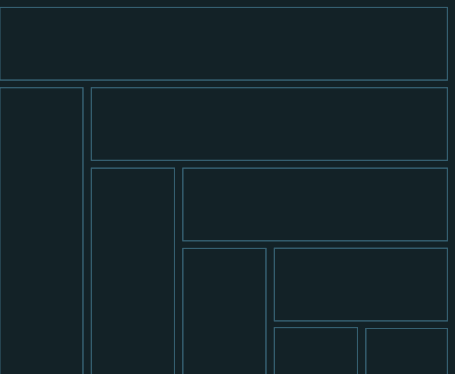
A support structure is installed ontop of a concrete base. Artificial turf is placed onto the Floor Structure Panels which are easily connected to the side of the Joists. A simple installiation requiring minimal bolts and screws.



Step 2

Choosing Your External Flooring.

Our external flooring include Terrafina Composite Decking, Atria Porcelain Tiles, and Farrino Porcelain Decking and are available in many styles, colours, effects and finishes.



Atria Porcelain Tiles

High performance, practical, and functional porcelain stoneware - concentrated in a tile that's just 20mm thick.

Atria 20mm porcelain tiles are the perfect match on terrace and balcony projects thanks to the characteristics of the material and their thickness. Hard-wearing, frost-proof, and non-slip, the 20mm porcelain slabs are easy to fit and clean, do not change their appearance, whatever the weather, and are resistant to mildew, moss, and verdigris treatments.

- Anti-slip. For outdoor and wet environments.
- Easy to clean and proof. Resistant to salt, moulds, acids, alkalis.
- Resistant to stresses and abrasion. 500 kg/cm² of mechanical pressing and firing at 1250°C.
- Fast and easy to install.
- Suitable for raised accessed floors.
- Resistant to frost and sudden thermal changes.
- Unchanged by UV light and weather agents.

CLASS A
FIRE RATED

Atria Porcelain Tiles

Technical Specification

KEY

JOIST

ATRIA TILE

Tile Size Range:

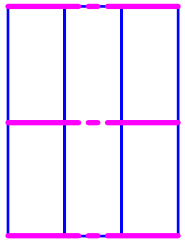
600mm x 1200mm

300mm x 1200mm

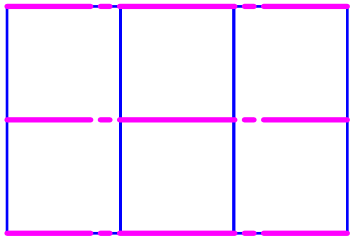
600mm x 600mm

Atria Tile Range Positioning:

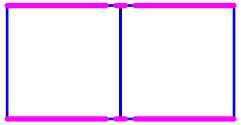
300 x 1200 x 20

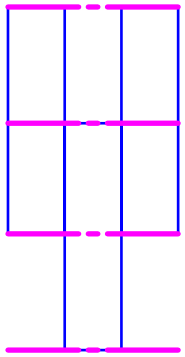


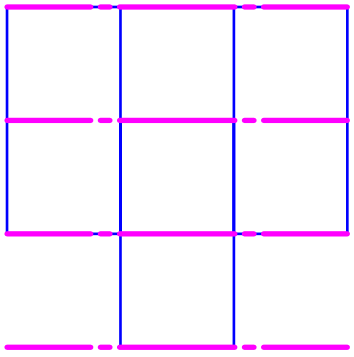
600 x 1200 x 20

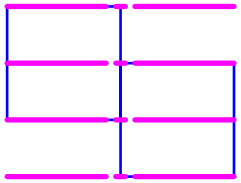


600 x 600 x 20







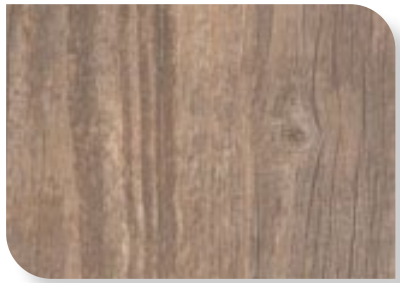


Surfaces

Stone
Roma - Copper

Stone
Roma - Natural

Stone
Roma - Lead



Wood
Milano - Age Walnut

Stone
Asti - Carbon

Stone
Asti - Taupe

Stone
Asti - Talc

Wood
Milano - Box

Wood
Como - Honey

Wood
Como - Brown

Concrete
Venice - Grey

Wood
Milano - Umber

PLEASE NOTE:

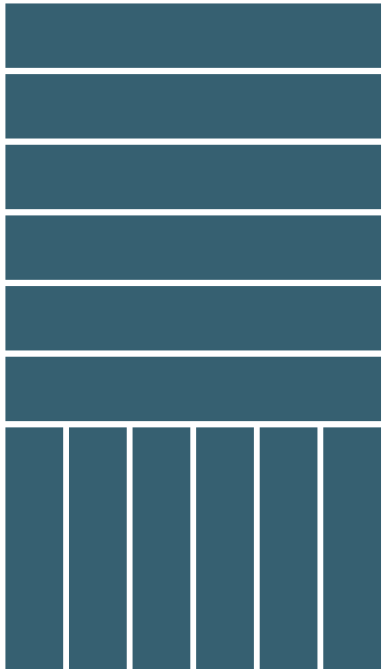
Tile collections are subject to change at short notice. Please call us before specifying or looking to purchase products. Visit raaft.co for our full range.

Solve Wind Uplift Challenges with Atria Porcelain Tiles

What is wind uplift?

When air currents pass over a flat surface they create pockets of low air pressure, and because the air pressure underneath the surface is higher, the surface is pushed upwards towards the lower pressure area. This is the principle behind aircraft wings.

On a roof deck, where the deck surface is loose-laid into a supporting frame, this can result in the surface lifting from the frame and becoming unstable or damaged. In more extreme conditions, the surface components can cause damage to surrounding structures and even injury to persons.



How Raaft are improving wind uplift resistance

Uplift resistant porcelain tiles

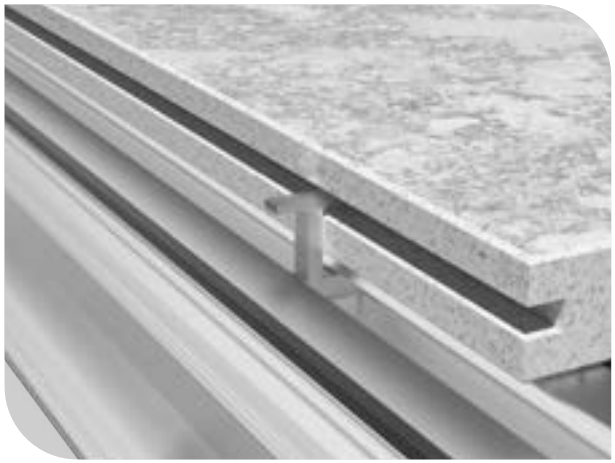
Our porcelain tile products are all characterised by design flair and premium quality porcelain manufacturing. Porcelain is a highly durable anti-slip surface resistant to scratching, staining and frost damage.

Atria + wind-uplift tiles is an innovation based on our popular Atria Porcelain Tiles, available in a fine selection of highly authentic wood, stone, concrete, and terrazzo effect finishes and a range of sizes to create uniform or random patterns.

Anti-uplift clips

Atria tiles feature a groove in the edge of the porcelain. Used in combination with our Raaft Terrace System, our design-protected stainless steel or Nylon 12 RP anti-uplift clips fit unobtrusively into this groove and will prevent uplift at typical UK wind speeds.

Atria Wind Uplift Clip



Products that claim to be resistant to wind uplift must meet **BS EN 1991-1-4: 2005 + + A1:2010 Eurocode 1 regulations,** so we put our tiles and clips to the test.

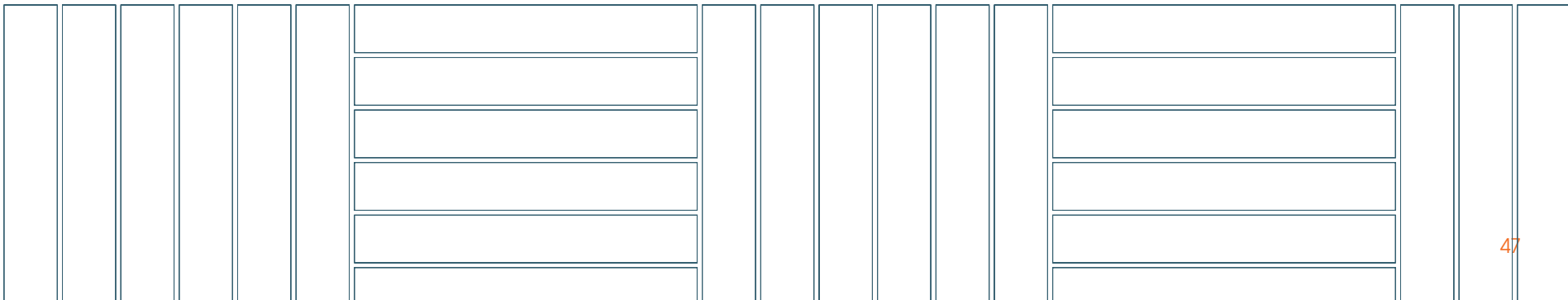
Following the **principles** of **BS 14437:2004,** the tests were conducted by independent testers BRE Group on both types of clip, fixing 600 x 600 mm, 20 mm thick Atria + Porcelain Tiles, with two clips per tile attaching them to the Raaft Aluminium Joists. Tests were also carried out on the Pedestal Joist Connectors. Testing applied an **uplift pressure** of **4536N/m2** and as the products were tested to destruction, no partial safety factors were used.

