

Stratavault™

LEADING THE WAY IN ADVANCED
STRUCTURAL SOIL CELLS

Healthy trees in the urban environment



transforming grey spaces into green



citygreen
URBAN LANDSCAPE SOLUTIONS

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**Leading the way in
advanced structural
soil cells**

For healthy trees in urban
environments



“Citygreen® systems are dedicated to the successful establishment of trees in cities”

Advanced Structural Soil Cell System For Tree Pits

Trees in cities are almost universally seen as a very desirable, indeed hugely beneficial part of our lives. And probably the most critical factor in tree health and longevity, is the provision of enough quality soil for the tree roots. Providing for this volume of uncompacted soil beneath pavements is an issue that arborists, landscape architects and engineers have been debating for decades.

Citygreen's® modular Stratavault system employs advanced design geometry and reinforced copolymers to produce an incredibly robust, skeletal matrix. This matrix has been tested by Finite Element Analysis, as well as physical Ultimate Load tests at university. These test results have been verified by consulting engineers to provide adequate support for pavement loads.



ROOT SYSTEMS: WHAT THEY CAN DO TO STAY ALIVE

Tree roots have possibly earned an unfair reputation for damaging built structures... sure they have enormous heaving force, and centuries of history have illustrated the expansive power of tree roots in the cities of man. Armed with our new-found knowledge of the enormous size of tree root systems, we must find ways of providing sufficient quality soil volume for trees in our cities.

Tree Root Systems

What they look like

Tree root systems are much more extensive than you may realise. Current accepted knowledge is that the roots typically occupy an area two to three times greater than the radius of the tree canopy. Root systems also occupy a relatively shallow soil strata being the top 400mm-800mm of soil. Presence of oxygen is of prime importance, with a huge volume of fibrous feeder roots gathering oxygen, moisture and minerals for the life of the tree, while large structural roots provide anchorage and balance for the huge leafy structure above ground.



Tree Root Systems Need Soil

How much?

Soil volume requirements for trees can be estimated using several methods. As stated earlier, in natural environment a root system can extend two to three times the radius of the tree canopy.

Probably the simplest way of calculating a minimum required soil volume is to take the projected canopy area of the mature tree, multiplied by a depth of 0.6m. The shape of this area can be configured to suit the particular site.



Other Methods are based on mature trunk calliper, and are possibly more accurate as they provide for different foliage shapes. The old method of providing an area the size of the pavement opening is clearly insufficient, and commits the tree to an untimely death.

“Stratavault treepits may be utilised wherever trees are being planted in paved areas”



WHY DO TREES OR PAVEMENTS FAIL?

Tree failure is pretty common the world over. Possibly the worst culprit is simply insufficient quality soil volume, along with soil compaction, insufficient drainage, lack of aeration and restrictive pavement openings. Other factors include neglect during establishment, vandalism, wind throw, drought and pollution. The heartening news is that all of these factors can be anticipated at design stage. Trees are remarkable survivors, if they have a chance.



Applications For Stratavault Treepits

Essentially, Stratavault treepits may be utilised wherever trees are being planted in paved areas. There are many areas where the application of this system can assist with the healthy growth of trees in cities:

Carparks, Roadways, Footpaths, Plazas & Medians.

