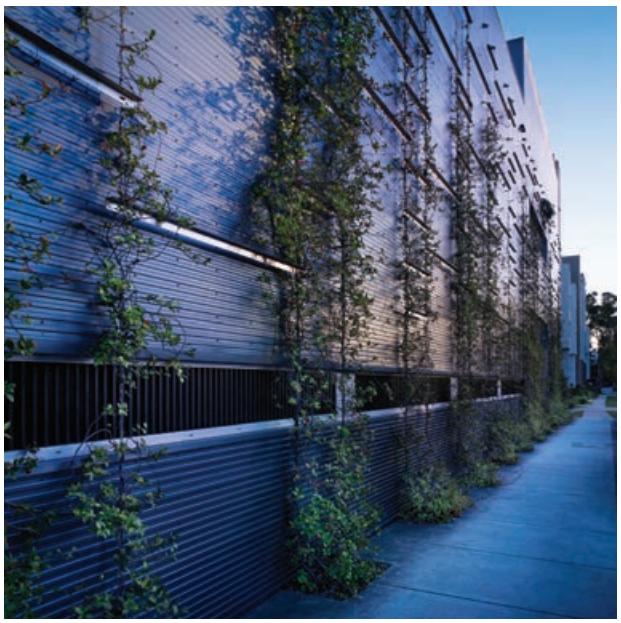
RONSTAN

TENSILE ARCHITECTURE

Cable Trellis

SYSTEMS



RONSTAN CABLE TRELLIS SYSTEMS

Contents

Introduction

Cables have long been used to support climbing plants. Faced with the challenge of increased urban density, where footprints for garden beds often come second to areas for active recreational activities, recent cable innovations combine with intelligent thinking to present new opportunities for vertical landscapes in the tightest building envelope. Whether a simple application of individual cables providing essential structure for plants to cover a domestic courtyard wall, or a complete integrated cable net to support plants over a multi-level facade, cables help extend the many benefits of plant life through vertical gardens. Reduced thermal gain through shading and the flow on effects this additional layer of insulation provides like reduced building running costs, noise reduction and improved air quality are very real outcomes. And the simple pleasure of being close to nature brings well-being often associated with tangible health and social benefits.

The Ronstan range of cable systems detailed in this catalogue has been developed with one function in mind - to deliver simple cable systems that provide the necessary structure for vertical climbing plants. As pioneers in cables for greening we have detailed our most popular cable systems. When combined with correct plant selection, and used in the right aspect and site orientation, they can be applied as modules to suit any wall or facade. To make the process even easier each system can be specified under a single AGS part number and has a specification block that can be copied to ensure the specification is clear and easily understood by specifier, builder and landscaper alike.

If you have never designed with tensile cables before it needn't be a mystery. Ronstan's experienced staff are ready to assist with concept development, system selection, specification and estimating, or to tailor a solution to your needs. Our project management team can be called upon to ensure the proper coordination of green cable and facade projects from concept to installation and commissioning.

Ronstan Tensile Architecture services

At Ronstan Tensile Architecture we pride ourselves on service. Whether our scope involves the simple supply of cables or components, or we are assisting you with full design and construction, our staff will deliver our support with equal passion; one founded deep within the excitement and challenge of leading our industry, of our long history of success and of a simple love of cables and what cables can do. Let us help you bring your most exuberant green cable concepts to life.

Design Support

Ronstan's design support services draw on sixty years of experience in cable innovation. Our team has the latest technology, matched only by their enthusiasm and creative approach.

Structural Analysis and Engineering Certification

The Ronstan team provides detailed analysis and modelling of system behaviours and interactions within any tensile architecture installation. We don't always need to apply these skills on green trellis systems, but you can be assured we have the in house skills at the ready to help you when needed.

Cost Estimation, Planning and Scheduling

Ronstan provides accurate quotations for greening projects as well as detailed estimates for cost planning requirements. We pride ourselves on transparency and open dialogue.

Supply of Materials

Ronstan manufactures product to exacting standards from manufacturing facilities in Australia, Indonesia and Denmark. Our market leadership demands continuous improvement and we are accredited to ISO 9001. Our Quality Manager also has an awfully big stick!

Custom Fabrication

If our wide range of hardware is not enough, Ronstan can custom design and fabricate the ideal hardware solution for any job. The bigger the challenge the better!

Method Statements

It's one thing to design structures that push boundaries, but to execute them safely and efficiently is something born from experience. Ronstan can develop accurate method statements for most designs. And after awarding our prize to the designer who has stumped us, we thrive on the challenge of realising the most efficient, safe and timely assembly possible.

Management and Coordination

Ronstan manages and oversees the construction of our greening systems on site and consolidates components from different suppliers for a seamless installation.

Installation

Ronstan's team of specialist installers pride themselves on doing things once and getting the job done to international standards. Quality and finish are outcomes of this passion.

Benefits of greening

The benefits of encouraging plant growth in an environment are many and varied. With density threatening urban environments, and space at a premium, real, buildable trellising solutions are required to unlock the green benefits we all know await.

Reducing Thermal Gain

During the summer months, plants act as sunshades shielding building facades from the harsh effects of the sun. In the winter months, they provide a further layer of insulation on the facade preventing heat loss. Vertical gardens help minimise the mechanical costs of cooling and heating, and aid in the reduction of the urban heat island effect in our cities.

Noise Reduction

Once fully grown, plants have the ability to insulate against noise and are particularly effective against low frequency noise.

Cooling Microclimates

In addition to helping reduce thermal heat gain by shading the facade, a plant's ability to cool through evapotranspiration creates a microclimate that can be up to 1-2 degrees lower than the ambient temperature. This helps ease our reliance on air conditioning.

Improved Air Quality

Many species have the ability to act as natural air filters improving air quality. They are known to absorb formaldehyde, benzene, xylene, and carbon monoxide from the immediate environment.

Aesthetic Benefits

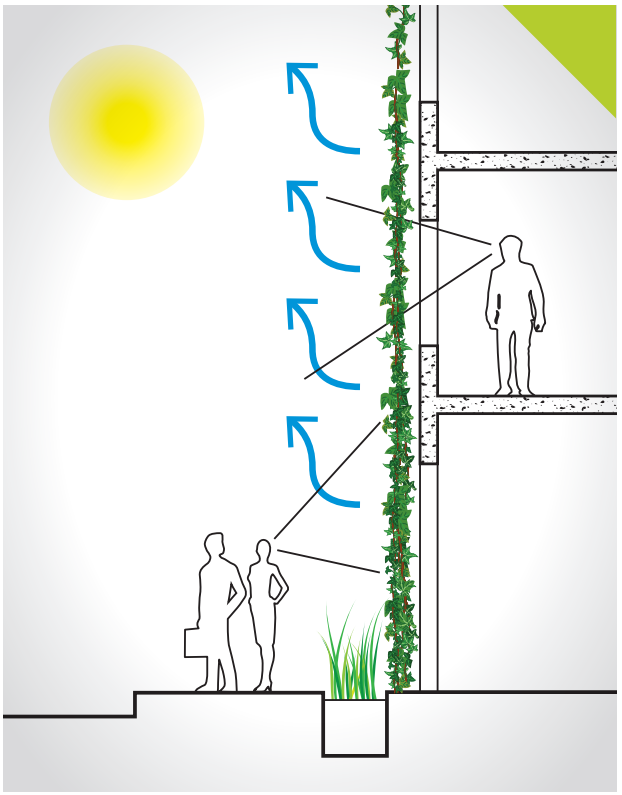
Plants look great! When encouraged to grow on a facade they can soften the appearance of a building and help it blend into the natural environment of the area.

Health Benefits

The psychological benefits associated with the proximity to plant life are well known. Medically, a soothing environment brought about by the close proximity of plants has been shown to contribute towards a reduction in stress and, in some circumstances, a reduced dependence on medication and faster healing time.

Social and Economic Impacts

Although difficult to quantify, perhaps one of the most important benefits of greening is the effect the close proximity of plant life has on the users of an environment. Improved productivity, reduced stress and a decrease in absenteeism are all social/economic benefits made possible by greening a workplace and increasing employee engagement.