The results were as follows:

- Using **stainless steel clips,** the characteristic wind uplift resistance per clip was **738.1N**.
- Using **nylon clips,** the characteristic wind uplift resistance per clip was **51.6N**.
- By also fixing the tile with **Formoa 017FE hybrid polymer adhesive** the indicative wind uplift resistance per clip was **2943N**.
- The pedestal joist connector returned a wind uplift resistance of **71.0N**.

For more info on these test results please contact technical@raaft.co

N.B. It is the responsibility of the client, architect or contractor to obtain a wind load assessment if intending to use any surfaces that are not fastened together or to the support structure



Terrafina Composite Decking

Hugely popular with developers and architects alike, this solid composite decking delivers a high-quality, low maintenance finish with an elegant, contemporary style that opens up the opportunities for imagining public and private sector spaces.

Terrafina offers stylish contemporary composite decking with easy installation and low maintenance. Raaft Terrafina decking range offers wood-polymer, non-slip composite systems for terraces of all sizes. Hugely popular with developers and landscape architects, the decking delivers a high-quality finish and elegant style that opens up the opportunities for public and private spaces.

Our low maintenance decking boards only use timber from certified sustainable sources and are 100% recyclable.

Benefits

- Non-slip surface when wet or dry.
- Low maintenance.
- Stable and durable material.
- Excellent colour fastness and resistance to abrasion.
- Crack and splinter-free.
- High resistance to weathering and temperature.
- High resistance to wood destructive fungi and insect attack.
- Simple and easy to clean.

How it works

Terrafina products are easy to install and use Raaft's 'click and clamp' system which halves the installation time compared to hardwood decking. They are also simple to clean and require little or no maintenance. That means a smooth development process and happy client.

Extensive research and refinement of Raaft's external flooring products has resulted in stable and durable composite decking which is non-slip, crack and splinter-free and resistant to weathering and temperature.

Terrafina Composite Decking

Technical Specification

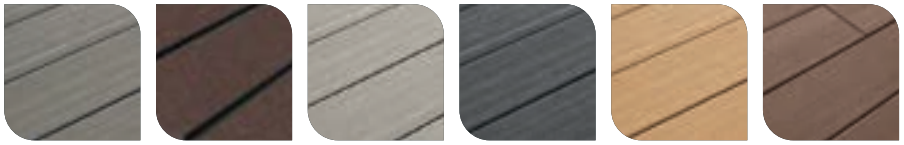
Plain and Yacht Decking

Board width: **146mm + 4mm joint**
Height: **21 mm**
Weight: **3.8 kg/lm**
Length: **4, 5, & 6 m**

Max span between supports: **500mm**
Max loading between board: **2720 Newtons**

N.B. Using our 500mm Bracing Strut will make installation quick and simple!

Plain Finish



Length	Finish	Grey Brown	Red Brown	Pebble Grey	Graphite	Sand	Coffee Brown
4.0 m	Plain	501015	501018	501017	501016	501019	501014
5.0 m	Plain	501027	501030	501029	501028	501031	501026
6.0 m	Plain	501038	501041	501040	501039	501042	501043

Yacht Finish

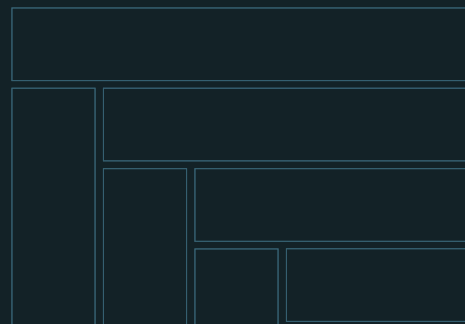
Length	Finish	Grey Brown	Red Brown	Pebble Grey
4.0 m	Yacht	501111	501113	501112
5.0 m	Yacht	501116	501118	501117
6.0 m	Yacht	501121	501123	501122

135 Bishopsgate, London.

Step 3

Adding Dimension Using Planters and Bench Seating.

A terrace can easily be transformed into a garden with layers of interest and a feeling of permanence by adding planters.



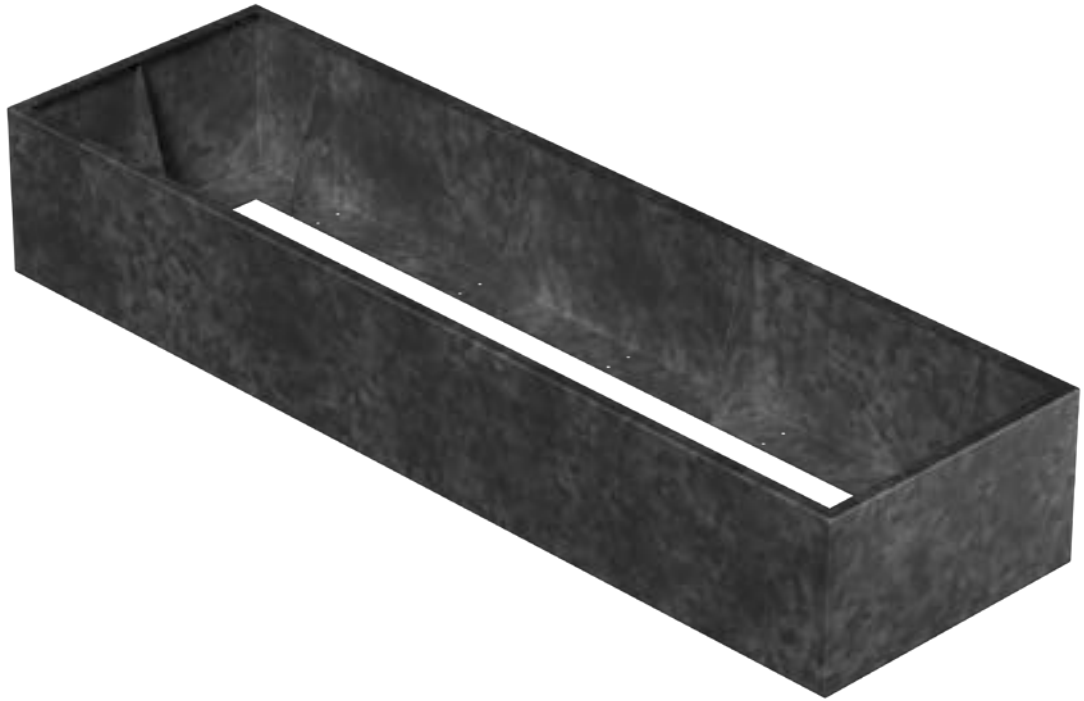
Planterline Straight Planters

Planterline Planters are premium quality steel planter panels available in straight and curved standard sizes suited to a wide range of designs, available in CorTen, PPC Green Steel, Galvanised T-Wash, and Powder-coated to any RAL colour. The panel systems are pre-formed to straight standard sizes required for your project and are easy to handle and install on site. The panels have a unique folded design that ensures a strong retaining structure, but also keeps weight to a minimum making this an ideal choice for roof terrace applications.

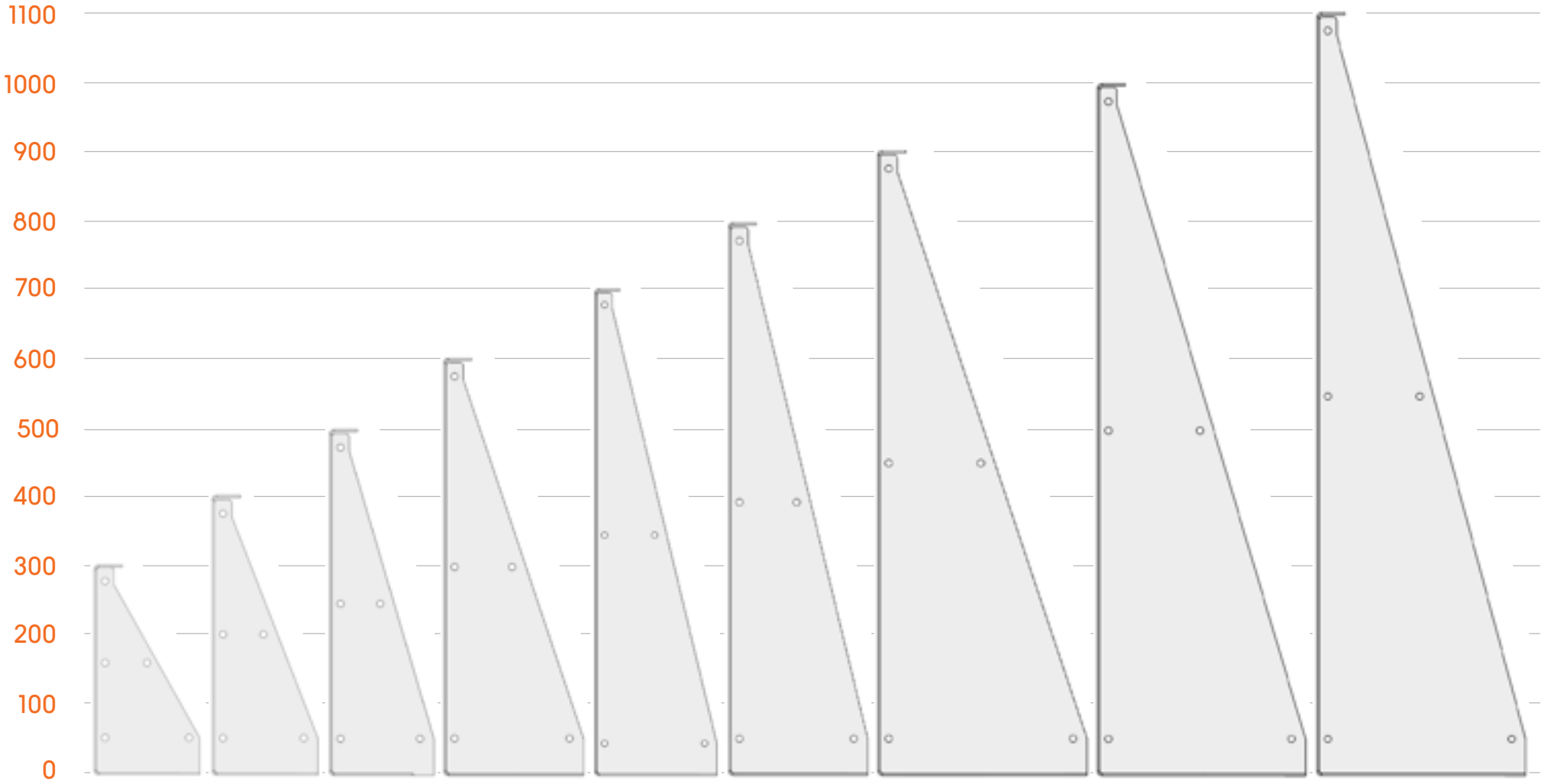
Raaft Timber Benches can easily be incorporated into Planterline Planter systems which add highly desirable relaxation areas. Can be used on the system, or directly on the roof, to increase soil volume.