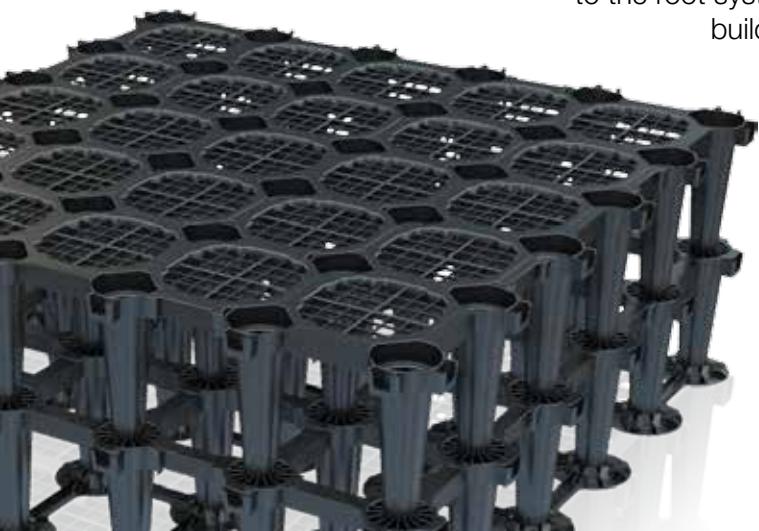
Linked treepits

Shared root space plus permeable pavements

For many years arborists have recognised that tree root systems can share space and overlap. This can permit designers to place trees in continuous rooting trenches, or linked tree pits. There can also be economies gained in excavation and installation times. Width of such “root trenches” needs to be carefully monitored relative to mature tree height and canopy width, particularly in high wind areas. Local arborists can advise on this. Innovative use of permeable pavement above the linked treepits is to be commended, providing aeration to the tree root system and harvesting of valuable rainwater and surface flow. There are several very critical points to be included in design of these treepits, and it is strongly recommended that assistance be sought from a Citygreen® design consultant.

Water-sensitive urban design

There are several additional ways of utilising valuable rainfall to enhance the growth of trees in our cities, with some slight differences caused by geographical location. Kerb or road grates and surface strip drains can intercept rain water for distribution to the root system via perforated pipe. Roof water from nearby buildings can also be piped to the Stratavault structural root zone, or permeable pavements and subgrades can be incorporated as stated above. Harvesting of stormwater at the source is strongly recommended, and treepits play a vital part in this. There are several very critical points to be included in design of these treepits, and it is strongly recommended that assistance be sought from a Citygreen® design consultant.



Applications



“Advanced engineering and design provides over 90% uncompacted soil volume”



STRATAVULT: KIND TO THE ENVIRONMENT

Recycled material

Citygreen® systems are dedicated to the reduction of harmful waste. Stratavault structural modules are made from 100% post industrial waste, thereby utilising material that could have been consigned to landfill.



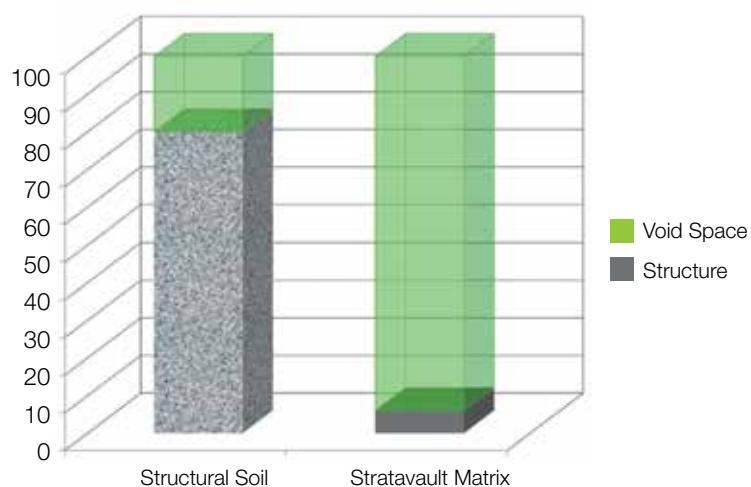
Stratavault

Apertures

This sixth generation Root Cell has very generous apertures for root growth, without sacrificing the structural integrity of the matrix. Stratavault apertures are large enough to permit some common conduits, service pipes and aeration systems to be incorporated within the structure.

Growth zone

The open, skeletal structure of the Stratavault matrix provides an optimal growth zone for tree roots. In excess of 90% of the total volume is available for tree root growth.



Compared to rock/soil matrix

Early research utilised a rock and soil matrix to provide support for pavement, while permitting some root growth within the pavement. Structural Cells have moved this principle forward by replacing the rock (80% of the total volume) with engineered modules (10% of total volume).

A photograph showing a row of mature trees standing in a parking lot. Each tree is surrounded by a black metal frame and a concrete planter, which is a Stratavault tree pit. In the foreground, several cars are parked, including a red car, a dark car, and a white car. The background shows other buildings and trees under a blue sky with white clouds.