Designing green facades and trellises

1. Defining the purpose?

Designing a successful green wall or cable trellis comes down to planning, and the careful consideration of the function and purpose the structure is to serve. Is the objective of the wall to provide visual screening or to achieve a reduction in thermal gain? Is attracting wildlife important? Different plants and trellis systems achieve different results in terms of plant growth and benefits. For example, choosing deciduous plants provides good shading and control of thermal gain, but may not provide the desired lush visual screen during the winter months. Careful consideration of the purpose, and the desired attributes and benefits of your greening structure will serve as a guide in choosing the right plants and design of the support structure. This will provide a base from which you can measure the success of your green wall project.

2. Climate and Orientation

Climate generally determines which plant species exist naturally within an environment. Paying close attention to the species already flourishing in the vicinity of the intended green wall or trellis, provides a good indicator of plant species likely to grow well.
The orientation of the green wall is important for determining sun exposure and wind speed. When considering the orientation of the green wall, it is also important to note surrounding structures likely to affect the amount of sunlight and wind speed to which the green wall is exposed. Once the orientation is determined, it is best to match the hours of sunlight the area receives during the day with species that cope well in these conditions. This can be done with a light meter or through simple observation and reference to the Plant Selection Guide on pages 8 & 9.

3. Planter Units and Irrigation

A common cause of failure for green facades is the incorrect design of the planter units. Quite simply, plants need room for their roots to expand as they grow. If the planter is too small, it is unlikely the plant will achieve its maximum mass.
Important aspects of planter design include:

- Planter Size
- Growing Media
- Drainage
- Irrigation

Designing green facades and trellises

4. Plant Selection

Climbing Habit

A. Self Clinging

Self clinging plants can attach themselves to relatively smooth surfaces and because of this, they do not require any trellis to support their growth; however, they are notorious for causing damage to building facades as their roots can grow into small cracks in the surface.
e.g. Ivy, Trumpet Vine

B. Tendril Climbers

The tendrils are specialised stem, leaf or petiole with a threadlike shape that is used by the plants for support and attachment. Unlike vines, they impart less load on to the mating structure.
e.g. Clematis, Passionfruit

C. Vines (Twining Plants)

Vines twine around their supports as a result of the circular growth motion of their stem tips. They form a much stronger connection than tendril climbers and are better suited for high wind locations.
e.g. Wisteria, Star Jasmine

D. Scrambling Plants

Scrambling plants work their way up by using epidermal outgrowth such as thorns.
e.g. Bougainvillea, Climbing Roses

Plant Life Cycle

Deciduous - Deciduous climbers are ideal for thermal control as they provide shade in the summer and allow the sun through to heat the facade in winter.
e.g. Ornamental Grape (Vitis Vinifera)
Evergreens – Evergreens maintain their foliage year round and can grow into a perfect privacy screen.
e.g. Chinese Star Jasmine (trachelospermum jasminoides)

Growth Rate & Vigour

Plants have different growth rates. Some grow slowly during their early growth stages, taking longer to achieve the desired level of plant coverage. In this case the selection of mature plants may be an option. Other plants, with faster growth rates, may achieve the desired plant coverage quicker, but be wary as this can mean a considerable increase in ongoing maintenance to keep the plants under control.


A.


B.


C.


D.

Designing green facades and trellises

5. Access

Access to the green wall or trellis should be considered for both the initial installation as well as for regular general maintenance. A failure to consider the cost of appropriate access and labour to facilitate maintenance can lead to neglect and a less than satisfactory coverage.

6. Mating Structure and Loads

It is important to ensure that whatever you are attaching the trellis structure to can support the loads which the trellis system will impose. The factors which need to be taken into account are:

- Material of mating structure
- Plant Load
- Wind Load
- Trellis Load / Cable Pre-tension
- Live Load (i.e. a person climbing the trellis structure)

The need for proper engineering of the trellis or mating structure should be evaluated on a case by case basis depending on the risk profile or possible outcomes of a structural failure. At the very least, some thought must be given to consideration of the factors mentioned above.

7. Maintenance

Buildings are not natural environments for plants and human intervention is required to help them survive. As such, maintenance requirements should be considered carefully when evaluating the feasibility of a green wall project. Although clever design and technology can be used to reduce the need for maintenance (i.e. automated planter box irrigation systems), maintenance is unavoidable and the effectiveness of the regime will impact on the success of the project.

INFORMATION & CONSIDERATIONS

Common plant species of climbing plants (AUST)

Bougainvilleas (Bougainvillea spp.)

- Life Cycle: Evergreen
- Climbing Habit: Scrambling
- Growth Rate: Vigorous

Bougainvilleas come in a range of colours with brightly coloured bracts in shades of red, purple, pink apricot, orange and cream. They will hide low fences, pergolas or walls that they grow over.


Golden Trumpet Vine (Allamanda Cathartica)

- Life Cycle: Evergreen
- Climbing Habit: Vine (Twining)
- Growth Rate: Vigorous

Clear buttercup yellow flowers with orange stripes in the throat through spring to autumn. Grow in a sheltered warm position and water generously. Will need some support and early training.


Stephanotis or Madagascar Jasmine (Stephanotis Floribunda)

- Life Cycle: Evergreen
- Climbing Habit: Vine (Twining)
- Growth Rate: Vigorous

A small perfumed climber with white flowers often used in bridal bouquets. The flowers are pointed when in bud but star-shaped when open. Grows in warmer zones by the water and thrives in the tropics. It likes a sheltered position in full to partial sun and well-drained soil.


Orange Trumpet Creeper (Pyrostegia Venusta)

- Life Cycle: Evergreen
- Climbing Habit: Tendril Climber
- Growth Rate: Vigorous

Orange flowering climber, grows as far south as Sydney or Perth. Grows in full sun in well-drained soil but can become rampant so needs space to sprawl. Flowers through winter and spring


Bower Vine (Pandorea Jasminoides)

- Life Cycle: Evergreen
- Climbing Habit: Vine (twining)
- Growth Rate: Medium Vigour

A native vine that comes in a few forms including ‘Lady Di’ which is white or ‘Southern Belle’ that is pale pink with a deep pink throat. Likes full sun to dappled shade in well-drained soils


Star Jasmine (Trachelospermum Jasminoides)

- Life Cycle: Evergreen
- Climbing Habit: Vine (twining)
- Growth Rate: Slow during early years / Medium Vigour

This is not a true jasmine so will not strangle other plants but has white perfumed flowers. Has thick glossy leaves that likes sun to semi-shade and grows in all but the coldest zones of Australia.


Green shading: suitable Light-green shading: semi-suitable

INFORMATION & CONSIDERATIONS

Common plant species of climbing plants (AUST)

White Potato Creeper (Solanum Jasminoides)

- Life Cycle: Evergreen
- Climbing Habit: Vine (twining)
- Growth Rate: Medium-High Vigour

White flowering climber that grows in most areas of Australia except for the coldest zones. They are hardy and fast growing, like full sun, plenty of moisture but a well-drained soil.


Wisteria (Wisteria Jinensis and Wisteria Floribunda)

- Life Cycle: Deciduous
- Climbing Habit: Vine (twining)
- Growth Rate: High Vigor

There are several forms of wisteria including white, 'Alba'. Also flowering in pink and purple and have a delicious perfume. Will grow over pergolas for summer shade and winter sun or can be trained to grow as a standard or over a fence. Likes a sheltered position in full sun and will grow in most of Australia except the tropical north.


Guinea Flower (Hibbertia Scandens)

- Life Cycle: Evergreen
- Climbing Habit: Vine (twining)
- Growth Rate: Vigorous

A native climber that has large, bright yellow flowers (7.5cm (3") in diameter) and thick leathery foliage. Can be used as a ground cover or grown over a fence but does not become rampant. Will take full coastal exposure and will grow in full sun to partial shade.