Benefits

- Strong and robust.
- Folded top-edge.
- Standard design.
- Available in Corten steel, PPC Green Steel, Galvanised T-wash, and Powder-coated.
- Quick lead times.
- Faster install.

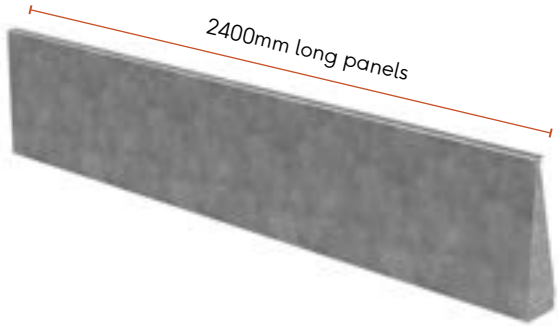


Planterline Straight and Curved height range

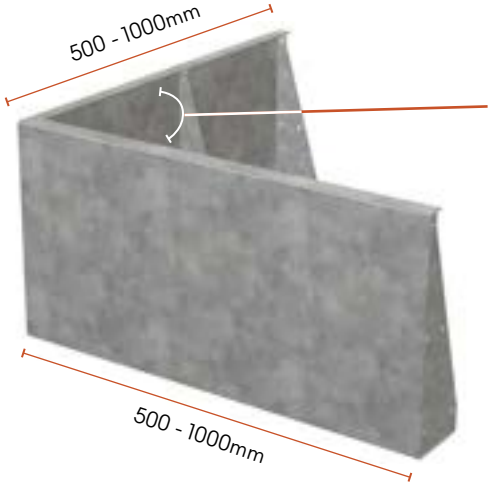


Planterline Panels

Straight



Corner



Angle range:
Minimum angle: 35°
Max angle: 175°

Curved

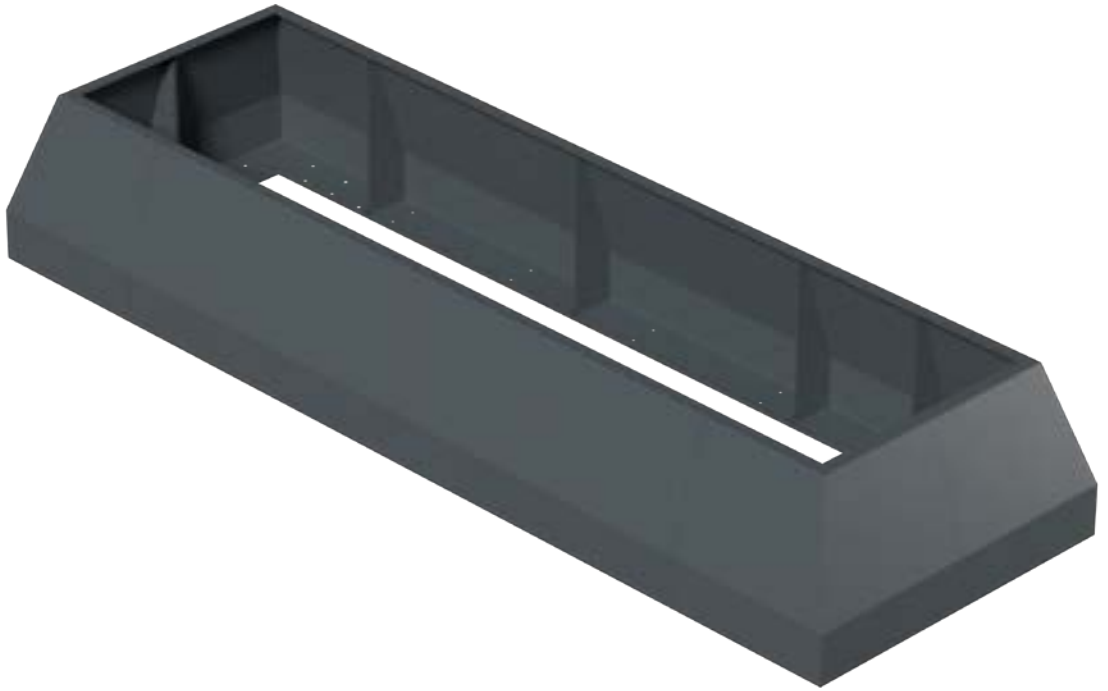
Minimum curve angle:
Radii = 750

Mix of Planterline Straight and Curve

Design - Create - Inspire

Planterline Prism Planters

Planterline Prisms are premium quality steel planter panels available in a wide range of designs, available in CorTen, PPC Green Steel, Galvanised T-Wash, and Powder-coated to any RAL colour. The panel systems are pre-formed to standard sizes required for your project and are easy to handle and install on site. The panels have a unique folded design that ensures a strong retaining structure, but also keeps weight to a minimum making this an ideal choice for roof terrace applications.

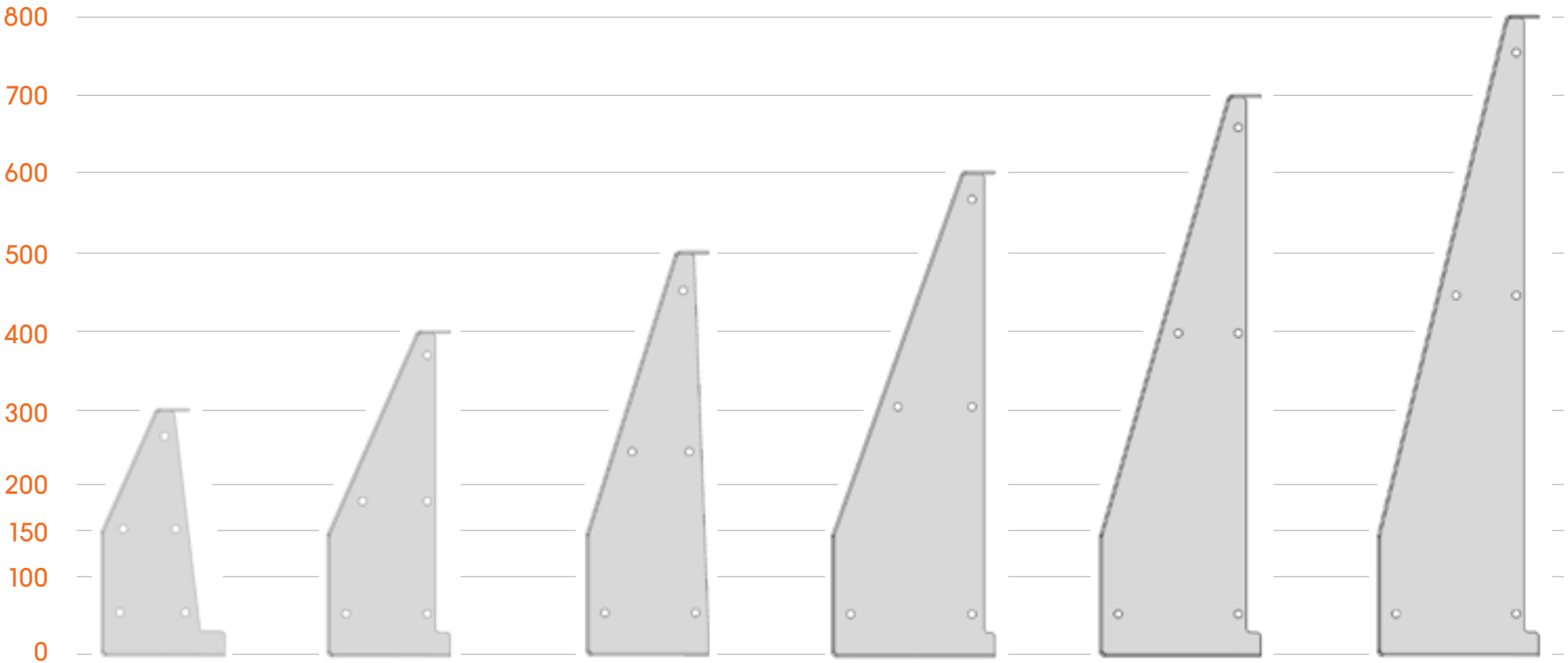


Benefits

- Strong and robust.
- Folded top-edge.
- Standard design.
- Available in Corten steel, PPC Green Steel, Galvanised T-wash, and Powder-coated.