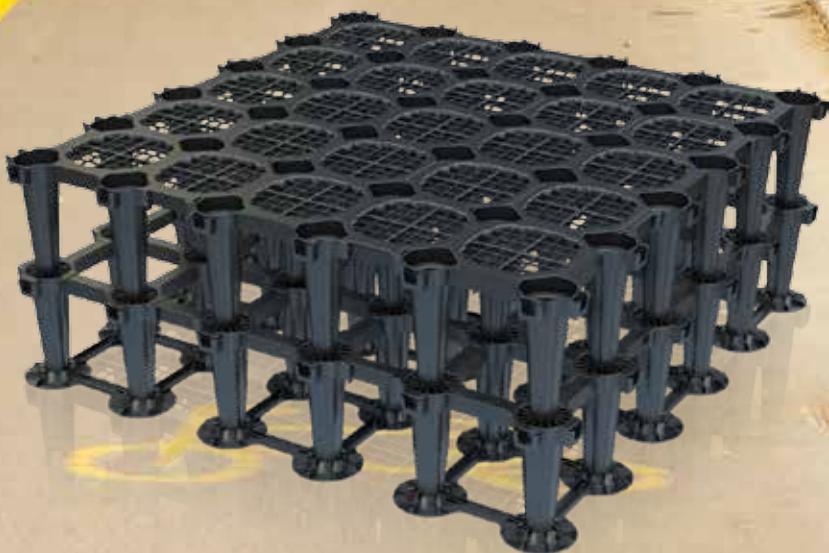
Stratavault tree pits for healthy trees

For the long term success of
urban trees



**Stratavault –
the strongest large soil
cell available globally**

Advanced engineering & design



“The Stratavault system is designed and tested to support 300kPa loads ('30 Series') and 600kPa loads ('60 Series')”

Stratavault Structural Modules

How they work

Structural Cells are modular units that assemble to form a skeletal matrix that supports relevant pavement loads while providing large volumes of soil within the structure for root growth.



Compressive load

Stratavault modules have been designed to support enormous vertical loads, so that tree root systems can be brought closer to the pavement surface.

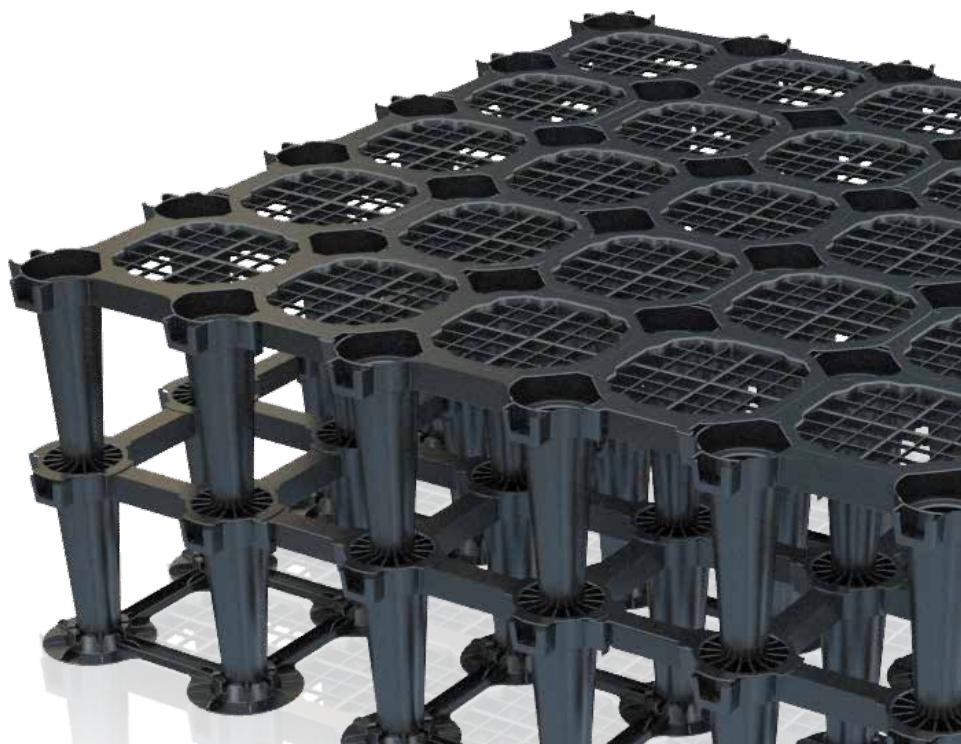
Extensive computer modeling and laboratory testing have established Stratavault as the strongest large soil cell.