Hardenbergia or Coral Pea (Hardenbergia Violacea)

- Life Cycle: Evergreen
- Climbing Habit: Vine (Twining)
- Growth Rate: Vigorous

A popular long flowering native climber that has many forms that are all pretty. The most popular form is 'Happy Wanderer' which flowers purple, but there are other forms that are white suffused with a reddish purple or pink. It can also be grown as a ground cover in full sun to dappled shade and well-drained soil.


Ornamental Grape (Vitis Vinifera)

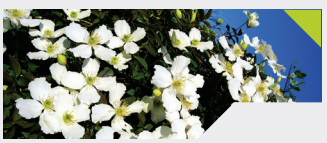
- Life Cycle: Deciduous
- Climbing Habit: Vine (twining)
- Growth Rate: Vigorous

It has brilliant orange, red, burgundy and yellow autumn foliage but does not produce fruit. Likes a position in full sun and well-drained soil. It can be attacked by caterpillars and suffers from powdery mildew in humid climates


Clematis (Clematis Montana)

- Life Cycle: Deciduous
- Climbing Habit: Tendril Climber
- Growth Rate: Vigorous

Best suited to the cooler, mountainous zones. Flowers are soft pink or white and like a sheltered spot in full sun with roots in cool and well-mulched soil.

Green shading: suitable Light-green shading: semi-suitable

Green Facades

Owner QUEENSLAND GOVERNMENT
Architect COX RAYNER ARCHITECTS
Landscape Architect GAMBLE McKINNON GREEN
Builder LAING O'ROURKE

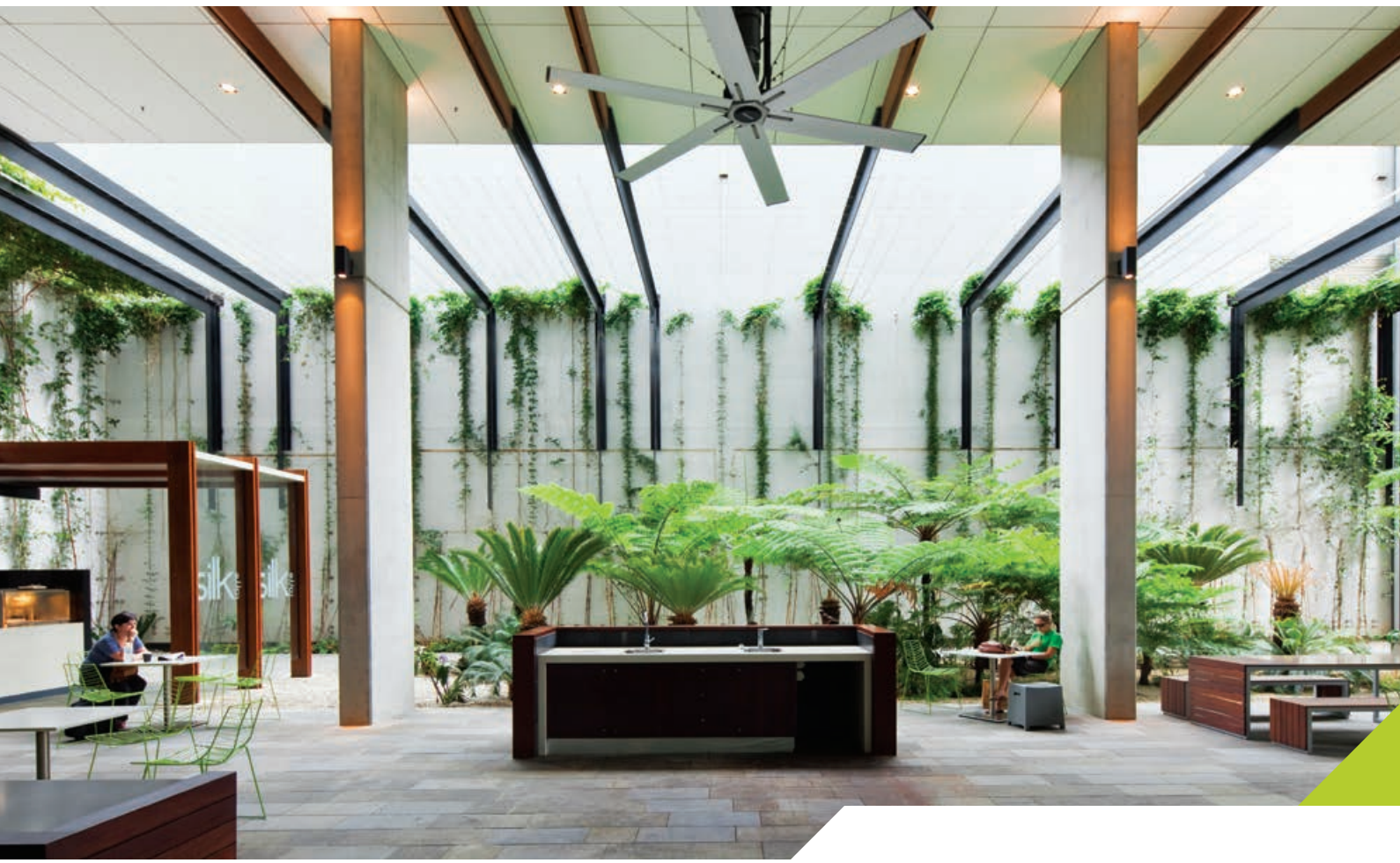
William McCormack Place II

Cairns, Australia

PRODUCT USED **AGS2C Cable Trellis System**

This grid-style cable trellis is comprised of horizontal and vertical cables which affix to the supporting walls via stainless steel wall mounts. The trellis flows up vertical walls, and folds back horizontally across the canopy enabling full cover over the pergola.

The effect is a vibrant, cool and fresh space within which the building occupants can enjoy the fresh air and shade provided by the structure. The trellis has been fully engineered to ensure long term structural performance, as the plants grow and apply increasing load to the system.



Owner CITY OF MELBOURNE
Architect DESIGN INC.
Builder HANSEN YUNCKEN

Council House 2

Melbourne, Australia

PRODUCT USED AGS4c Trellis System

Council House 2 (CH2) was the first Australian commercial building to achieve a 6 Green Star rating from the Green Building Council of Australia and remains a prime example of sustainable building design. The building design demonstrates a wide range of innovations that reduce energy consumption, and amongst other things, facilitate a closer connection between its occupants and the surrounding natural environment. Tensioned stainless steel cables and mesh provided the structural platform upon which the plants could flourish.

The northern façade balcony screens continue up 9 levels and protect against the harsh morning and afternoon sun in summer. During winter the dormant plants allow the sun to penetrate and warm the building.

Cutting Edge

Brisbane, Australia

PRODUCT USED **AGS2A Trellis System**

The designers used the Ronstan AGS2a trellis system to create this interesting and unique green wall feature. The plant species chosen was Chinese Star Jasmine, which was planted directly in the ground allowing the roots to spread freely and the plants to achieve their full growth potential.

Owner SOUTH AUSTRALIA CRICKET ASSOCIATION
Architect HASSELL + COX

Adelaide Oval

Adelaide, Australia

PRODUCT USED AGS4c Trellis System

Adelaide Oval has often been referred to as one of the most picturesque ovals in the world. The challenge for Architect's, Hassell + Cox, was to design a grandstand that did not adversely affect this reputation. The grandstand had to be modern and yet remain sympathetic to the strong heritage context of the facility. The existing heritage grandstand had iconic arched brick walls. Part of the charm of these arches was the network of climbing vines that covered almost half the height of the walls during the summer months. It was decided that the walls and plants should reflect within the new development as well. The existing vines were preserved and served as inspiration for the new stair towers located at the back of the stands.
By using a Ronstan stainless steel tension cable system to support deciduous vines on the towers, Hassell + Cox achieved a great balance between the contemporary architecture created and the historical context. The vines provide shading during the hot summer months and allow cooling breezes to permeate the stairs.
Paul Suter (Hassell Architects)

Owner OUR LADY OF MERCY COLLEGE
Architect TZANNES ASSOCIATES
Landscape Architect JAMES MATHER DELANEY DESIGN PTY LTD
BUILDER BUILT ENVIRONS

Our Lady of Mercy College

Sydney, Australia

PRODUCT USED AGS4c Trellis System

Sustainability was a major factor in the design of this building. On the eastern facade green walls were used in conjunction with overhead aluminium louvres to provide shade and natural ventilation to the building interior. The 470 square metre green wall cable trellis has become a major feature of the campus and is enjoyed by the whole school community. The green wall cable trellis panels consist of AGS4c X-TEND mesh infill panels with a cable border.