Planterline Prism height range

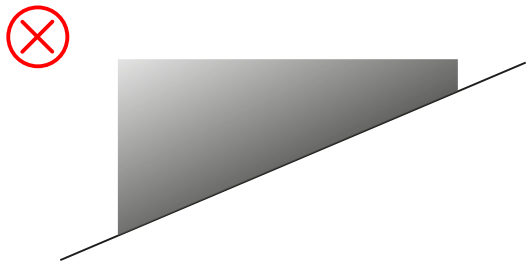
Planterline ranges from 300mm to 1100mm and goes up in 100mm increments.



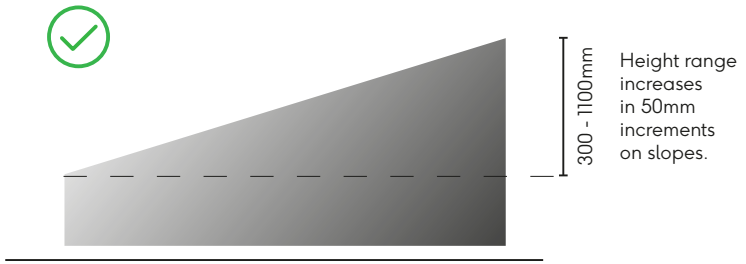
Planterline on Slopes

There are certain limitations with steel planter panels. Get in touch with our team to find out more.

Sloped bottom edge

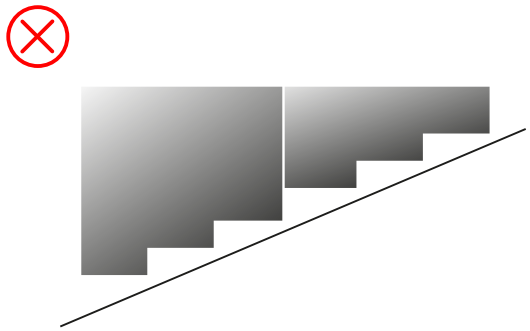


We're unable to do planterline panels with a sloped bottom edge.

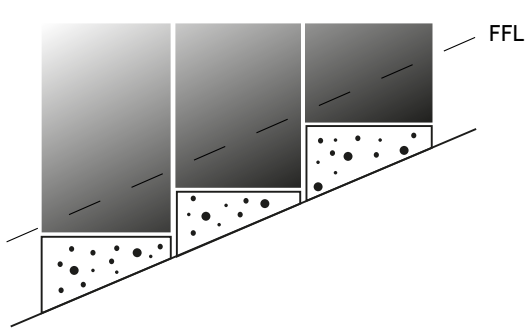


We can create planter panels with a sloped top edge.
The shortest and highest height need to be in increments of 50mm.

Stepped concrete foundation



We're unable to do planterline panels with stepped bottom edge.



We can create level planters on a slope by stepping the concrete foundation and then changing the height of each planter panel to suit.

Benches

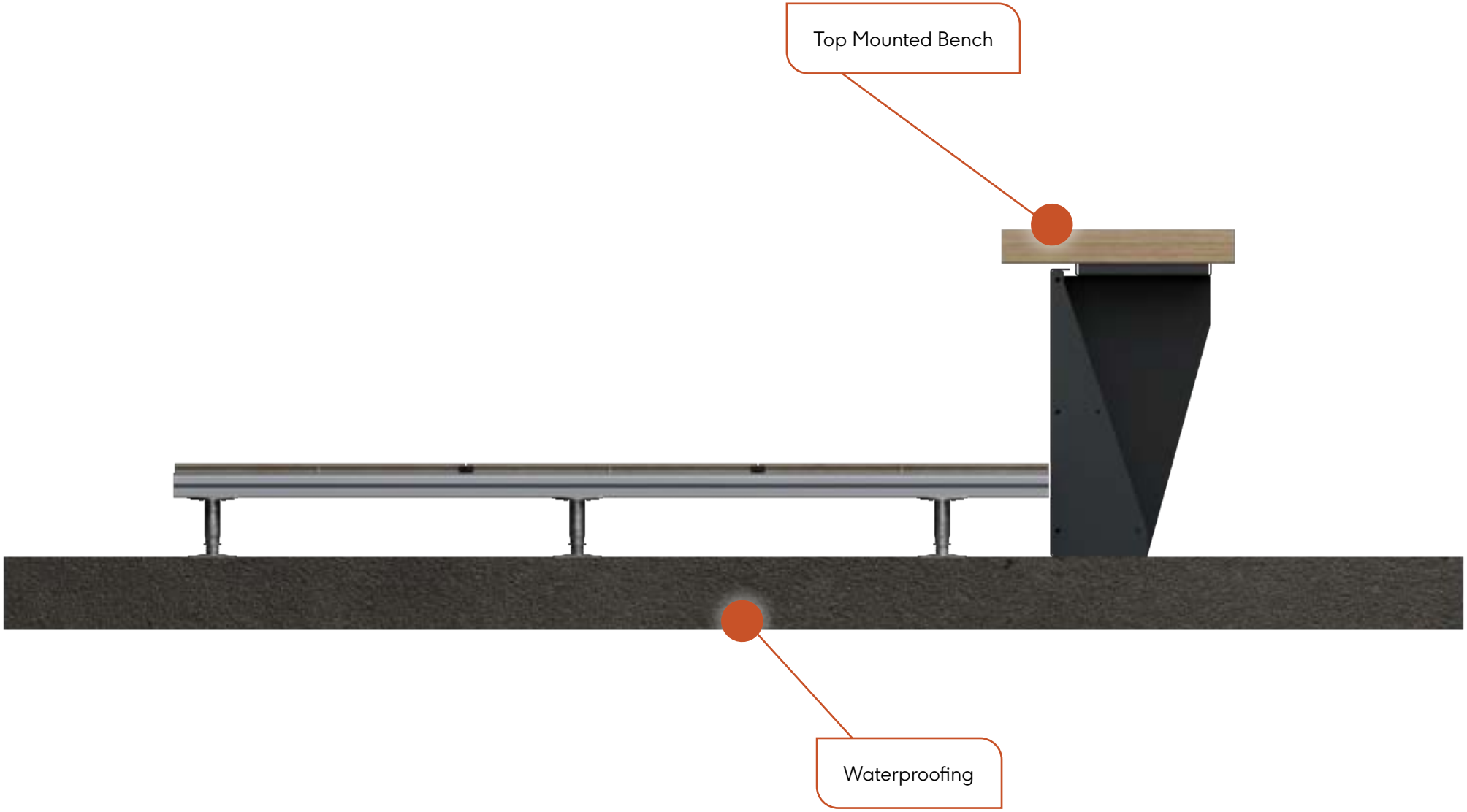
Our benches have been created to compliment the Planterline Planter Systems. Designs include Top Mounted and Cantilever versions completed with hardwood of either Iroko or European Oak to achieve a fantastic end result in any environment, requring minimal if no maintenance at all.

	Iroko	European Oak
Country of Origin	Africa	France, Germany Croatia, Poland and many more countries
Hard or soft wood	Tropical hardwood	Hardwood
Maintenance	Relatively maintenance free but will need attention to cracks and splitting	Relatively maintenance free but will need attention to cracks and splitting
Treatment	No treatment is advised to reduce maintenance	No treatment is advised to reduce maintenance
Product quality	Premium	Premium