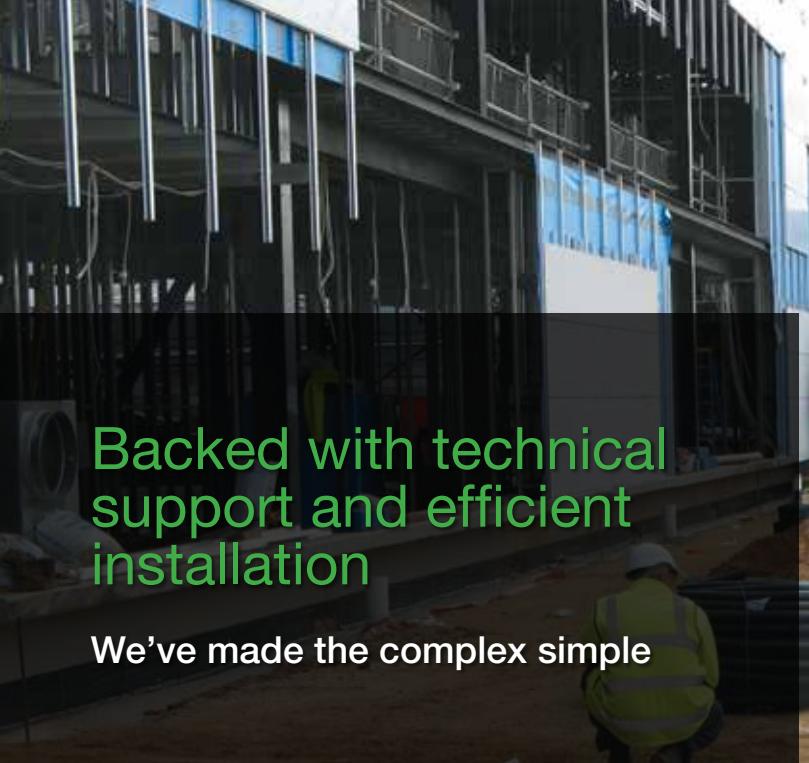
Lateral load

As mentioned earlier, lateral forces must also be provided for in engineering design of tree pits. Stratavault units lock together to form a monolithic structure with excellent modular strength, both vertically and laterally.

Interlocks

Positive and secure connectors are a feature of the Stratavault patented design both vertically and laterally. Stratavault modules are simple and fast to click together, producing an integrated matrix.





Backed with technical support and efficient installation

We've made the complex simple



Technical Assistance and Design

CAD details, custom, standard

ONGOING RESEARCH

The knowledge frontier for trees in cities is being relentlessly pushed forward and Citygreen® Urban Landscape Solutions are heavily involved in this by way of our own trials, and collaborative trials with clients and educational establishments. If your college or university would like to be involved in a trial of Citygreen® treepit systems, please contact us. We can provide free design assistance, reduced component cost, and installation assistance subject to location.

Treepit detailing is a free service that is available to all designers and specific's. After an initial consultation, you will be provided with a fully detailed and dimensioned set of plans showing plan view and sectional views of your design in CAD and PDF format for inclusion in your project documentation. Standard treepit details are also available for your own library, free of charge.

Engineering design assistance

Due to the importance of correct engineering design for treepits in cities, a further service is available from experienced consulting engineers. These engineers have thorough understanding of Stratavault treepits and are conversant with pavement design standards globally. This service is provided at cost, and Citygreen® designers will provide a quotation for you after consultation.

Site visits and training

From the earliest days of ArborSystem treepits, our consultants have been visiting sites to provide training for installers. This service is available at no charge in most regions, instructs installers in the most efficient methods, giving us first hand interaction with the landscape industry and peace of mind as to projects.

“Units snap together quickly and easily, with labour times being reduced drastically.”