Owner RMIT UNIVERSITY
Architect PETER ELLIOT ARCHITECTURE + URBAN DESIGN
Landscape Architect RUSH WRIGHT ASSOCIATES
Builder TJS SERVICES

RMIT Building 21

Melbourne, Australia

PRODUCT USED AGS4r Trellis System

Building 21 was part of the original Magistrates Court Legal Precinct which RMIT University acquired in 1997. It was designed in the late 1950's to accommodate police offices and over flow court facilities, and is land locked between the Francis Ormond Building and Building 20.

The building has always looked out of place in this precinct with its back facing RMIT, its cream brick walls, flat roof and awkwardly placed windows. With the completion of University Lawn Precinct and the refurbishment of all of the surrounding buildings, B21 needed a face lift as the last piece in the precinct.

The building now sits comfortably as a back drop to the University Lawn Precinct with the creeper covered walls meshing into the urban landscape. The university wanted to transform the appearance of the building, which has been successfully achieved through the softening effect of the creeper covered wall.

Peter Elliot (Peter Elliot Architects)

Owner WESTERN AUSTRALIA DEPARTMENT OF HEALTH
Architect HASSELL, SILVER THOMAS HANLEY, HAMES SHARLEY
Builder BROOKFIELD MULTIPLEX

Fiona Stanley Hospital

Perth, Australia

PRODUCT USED **AGS4c Trellis System**

The Fiona Stanley Hospital is the largest health project ever undertaken by the Western Australia State Government and is one of the most technologically advanced hospitals in Australia. It's design incorporates contemporary health as well as evidence based design principles and includes many ecologically sustainable design practises.

Proximity to green space featured prominently in their holistic approach to patient recovery, catered for within the design, by providing patients and staff easy access to nature. In the two rooftop gardens, X-TEND mesh panels where installed to provide discreet fall protection barriers, which double as green facades.

These load-rated mesh panels are brilliantly transparent allowing the plants to float seemingly unsupported, towards the sky when viewed from a distance.

Owner AUSTRALIAN NATIONAL UNIVERSITY
Architect LYONS ARCHITECTS
Builder HINDMARSH

ANU Colleges of Science

Canberra, Australia

PRODUCT USED **AGS4r Trellis System**

The Central Plant Facility is one of four new buildings that Lyons Architects designed for the Colleges of Science Precinct at Australia National University. The building houses engineering services that serve the precinct and University facilities. As it is sited within a landscaped campus and visible 'in the round', the design response was to connect the building to its natural surroundings and to the architectural language of the other new buildings. The green wall was used to reference, and extend a nearby ivy-covered wall. It enables the building to have distinct 'public' facades, where the green wall is a feature on prominent corners.

Adam Pustola, Lyons Architects

Green Facades

AGS Cable Trellis Systems

FOR GREEN WALLS

AGS1 - INDIVIDUAL CABLE TRELLIS SYSTEMS

AGS1v

Individual Vertical Cable Trellis System

Vertical cable trellises allow the introduction of exciting accents to walls with cables positioned to splash vibrant colour, or lush greens, as features on the facade.

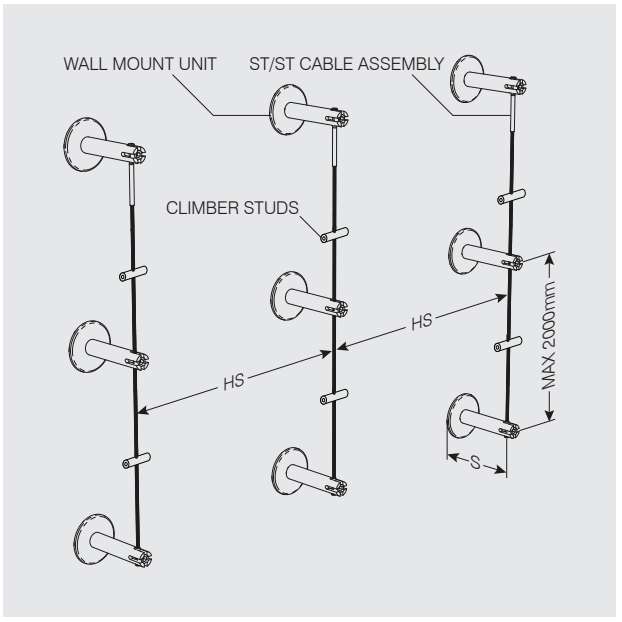
The Ronstan AGS1v is the ideal climbing structure for vines and tendril climbers. The stainless steel cables are held off the wall by grade 316 stainless steel wall mounts designed to hold the cables specific distances from the wall. All cables have threaded ends for tensioning.

Plants have space to easily weave around the cables providing optimal growth conditions. Wall mounts have backing plates to spread the load on the facade. Climber studs can be added to give plants an extra foothold.

AGS1v - Single Vertical Cable

System No	Orientation	HS mm	S mm	Suitable plant types
AGS1v-200	Vertical	200	80	Slow growing vines
AGS1v-400	Vertical	400	80	Slow growing vines
AGS1v-600	Vertical	600	120	Vigorous vines
AGS1v-800	Vertical	800	160	Vigorous vines
AGS1v-CUST	Vertical	Custom	Custom	

*See page 28 for further component details.
See page 40 for wall mount installation details.



SPECIFICATION BLOCK

Specify as Ronstan AGS1v-XXX Vertical Cable trellis system.
Consists of stainless steel wall mount sets and 4mm cable assemblies.
Aluminium/plastic climber studs to be provided at 500mm centres.

AGS1 - INDIVIDUAL CABLE TRELLIS SYSTEMS

AGS1h

Individual Horizontal Cable Trellis System

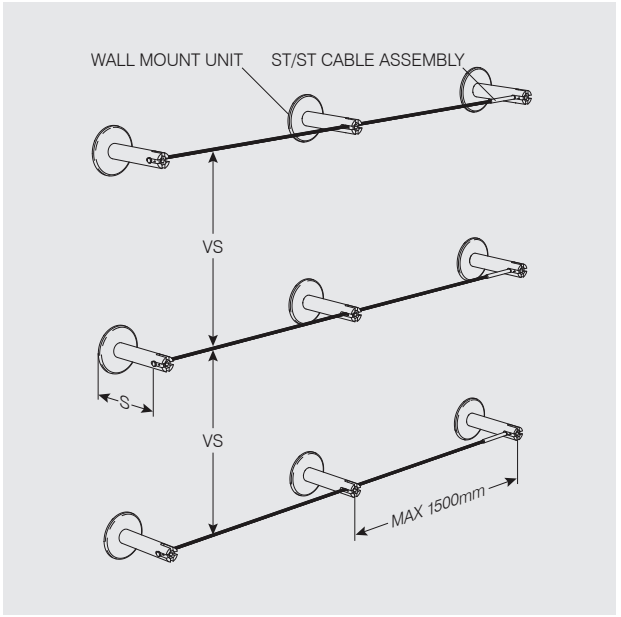
Horizontal cable trellis systems have a cable layout ideal for promoting broad plant growth across the complete width of a facade.

The Ronstan AGS1h horizontal cable trellis system provides essential structure for scrambling plants such as bougainvillea or climbing roses.

The system utilises grade 316 stainless steel wall mounts with backing plates to hold Ronstan 4mm stainless steel cable assemblies. All cables have threaded ends for tensioning.