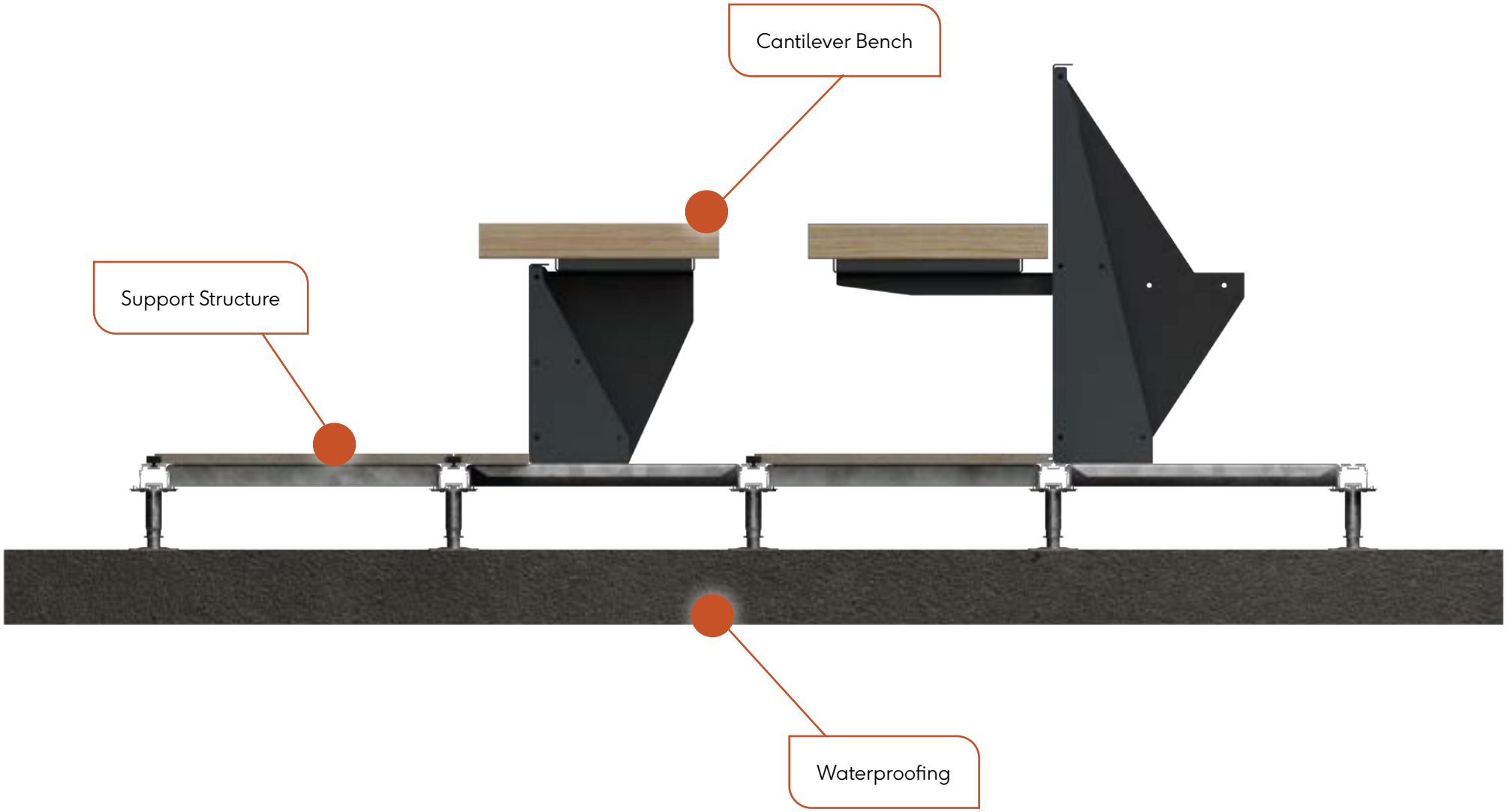
Cantilever

Top Mounted

Benches on Waterproofing



Benches on Support Structure



Planter Finishes

We offer the following finishes with our planter systems: Corten, PPC Green Steel, Powder coated, and Galvanised T-wash.

Corten steel is a mixture of steel and alloys that varies according to the grade of corten steel. Before exposure to the elements its dull, dark grey surface might suggest the wrong product has been supplied, but over time it will develop a patina that is unique to each piece. Humidity, warmth, and airborne pollutants all contribute to this natural palette, while oxidation will be faster in more exposed locations and if water remains on the surface rather than draining away. Corten is capable of withstanding greater forces before buckling or breaking.

The naturally-occurring protective oxidised layer protects corten against corrosion in most environments. Corten requires no painting or ongoing surface treatment. If the oxidised layer is scratched and exposes new steel, this will rapidly oxidise and blend in with the rest of the surface. It blends effortlessly with other natural materials such as wood and stone and provides a striking contrast to the lush greenness of foliage.

Benefits

- Corrosion resistant and low maintenance.
- Aesthetically pleasing.
- Can be Powder-coated in any RAL colour to fit into any landscape design.

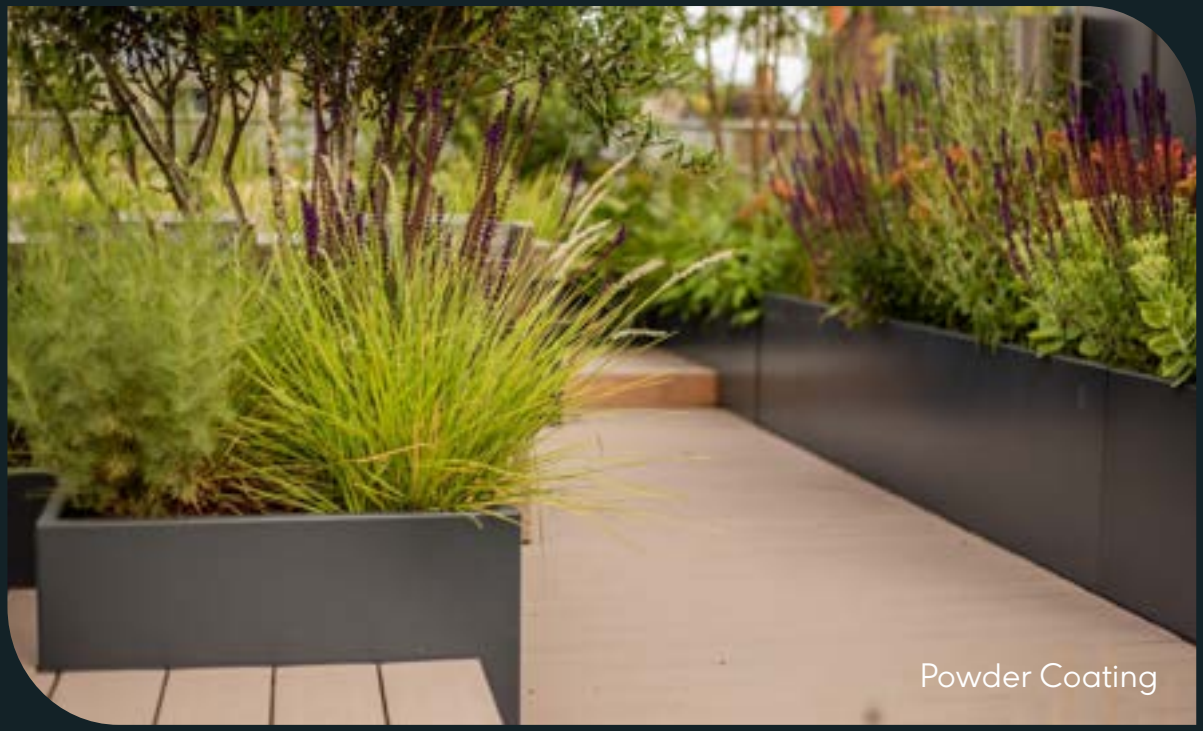
PPC Green Steel or 'sustainable steel' is a decarbonised alternative to regular steel that could pave the way for future production of the material and could be the answer to reducing global pollution from fossil fuels. This method involves replacing fossil fuels with green hydrogen. Green steel has the least amount of emissions and is produced with the lowest carbon footprint currently possible.

The process of manufacturing green steel eradicates the need to use fossil fuels, thus reducing the release of harmful gasses into the atmosphere. Making it a more sustainable and environmentally friendly option for the future of steel.

Corten

Galvanised steel are manufactured and treated with T-wash.

T-Wash is an etching wash for new bright unweathered, untreated galvanised surfaces. It creates a chemical reaction and causes the surface to turn black, which confirms that the surface has been degreased and etched. Treated surfaces are then ready for priming.



Powder Coating

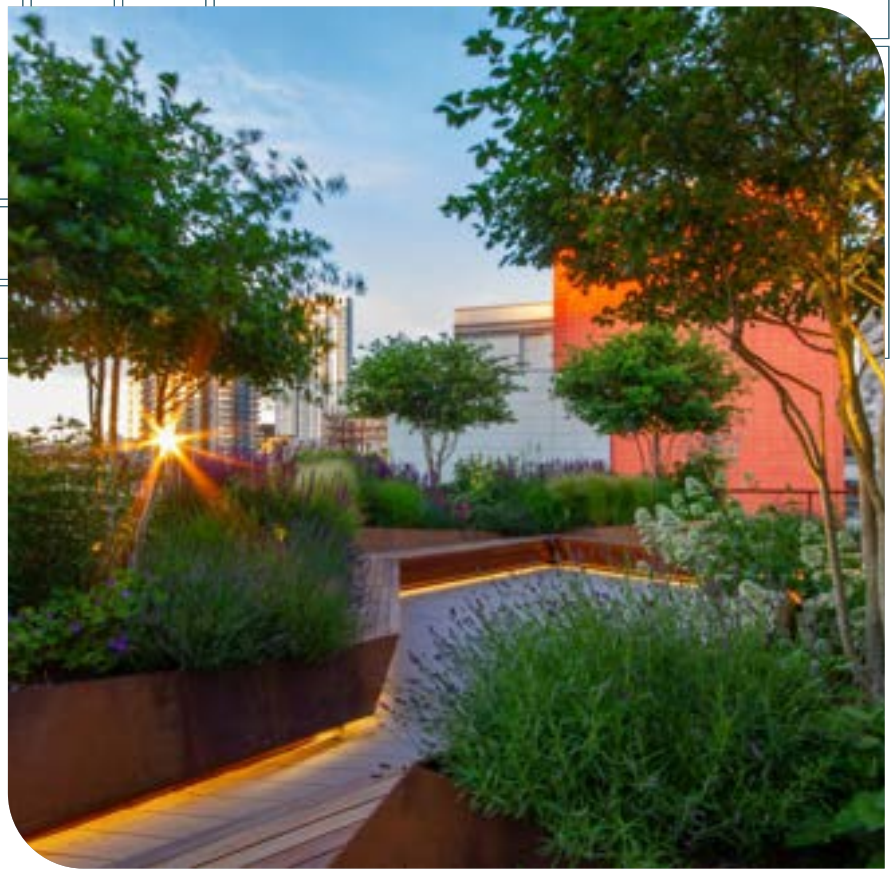
Powder coating has largely replaced liquid paints for protective and decorative metal finishing as it is stronger, more resistant to scratching and weathering, provides better protection against corrosion and requires less maintenance.