Stratavault Efficiency

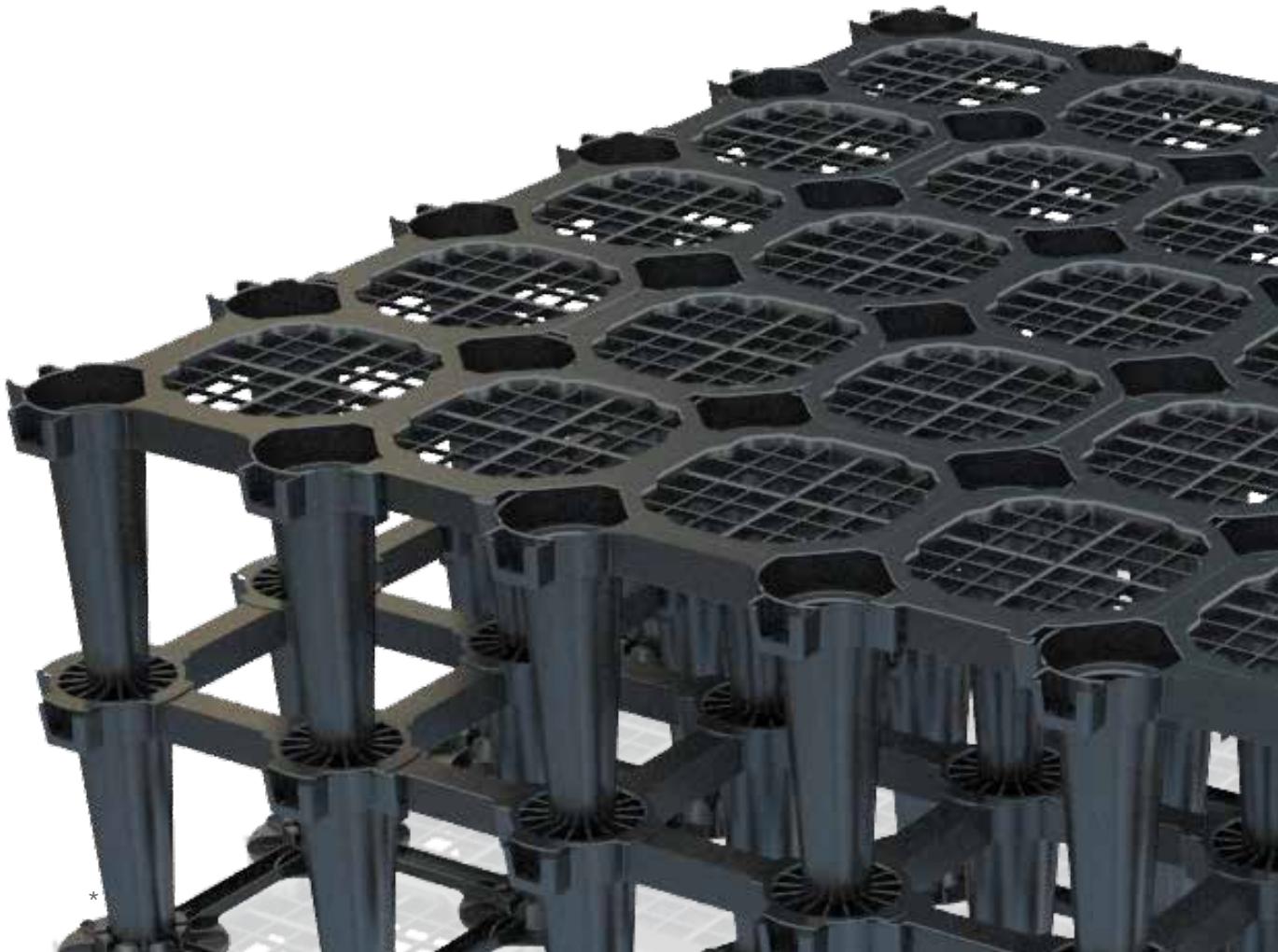
Lower cost installation

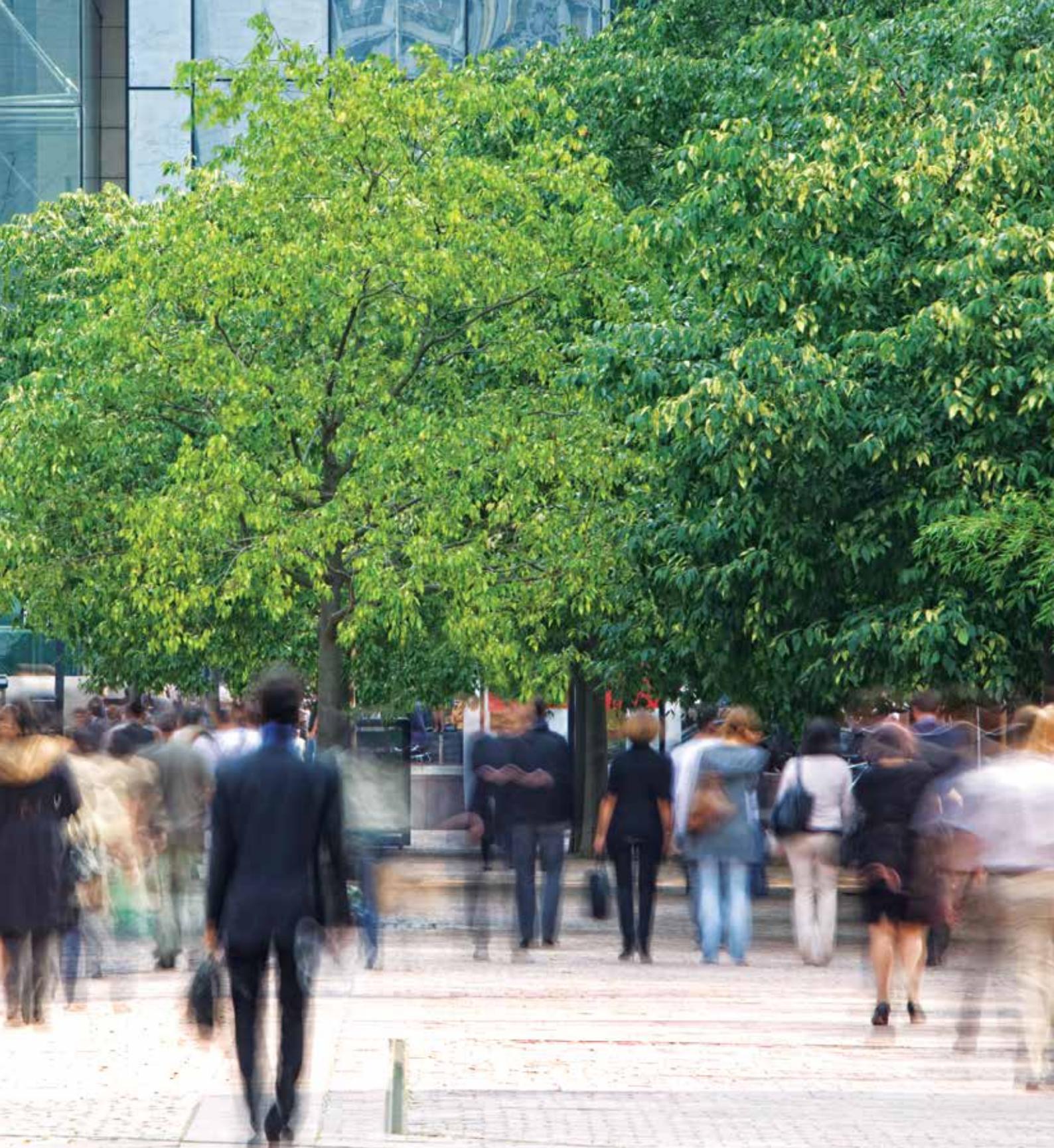
Stratavault has been designed to achieve major reductions in installation costs. Units snap together quickly and easily, with labour times being reduced drastically.



Nesting/shipping

Another unique design feature of the new Stratavault module is the significant volume reduction for freight. With increasing scrutiny placed on use of fossil fuels, and shipping costs, it was decided that this unit must achieve major volume reductions for shipping. The innovative nesting design is protected by worldwide patents and design registration, as are all other design features.





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