AGS1v - Single Horizontal Cable				
System No	**Orientation**	**VS mm**	**S mm**	**Suitable plant types**
AGS1h-200	Horizontal	200	80	Slow growing scramblers
AGS1h-400	Horizontal	400	80	Slow growing scramblers
AGS1h-600	Horizontal	600	120	Vigorous scramblers
AGS1h-CUST	Horizontal	Custom	Custom	

*See page 28 for further component details.
See page 40 for wall mount installation details.



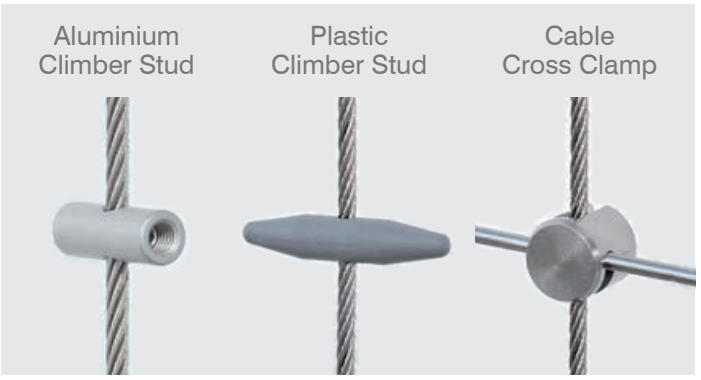
SPECIFICATION BLOCK

Specify as Ronstan AGS1h-XXX Horizontal Cable trellis system.

Consists of stainless steel wall mount sets and 4mm cable assemblies.

AGS1

Components



OTHER CONSIDERATIONS

For large spans or plant loads, heavy duty stands are required. Horizontal systems can sag under plant weight and consideration should always be given to how accessible and climbable your installation is. End stands can be replaced by posts/frames/support as required.

AGS2 - GRID STYLE TRELLIS SYSTEMS

AGS2c

Cable-Cable Grid Style Trellis System

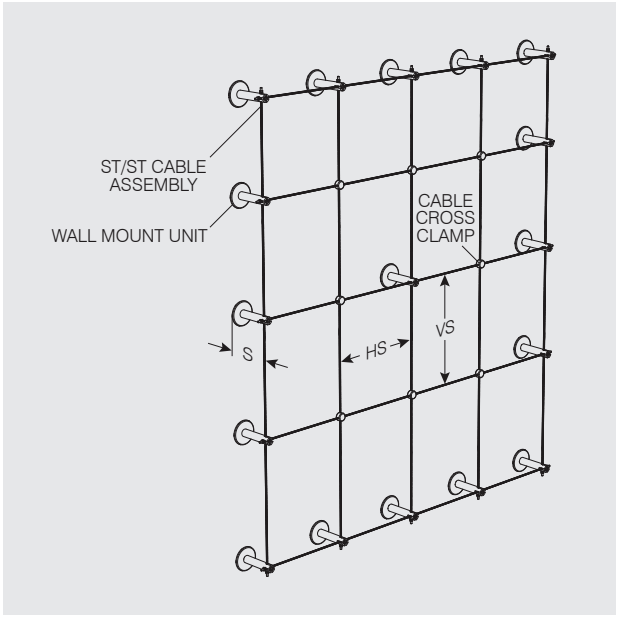
The application of a Grid Style Trellis to your space enables you to train plants upward and sideways to help create a fully filled expanse of lush greenery.

The AGS2c system uses 4mm stainless steel cables to form a tensioned rectangular grid. Ronstan grade 316 stainless steel wall mounts are used at the borders to offset the cable net from the wall and to locate the cable net in the desired position. All cables have threaded ends for tensioning.

Where cables cross they are positively secured with cable cross clamps to create a stable plant growing platform.

AGS2c - Cable-Cable Grid				
System No	**HS mm**	**VS mm**	**S mm**	**Suitable plant types**
AGS2c-150	150	250	80	Slow growing vines and tendril climbers
AGS2c-300	300	500	120	Fast growing vines and tendril climbers
AGS2c-CUST	Custom	Custom	Custom	

*See page 32 for further component details.
See page 40 for wall mount installation details.



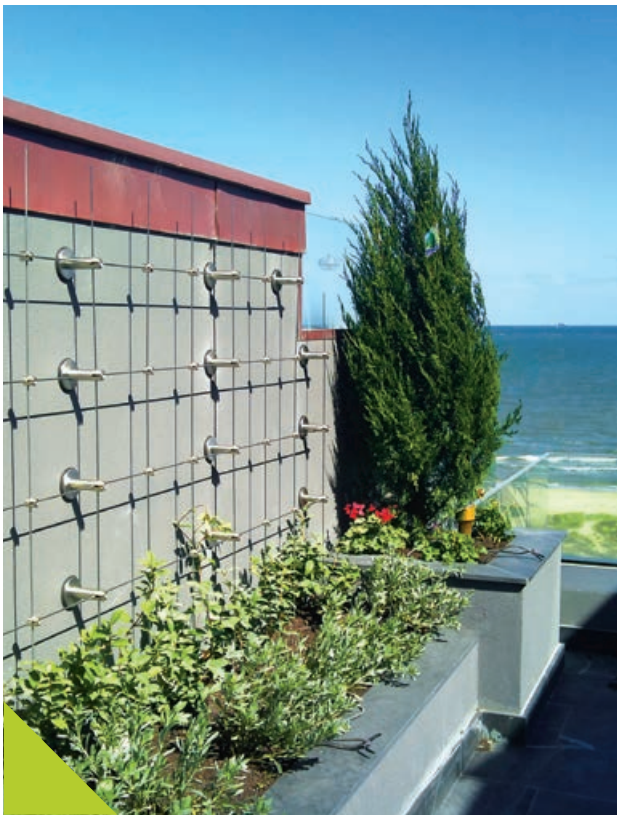
SPECIFICATION BLOCK

Specify as Ronstan AGS2c-XXX Cable-Cable trellis system.
Consists of stainless steel wall mount sets, 4mm cable assemblies and cable cross clamps.

AGS2 - GRID STYLE TRELLIS SYSTEMS

AGS2r

Cable-Rod Grid Style Trellis System



The AGS2r system uses a combination of 4mm stainless steel cables and 4mm rods to form a rectangular grid trellis.

The introduction of rods in one direction reduces the level of tension in the net which helps minimise loads back on the supporting wall while maintaining the effective geometric pattern. Rods can be used in either horizontal or vertical members. AGS2r trellises are ideal for small grid style trellises due to availability of rod lengths.

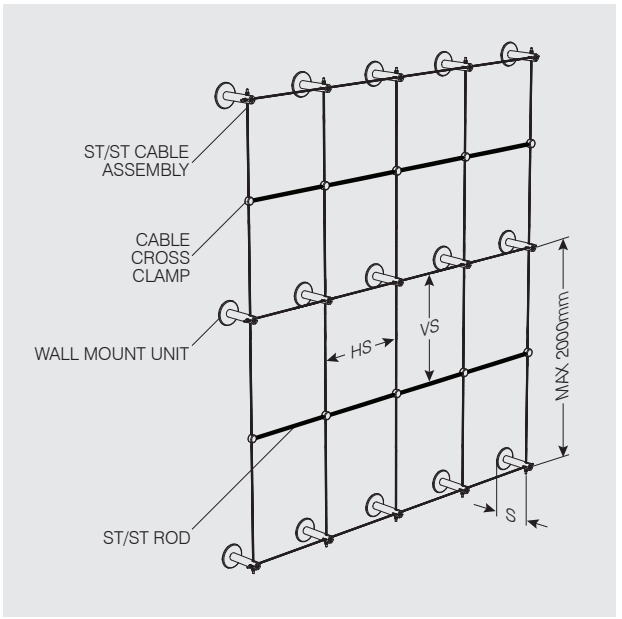
Ronstan grade 316 stainless steel wall mounts are used to offset the cable net from the wall. All cables have threaded ends for tensioning.

Where cables & rods cross they are positively secured with cable cross clamps to create a stable plant growing platform.