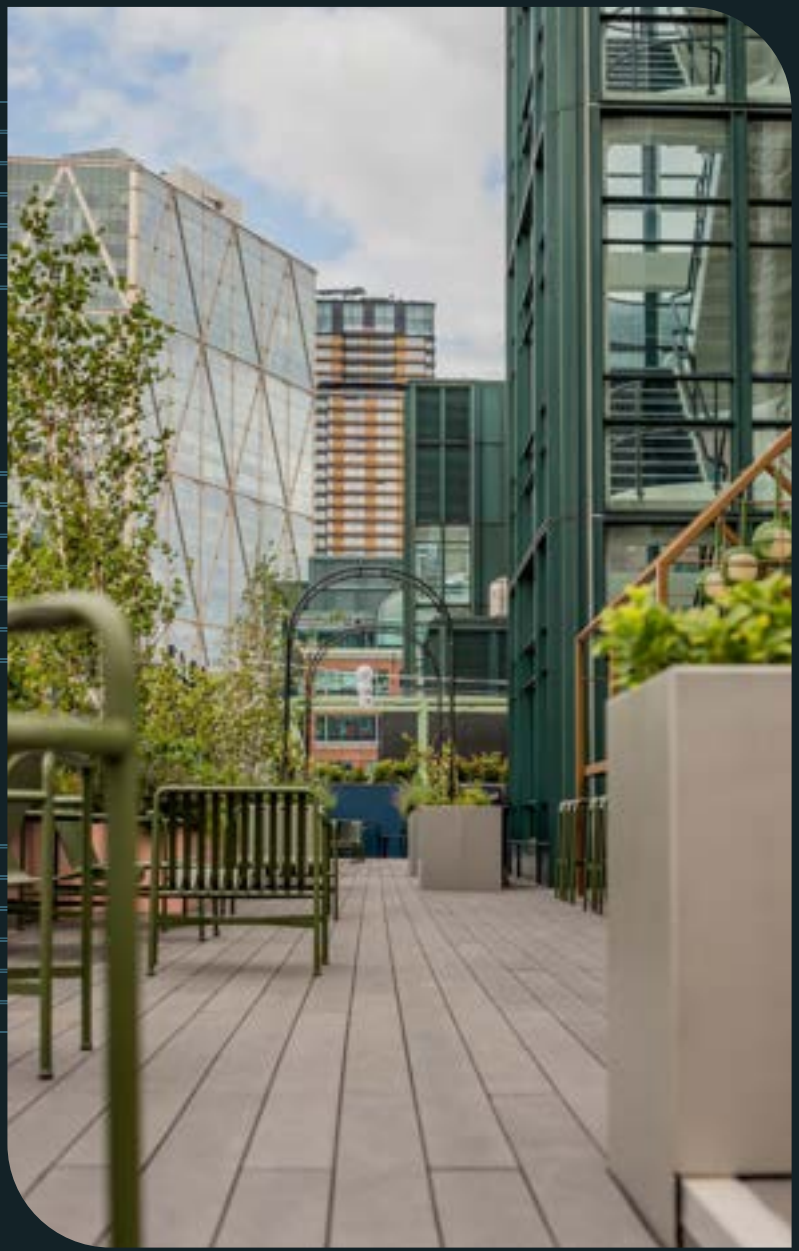
Powder coating is also a more environmentally friendly alternative. It is almost totally VOC-free and as it is a powder rather than a liquid no harmful vapours are released into the atmosphere. Powder overspray during the application process is collected and reused, reducing waste and carbon footprint.

Fully Bespoke Options

Fully bespoke options are also available as part of our extended range. These include a broader range of shapes and sizes to make your space even more personal. Light details can be used that are ideal for mood lighting on your terrace or lighting up the planters from the inside edge. These include: spotlights, wash lighting, recessed lighting and top-edge planter lighting.

Reach out to one of our team for a consultation on what is possible on your terrace





135 Bishopsgate

Given the exposed position of some terrace areas, wind uplift was regarded as a potential challenge. To overcome this, tie-down clips were used to secure the decking to the Raaft support structure which incorporated extruded aluminium joists and adjustable pedestals to ensure stable, level walkways and seating areas.

Soft landscaping was contained in planters, custom powder coated in a variety of shades including RAL 7021, RAL 7048 & BS04 E50 - PINK to complement those of the building. Raaft Floor Structure Support Panels were incorporated within the terrace system to provide a sturdy, permeable platform for the planters without penetrating the roof slab's waterproofing layer.

Location

Broadsgate, London C2M 3YD

Client

British Land

Architect

Fletcher Priest Architects

Landscape Architect

Gensler / VOGT

Main Contractor

Sir Robert McAlpine / BW Interiors

Product Installer

Blu-3 / Valley Provincial

Tailors Corner

The greatest challenge we faced on this project was the extremely short time frame, as all heavy lifting to the roof area had to be completed before a crane was removed from the site.

The client also originally specified powder-coated planters then changed to Corten finish. Our operations team proved their agility by ensuring all components were manufactured and shipped to site on schedule.

Location

Leeds, LS1 4JF

Client

Boultbee Brooks Real Estate

Architect

GPAD London

Landscape Architect

John Davies Landscape Architecture

Main Contractor

Simpson (York) Ltd

Product Installer

Palmer Landscapes

Vega, Miles Street

Designing the terrace from the ground up, the Raaft support structure system was used to create a level, load-bearing base for the heavy planters and porcelain tile surfacing.

To create additional visual interest, the architects also harmonised three colours from the Atria Roma range of porcelain tiles - Copper, Lead and Natural – for the walkways and seating areas.

Sourcing all hard landscaping from one manufacturer ensured full compatibility between the various products and meant the designers, client and installers all liaised with a single team from design to completion.

Location

Miles Street, Lambeth, London, UK

Client & Main Contractor

Downing

Architect

TP Bennett

Landscape Architect

Optimised Environments

Product Installer

Plan Construction Solutions

Bloom Clerkenwell

Bloom Clerkenwell is a new tech-enhanced, managed office space located above the new Farringdon Crossrail station, with over 15,000 square feet of landscaped roof terraces.

The Raaft fire-resistant aluminium joist structure used to support the terrace is both recyclable and manufactured from low-carbon materials with an A-rated Environmental Performance Certificate (EPC).

Raaft bespoke steel planters are also made from renewable, recyclable materials. Atria porcelain tiles are manufactured sustainably from natural, renewable materials and energy-efficient processes

Location

Bloom Clerkenwell, London, EC1M

Developer

HB Reavis

Architect

John Robertson Architects

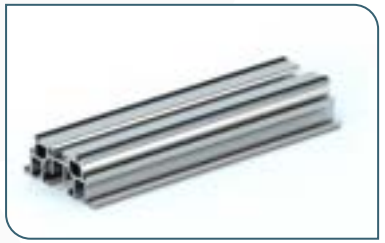
Product Installer

Valley Provincial

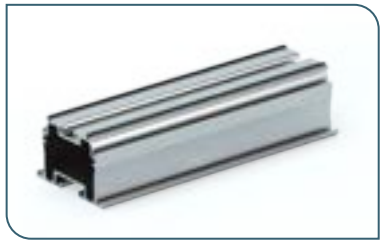
245 Hammersmith Road, London.

Aluminium Joists

Rigid aluminium extruded joist rails for use as a support structure system to decking and paving.
Raaft joists are designed to be used on roof terraces, balconies and other external podium construction areas.



30mm height joist



50mm height joist

PRODUCT INFORMATION

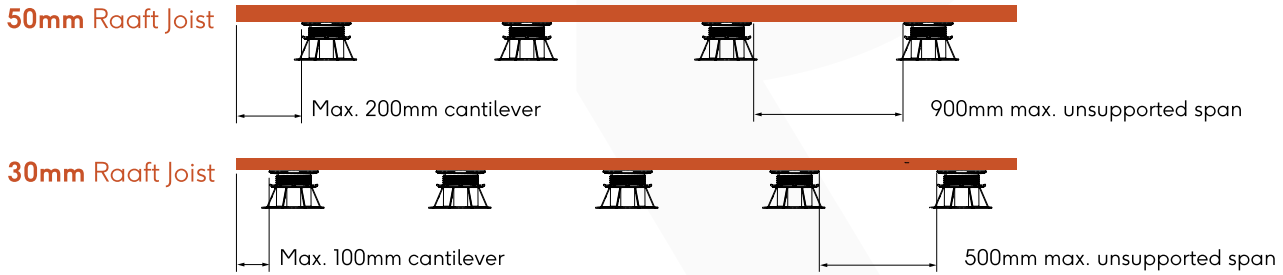
DIMENSIONS			MAX SPAN *	WEIGHT/ LENGTH	MAX CANTILEVER	MAX LOADING **	MATERIAL	FINISH	SKU
H	W	L							
30mm	60mm	2.4m	500mm	3.87kg	100mm	250kg	6063 T6 aluminium	Mill	301015
50mm	60mm	2.4m	900mm	4.26kg	200mm	250kg	6063 T6 aluminium	Mill	301012

* Between supports, see overleaf
** Point load based on Finite Element Analysis (FEA) with a x 1.5 factor of safety

30 & 50MM JOIST WEIGHT LOADINGS

JOIST HEIGHT	CENTRES	JOIST LOAD (kN)	SAFE WORKING LOAD (kN)
30 mm	400	2.812	2
	600	1.054	0.8
	900	0.624	0.4
50 mm	400	5.362	4.5
	600	2.264	1.8
	900	1.77	1.2

MAXIMUM UNSUPPORTED SPANS



CUTTING AND PPE

Raaft aluminium joists can be simply cut on site using an angle grinder or chop saw with the appropriate disc or blade. We recommend that PPE (Personal Protective Equipment) is used when cutting and installing joists:

a) cut-resistant safety boots/shoes with toe protection
b) protective eyewear
c) strong gloves to protect the hands.
d) if using loud cutting equipment then ear plugs or defenders should be worn.

FIRE RESISTANCE

Joists are manufactured from extruded aluminium alloy 6063A T6 which is a non-combustible material deemed to be Class A in accordance with the European Commission decision of 4 October 1996 (Document: 96/603/EC). Approved Document B (Building Regulations relating to Fire Safety) states under Regulation 7(2) that the requirements on external walls and roof tops of buildings does not include seals, gaskets and fixings.

Atria 20mm Porcelain Tiles

SLIP RESISTANCE

TECHNICAL FEATURES	SPECIFICATION	VALUES REQUIRED	ATRIA VALUES
Dynamic Slider	BCRA	Test Method Available	> 0.4
Static Slider	ASTM C1028	Test Method Available	
Inclined Platform	DIN 51130	Test Method Available	R11
Pendulum Test Value (PTV) - Dry Surface	BS EN 14231	36+	72
Pendulum Test Value (PTV) - Wet Surface	BS EN 14231	36+	65

REGULARITY CHARACTERISTICS

TECHNICAL FEATURES	SPECIFICATION	VALUES REQUIRED		ATRIA VALUES
Length and Width	ISO 10545-2	± 0.6 %	± 2 mm	≥ 3400 N
Thickness	ISO 10545-2	± 5.0 %	± 0.5 mm	≥ 2720 N
Squareness	ISO 10545-2	± 0.5 %	± 2 mm	≤ 1.8 mm
Straightness of sides	ISO 10545-2	± 0.5 %	± 1.5 mm	≤ 13 mm
Surface Flatness	ISO 10545-2	± 0.5 %	± 2 mm	≤ 7.0 %

THERMAL AND HYGROMETRIC CHARACTERISTICS

TECHNICAL FEATURES	SPECIFICATION	VALUES REQUIRED	ATRIA VALUES
Coefficient of Linear Thermal Expansion	ISO 10545-8	Test Method Available	< 7 x 10-6 °C-1
Thermal Shock Resistance	ISO 10545-9	Test Method Available	Guaranteed
Frost Resistance	ISO 10545-12	Required	In Accordance

SURFACE CHARACTERISTICS

TECHNICAL FEATURES	SPECIFICATION	VALUES REQUIRED	ATRIA VALUES
Resistance to Deep Abrasion	ISO 10545-6	≤ 175 mm3	≤ 155 mm3

CHEMICAL CHARACTERISTICS

TECHNICAL FEATURES	SPECIFICATION	VALUES REQUIRED	ATRIA VALUES
Chemical Resistance	ISO 10545-13	Test Method Available	Guaranteed
Stain Resistance	ISO 10545-14	Test Method Available	Guaranteed

STRUCTURAL CHARACTERISTICS

TECHNICAL FEATURES	SPECIFICATION	VALUES REQUIRED	ATRIA VALUES
Water Absorption	ISO 10545-3	± 0.5 %	± 0.1 %
	ASTM C373		In Accordance
Breaking Strength	ISO 10545-4	≥ 1300 N	≥ 10,000 N
Modulus of Rupture	ISO 10545-4	≥ 35 mm²	≥ 45 N/mm²
Breaking Load Class	EN 1339	± 0.5 %	U 11
			T 11

Atria 20mm Porcelain Tiles

WORKING SIZE AND WEIGHT

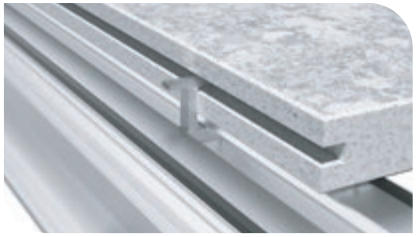
TILE SIZE	ACTUAL RECTIFIED SIZE	M²/TILE	KG/TILE
300 x 1200	297 x 1195	0.3600	=16.88
600 x 600	596 x 596	0.3600	=16.88
600 x 1200	596 x 1195	0.7200	=33.77

HOW RAAFT OVERCOME WIND UPLIFT WITH ATRIA PORCELAIN TILES

To overcome wind uplift challenges on roof terraces, Raaft has developed Atria + wind uplift resistance tiles. Products that claim to be resistant to wind uplift must meet BS EN 1991-1-4: 2005 + + A1:2010 Eurocode 1 regulations, so we put our tiles and clips to the test. Following the principles of BS 14437:2004, the tests were conducted by independent testers BRE Group on both types of clip, fixing 600 x 600 mm, 20 mm thick Atria + Porcelain Tiles, with two clips per tile attaching them to the Raaft Aluminium Joists. Tests were also carried out on the Pedestal Joist Connectors.

Testing applied an uplift pressure of 4536N/m2 and as the products were tested to destruction, no partial safety factors were used.
The results were as follows:

- Using stainless steel clips, the characteristic wind uplift resistance per clip was 738.1N
- Using nylon clips, the characteristic wind uplift resistance per clip was 51.6N
- By also fixing the tile with Formoa 017FE hybrid polymer adhesive the indicative wind uplift resistance per clip was 2943N
- The pedestal joist connector returned a wind uplift resistance of 71.0N



The clip and groove wind uplift resistance system is also featured on our Terrafina Composite Wood-polymer Decking and Farrino Porcelain Decking.
To view the full BRE Report, please visit www.raaft.co/storage/uploads/documents/wind-uplift-test-bre-report_kwbgo.pdf

PACKAGING AND WEIGHTS

SIZE	THICKNESS	BOX SPECIFICATIONS			PALLET SPECIFICATIONS		
		PIECES/BOX	SQM/BOX	KG/BOX	BOX/PALLET	SQM/PALLET	KG/PALLET
300 x 1200	20 mm	2	0.720	26.38	36	16.88	1519.56
600 x 600	20 mm	2	0.563	50.65	30	45.36	5673.02
600 x 1200	20 mm	1	0.540	33.77	15	28.80	1013.04

STORAGE & HANDLING

The product is securely packed into cardboard boxes to ensure no movement of the product in transit. Depending on the size/weight of the consignment this may be palletised.
Whilst there are no specific weight restrictions on what is or is not safe to lift in manual handling, an assessment of the health and safety risks should be undertaken and measures taken to reduce the risk of injury so far as reasonably practicable.

The following guidelines may be useful:

a) Each person should be fully trained in manual handling techniques.
b) The use of handling aids such as a trolley, folk-lift, pallet truck or conveyor should be used if moving large volumes of cartons.
c) Break up large consignments into more manageable loads.
d) Ensure that the product is stored at a reasonable height, so avoiding the lifting of cartons from floor level or above shoulder height.
e) Reduce carrying distances of cartons.

Terrafina Composite Decking

Solid composite decking boards manufactured from a WPC compound containing in excess of 50% wood fibre. High-quality stabilizers and pigments give the product both excellent durability and longevity. Available in a range of board lengths and two finishes.

WORKS AS PART OF THE RAAFT TERRACE SYSTEM

This durable system almost eliminates the need for screw fixing, making installation fast and simple.

FIRE RESISTANT

Boards in all colours achieve:
EN 13501-1 Class Bfl
EN 13501-5 Class Broof

Manufactured with PEFC certified wood fibres.

Simple and time-saving assembly - over 50% faster to install than hardwood decking

Advantages:

- Easy to assemble
- Invisible joining system
- As easy to work with as wood
- 100% recyclable material

PRODUCT INFORMATION

	PL AIN YACHT	DECK
Board length	4m, 4.5m, 5m, 5.5m and 6m	4m, 5m, and 6m
Width	146mm	
Height	21mm	
Weight	3.9kg/m	
Material	Wood plastic composite PVC-WF56	

FIRE RATING

RANGE	COLOUR	DIN EN 1350 1 - 1	DIN EN 13501-5
Terrafina Excel	Grey Brown	Bfl (s1 d0)	Broof (t1)
Terrafina Excel	Pebble Grey	Bfl (s1 d0)	Broof (t1)
Terrafina Excel	Red Brown	Bfl (s1 d0)	Broof (t1)
Terrafina Excel	Coffee Brown	Bfl (s1 d0)	Broof (t1)
Terrafina Excel	Sand	Bfl (s1 d0)	Broof (t1)
Terrafina Excel	Graphite	Bfl (s1 d0)	Broof (t1)

TECHNICAL CHARACTERISTICS

DESCRIPTION	STANDARDS	MEASURED VALUE	LIMIT
Breaking load of a deck board at 20°C*	EN 310	≥ 3900 N	≥ 3400 N
Breaking load of a deck board (averaging)	EN 310	≥ 3700 N	≥ 2720 N
Deflection with load of 500N at 20°C*	EN 310	≤ 1.7 mm	≤ 1.8 mm
Creep characteristics: Deformation with 85kg for 7 days at 50°C	EN ISO 899-3	≤ 3 mm	≤ 13 mm
Water storage: Absorption of water – 5 hours at 100°C	EN 317	≤ 5.2 %	≤ 7.0 %
Water storage: Length expansion – 5 hours at 100°C	EN 317	≤ 0.2 %	≤ 0.3 %
Water storage: Width expansion – 5 hours at 100°C	EN 317	≤ 0.2 %	≤ 0.7 %
Water storage: Thickness expansion – 5 hours at 100°C	EN 317	≤ 2.2 %	≤ 4.0 %
Slip resistance in wet and dry	EN 13839	0.67 = R12	≥ 0.43
	DIN 51097	28° = C	≥ C
Coefficient of thermal expansion lengthwise	ISO 11359-2	20.6 x 10-6/k	-
	l = 4m, dT = 40K	3.3 mm	-
Design life	15 years (minimum)		

*480mm inside distance between supports unsupported.