AGS2r - Cable-Rod Grid

System No	HS mm	VS mm	S mm	Suitable plant types
AGS2r-150	150	250	80	Slow growing vines and tendril climbers
AGS2r-300	300	500	120	Fast growing vines and tendril climbers
AGS2r-CUST	Custom	Custom	Custom	

*See page 32 for further component details.
See page 40 for wall mount installation details.



SPECIFICATION BLOCK

Specify as Ronstan AGS2r-XXX Cable-Rod Grid trellis system.

Consists of stainless steel wall mount sets, 4mm stainless steel cable assemblies, 4mm stainless steel rods and cable cross clamps.

AGS2 - GRID STYLE TRELLIS SYSTEMS

AGS2a

Cable-Angle Grid Style Trellis System

The AGS2a system is comprised of vertical stainless steel cables supporting horizontal stainless steel / aluminium angles.

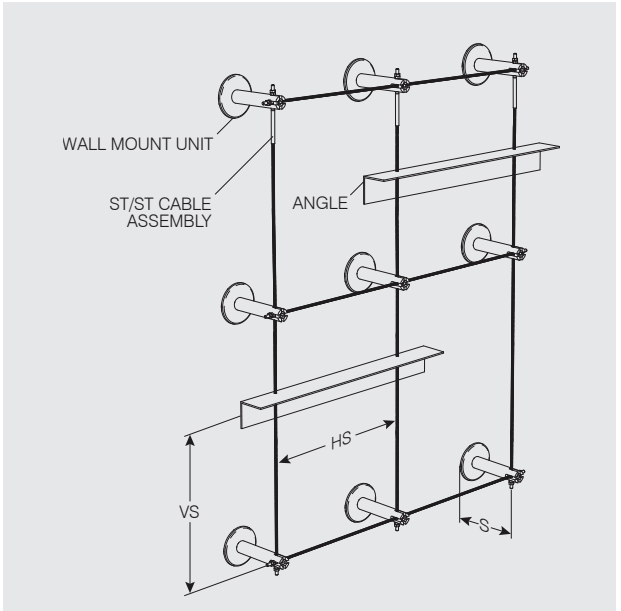
The system's strong horizontal lines and random pattern make for a striking feature on any wall and allow designers to experiment leading plants in deliberate yet spontaneous directions.

Ronstan grade 316 stainless steel wall mounts offset the cable net from the wall and locate it in the desired position. All cables have threaded ends for tensioning. A range of clamps are used to hold the horizontal elements in their desired positions.

AGS2a - Cable-Angle Grid

System No	HS mm	VS mm	S mm	Suitable plant types
AGS2a-150	150	250	80	Slow growing vines and tendril climbers
AGS2a-300	300	500	120	Fast growing vines and tendril climbers
AGS2a-CUST	Custom	Custom	Custom	

*See page 32 for further component details.
See page 40 for wall mount installation details.



SPECIFICATION BLOCK

Specify as Ronstan AGS2a-XXX Cable-Angle Grid trellis system.

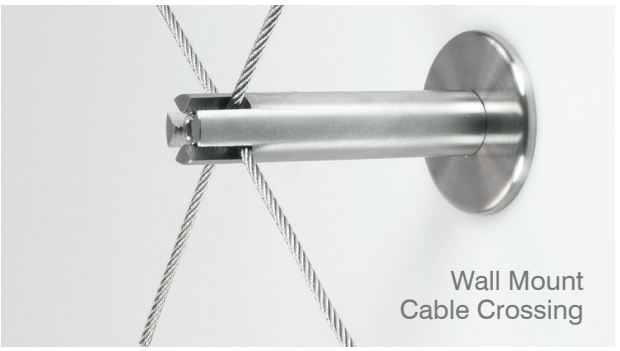
Consists of stainless steel wall mount sets, 4mm stainless steel cable assemblies and stainless steel/aluminium angles.

AGS2
Components

Stainless Steel
Cable Cross Clamp

Plastic
Cable Cross Clamp

Wall Mount
Cable End



Wall Mount
Cable Crossing

Wall Mount & Cable Assembly Connections

OTHER CONSIDERATIONS

For large spans or plant loads, heavy duty stands are required. End stands can be replaced by posts/frames/support as required. Grey plastic cross clamps are included as standard. Stainless steel cross clamps can be used instead if desired.

AGS3 - DIAGONAL GRID STYLE TRELLIS SYSTEMS

AGS3c

Diagonal Cable-Cable Grid Style Trellis System - Stainless Steel

A diagonal grid pattern is a great way of achieving wall coverage as it directs plants to spread naturally both horizontally and vertically without the need for training and pruning.

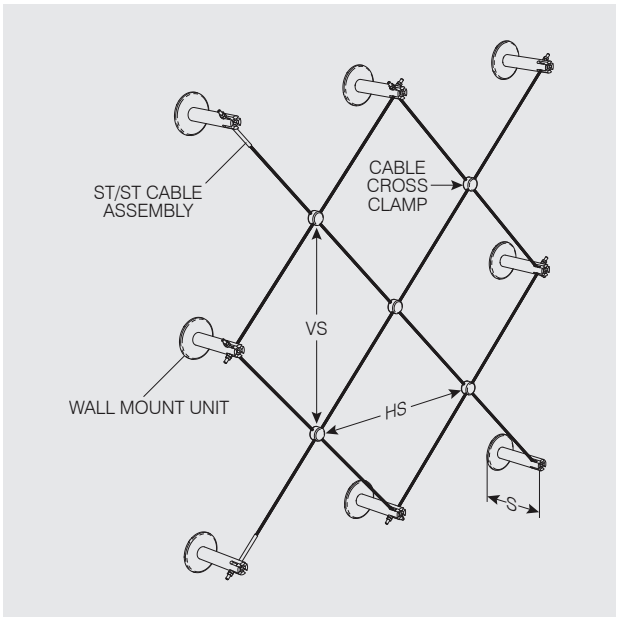
Ronstan's AGS3c trellis system features our grade 316 stainless steel wall mounts for highest strength, resistance to corrosion and longevity. All cables have threaded ends for tensioning.

The fully tensioned system is ideal for commercial applications and provides the necessary structure to promote good plant coverage across large scale facades for all types of climbing plants.

AGS3c - Diagonal Cable Grid Trellis

System No	HS mm	VS mm	S mm	Suitable plant types
AGS3c-200	200	200	80	Slow growing vines and tendril climbers
AGS3c-400	400	400	80	Slow growing vines and tendril climbers
AGS3c-600	600	600	120	Fast growing vines and tendril climbers
AGS3c-800	800	800	160	Fast growing vines and tendril climbers
AGS3c-CUST	Custom	Custom	Custom	

*See page 35 for further component details.
See page 40 for wall mount installation details.



SPECIFICATION BLOCK

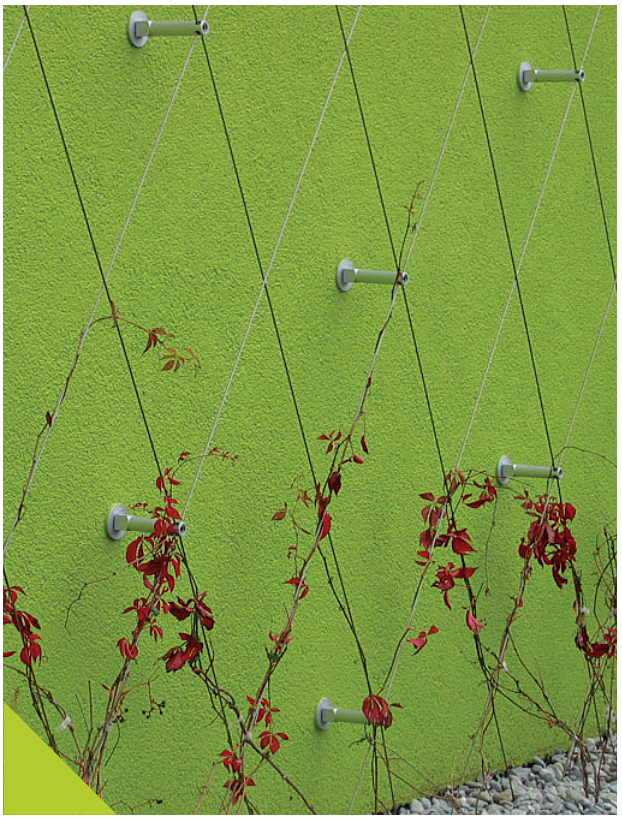
Specify as Ronstan AGS3c-XXX Diagonal Grid trellis system.

Consists of stainless steel wall mount sets with 4mm cable assemblies in a diagonal grid pattern. Plastic/stainless steel cross clamps at intersections.

AGS3 - DIAGONAL GRID STYLE TRELLIS SYSTEMS

AGS3i

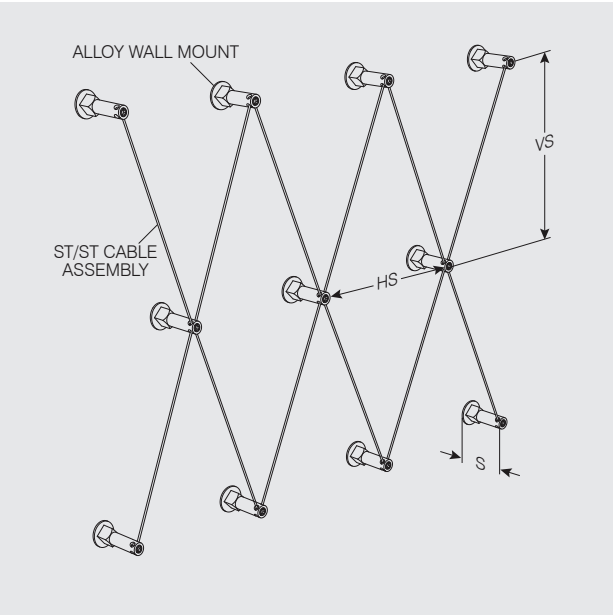
Diagonal Cable-Cable Grid Style Trellis System - Alloy



The AGS3i system delivers the benefits of the diagonal grid trellis in an easy to install and cost effective trellis system.

It utilises purpose designed, aesthetic aluminium wall mounts incorporating unique wire grippers to positively locate and lock the cables when the desired tension is achieved. 4mm stainless cables are simply cut and tensioned by hand on site.

The system holds moderate plant loads and is designed for smaller commercial and residential facades.



AGS3i - Carl Stahl® Greencable Diagonal Grid				
System No	**HS mm**	**VS mm**	**S mm**	**Suitable plant types**
AGS3i-200	200	350	95	Slow growing vines and tendril climbers
AGS3i-400	400	690	95	Slow growing vines and tendril climbers
AGS3i-600	600	1050	150	Fast growing vines and tendril climbers
AGS3i-800	800	1400	150	Fast growing vines and tendril climbers
AGS3i-CUST	Custom	Custom	Custom	

*See page 35 for further component details.
See page 40 for wall mount installation details.

SPECIFICATION BLOCK

Specify as Ronstan AGS3i-XXX Diagonal Grid trellis system.
Consists of Carl Stahl® aluminium wall mount sets with 4mm stainless steel wire rope in a diagonal grid pattern.

AGS3 - DIAGONAL GRID STYLE TRELLIS SYSTEMS

AGS3
Components


AGS3c Stainless Steel Wall Mount


Stainless Steel Cable Cross Clamp


AGS3i Alloy Wall Mount


Plastic Cable Cross Clamp

AGS4 - MESH STYLE TRELLIS SYSTEMS

AGS4c

X-TEND Mesh Trellis System - Cable Border

Carl Stahl® X-TEND mesh is a unique and versatile cable net manufactured from flexible grade 316 stainless steel cable.

When used in greening applications, it can take many forms and meets almost any conceived shape or border profile.

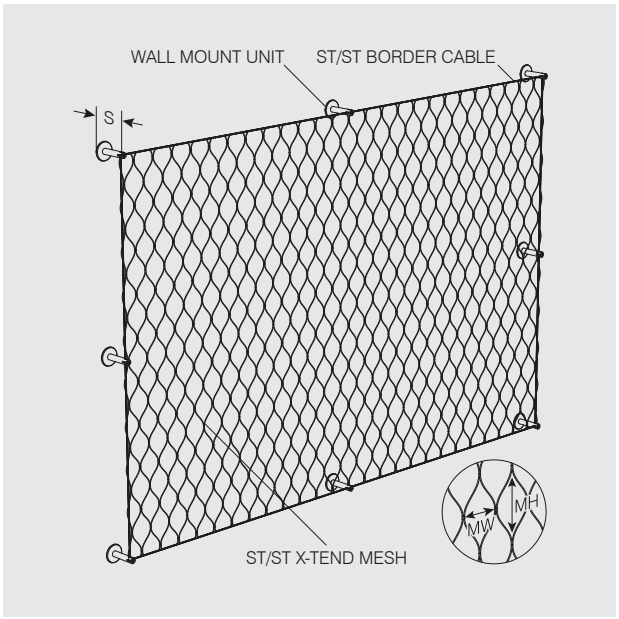
Ronstan AGS4c mesh trellises can span large areas and voids, providing continuous plant support across any structure.

Mesh apertures can be selected according to the project requirements and the mesh is secured at the borders only with cables located on the facade by grade 316 stainless steel wall mounts.

AGS4c - X-TEND Mesh - Cable Border

System No	MW mm	MH mm	S mm	Suitable plant types
AGS4c-100	100	173	80	Slow growing vines and tendril climbers
AGS4c-160	160	208	80	Slow growing vines and tendril climbers
AGS4c-240	240	415	120	Fast growing vines and tendril climbers
AGS4c-300	300	519	160	Fast growing vines and tendril climbers
AGS4c-CUST	Custom	Custom	Custom	

*See page 38 for further component details.
See page 40 for wall mount installation details.



SPECIFICATION BLOCK

Specify as Ronstan AGS4c-XXX Cable Mesh trellis system.

Consists of Carl Stahl® X-TEND mesh panel with Ronstan stainless steel cable border and stainless steel wall mount sets.

AGS4 - MESH STYLE TRELLIS SYSTEMS

AGS4r

X-TEND Mesh Trellis System - Rigid Framed

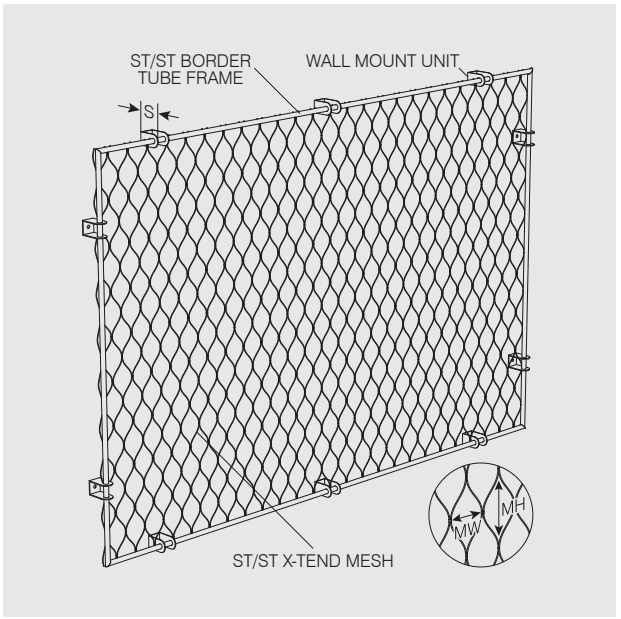
The AGS4r mesh trellis can span large areas and voids, providing continuous plant support across any structure. Again, mesh apertures can be selected according to the project requirements, but in this case the stainless steel mesh is bordered by a rigid stainless steel tube frame. This allows for greater control over border shapes and provides reduced reaction loads to the mating structure.

Our standard systems are basic rectangular configurations, however the flexibility of Carl Stahl® X-TEND mesh can accommodate a broad range of irregular shapes and designs.