Terrafina Composite Decking

VOLATILE ORGANIC MATERIALS

	STANDARDS	MEASURED VALUE
Formaldehyde	RAL-UZ 38	0.015 ppm
Organic compounds: Boiling point 50-250°C	RAL-UZ 38	3 µg/m³
Organic compounds: Boiling point >250°C	RAL-UZ 38	2 µg/m³
Organic compounds: CMR substances	RAL-UZ 38	<1 µg/m³

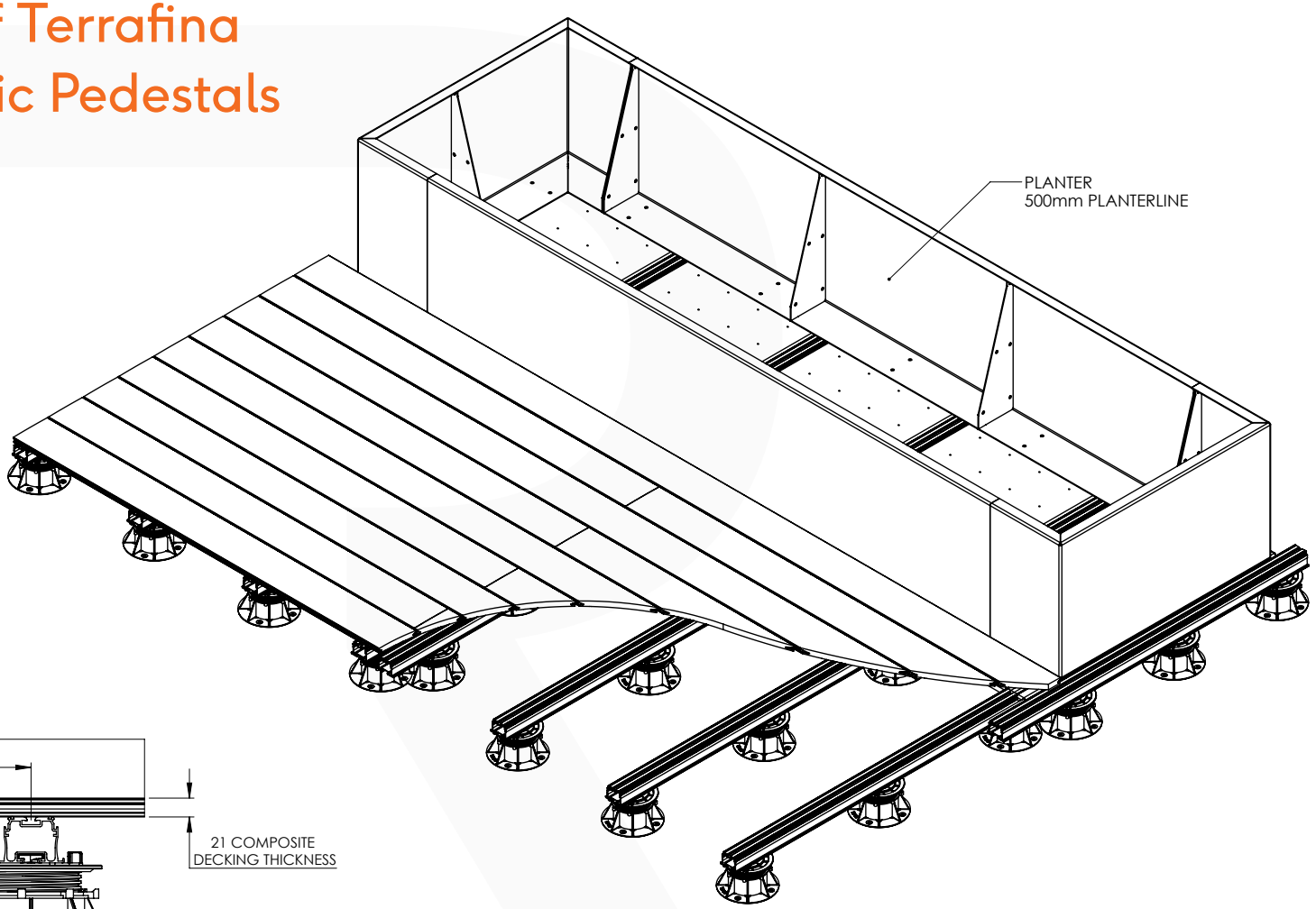
OTHER PROPERTIES

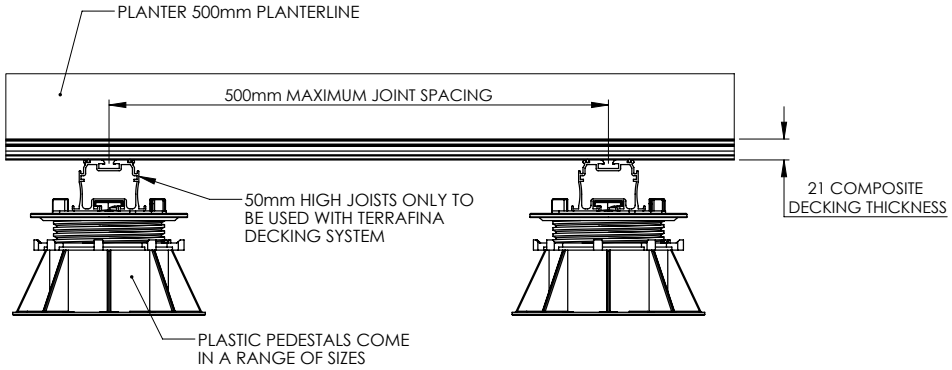
	STANDARDS	MEASURED VALUE
Raw material density	EN 323	ca./approx. 1350 kg/m³
Shape performance to heat (HDT, 1.8 N/nm2)	EN ISO 75	78 °C
Guaranteed short time load capacity	Point load	300 kg
	Area load 1	000 kg/m²
Durability class: Laboratory	EN 113 + EN 350-01	1 = very durable
Durability class: Outdoor test - 3 years	EN 252 + EN 350-01	60/5
Durability class: Outdoor test - 5 years	EN 252 + EN 350-01	-

COLOUR RANGE

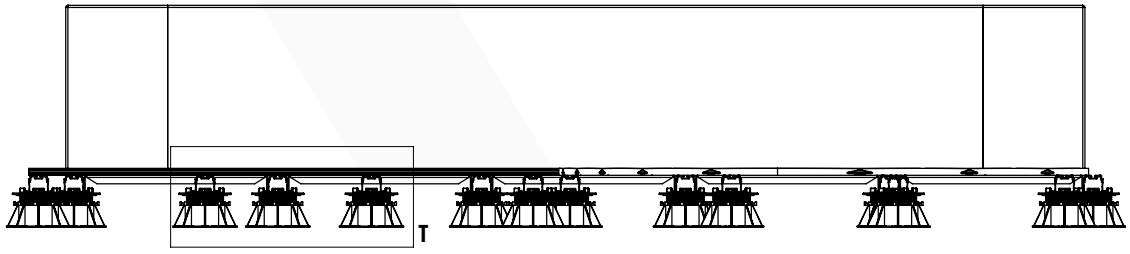
FINISH	GREY BROWN	PEBBLE GREY	RED BROWN	COFFEE BROWN	GRAPHITE	SAND
Plain	✓	✓	✓	✓	✓	✓
Yacht Deck	✓	✓	✓	-	-	-

Terrace Drawing of Terrafina Installed with Plastic Pedestals





DETAIL T
TYPICAL TERRAFINA BUILD UP
SCALE 1 : 5



FRONT VIEW

CPDs and Design Consultations

Your professional development is important. So is the successful specification and installation of our products. Presentations are approximately 45 minutes with 15 minutes of questions held either at our London Design Studio or over Microsoft Teams.

We currently offer three training seminars that count towards your CPD. Certificates with one CPD point will be sent directly to attendees by email to the list of participants you provide on completion of the session.

Creating a Safe, Class A Fire-rated Terrace

We explain why many roof terraces need to be Class A or B fire-rated. Raaft experts present the steps we have taken to develop a complete fire-rated terrace system that overcomes all fire regulated design challenges.

Key learnings:

- Recent fire safety regulation changes following the Grenfell tragedy - from the Hackitt report to Building Control Document B.
- Fire safety classifications of materials to enable your team to confidently specify in accordance with current legislation.
- Gain product knowledge: Raaft's Class A Fire-Rated modular Terrace System
- How to apply fire regulations to your projects.
- Inspiration for your next project – discuss how amazing spaces have been achieved in a range of case studies.

Designing Sensational Roof Terraces

The roof terrace is an essential part of modern development. Knowing how to install and which roof terrace system to specify is important. Learn why Raaft's Terrace System is the best solution on the market.

Key learnings:

- The value of a roof terrace in urban developments.
- Common challenges of roof terraces, and how to overcome them.
- Gain product knowledge: Raaft Terrace System - an intuitive modular terrace system that can be easily constructed in a simple three-step process.
- System - one simple revolutionary solution to build your whole terrace.
- Inspiration for your next project - learn how to use different surfaces with the Terrace System.

Sustainability

This Raaft CPD is for Architects, Landscape Architects, Designers and Specifiers who design or work on outdoor projects. Learn about sustainable roof terraces, how they can help you achieve your environmental goals, how you can reduce carbon footprint and ensure long-term sustainability with Raaft's flexible roof terrace system.

Key learnings:

- Climate change and creating sustainable roof terraces.
- Re-using and recycling roof terraces - The reconfigurable landscape.
- The Urban Greening factor and Biodiversity Net Gain.
- Creating outdoor spaces for mindfulness and wellbeing.Inspiration for your next project - learn how to use different surfaces with the Terrace System.

Contact us today to book a CPD

t. **+44 20 3146 78791** - e. **CPD@raaft.co** - or visit **raaft.co/book-cpd**

London Design Studio

Located in Clerkenwell, London, you can meet with colleagues and clients, and discuss your challenges with our technical experts. See, touch and feel the Raaft range, understand how to specify and install our products, and explore the Raaft Terrace System - pedestals, joists and the various range of finishes.

A diverse range and our experienced technical team on hand at our London design studio.

Open Monday to Friday 8am - 5pm with evening appointments available upon request.


INSPIRED PLACES MADE POSSIBLE

RAAFT

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