AGS4r - X-TEND Mesh - Rigid Framed

System No	MW mm	MH mm	S mm	Suitable plant types
AGS4r-100	100	173	80	Slow growing vines and tendril climbers
AGS4r-160	160	208	80	Slow growing vines and tendril climbers
AGS4r-240	240	415	120	Fast growing vines and tendril climbers
AGS4r-300	300	519	160	Fast growing vines and tendril climbers
AGS4r-CUST	Custom	Custom	Custom	

*See page 38 for further component details.
See page 40 for wall mount installation details.



SPECIFICATION BLOCK

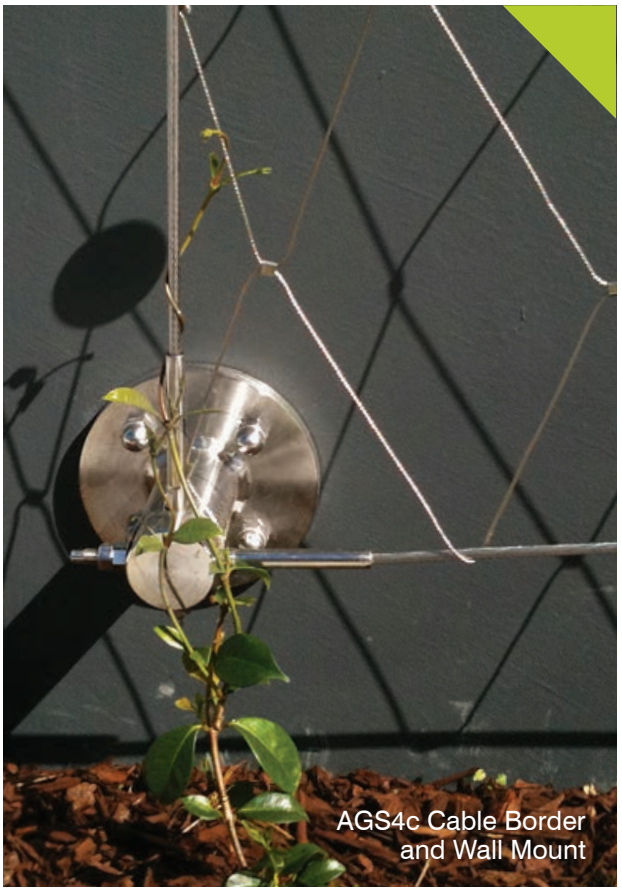
Specify as Ronstan AGS4r-XXX Rigid Framed Mesh trellis system.
Consists of Carl Stahl® X-TEND mesh panel with stainless steel tube border frame and stainless steel wall mount sets.

AGS4 - MESH STYLE TRELLIS SYSTEMS

AGS4
Components


Stainless Steel
X-TEND Mesh


AGS4r Rigid Border
and Wall Mount


AGS4c Cable Border
and Wall Mount

AGS5 - EASY GREEN™ CABLE TRELLIS SYSTEM

AGS5

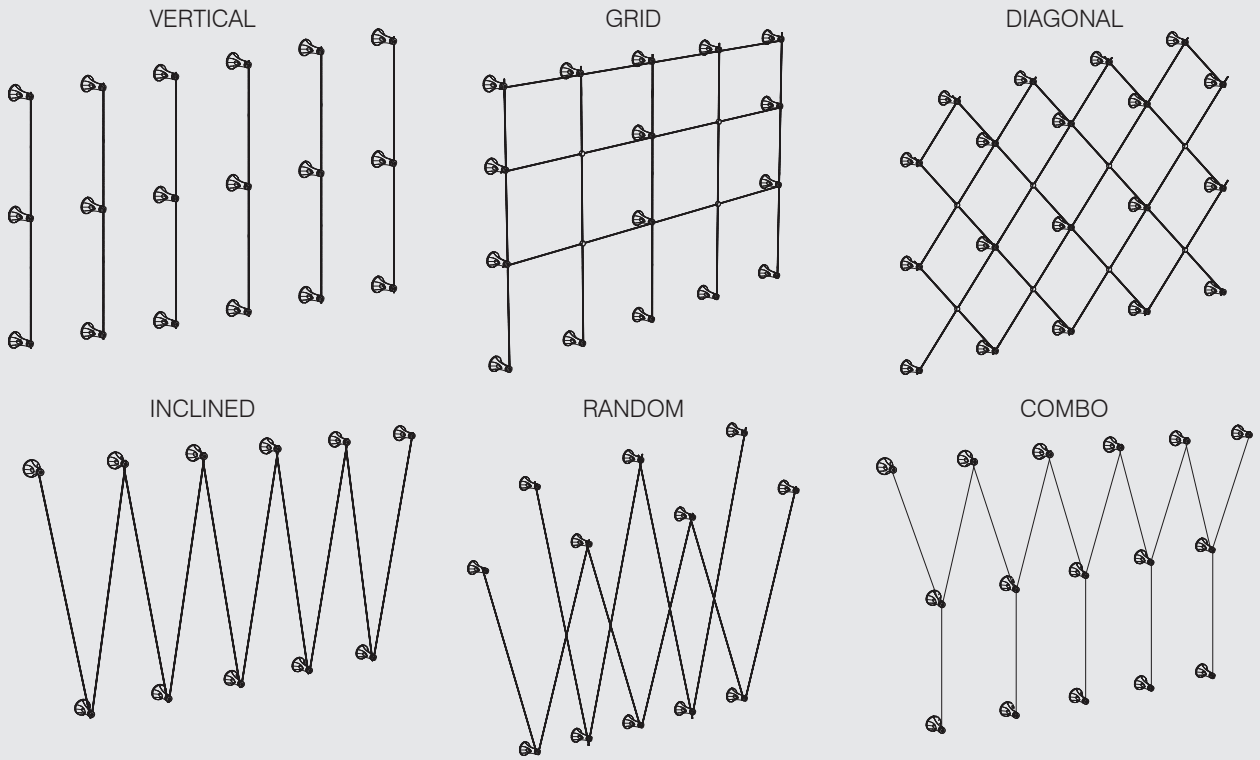
Ronstan Easy Green™ Trellis System

The new Easy Green™ cable trellis system provides essential structure for climbing plants and is designed to encourage plant growth up residential walls and commercial facades.

Available as single wall mounts or in DIY kit form, Easy Green™ is a simple and practical way to beautify or hide boundary walls and fences behind green climbing plants.

Wall mounts utilise an innovative, fully adjustable, swivelling head to clamp 4mm stainless steel cable in varying trellis layouts and patterns without the need for turnbuckles.

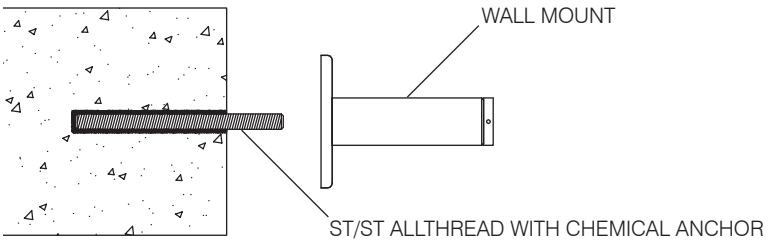
The high strength UV resistant composite construction of Easy Green™ matches the performance of stainless alternatives at a fraction of the cost, is simple to install, and fully recyclable.



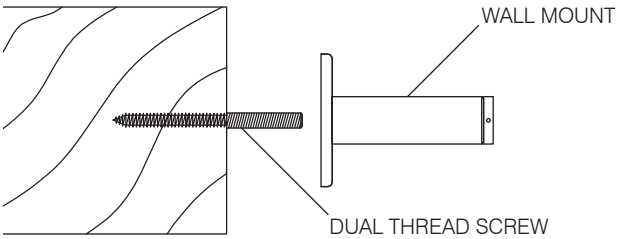
POSSIBLE LAYOUT OPTIONS - Layouts to be considered in the context of “Designing Green Facades & Trellises” pages 5-9

AGS wall mount recommended installation

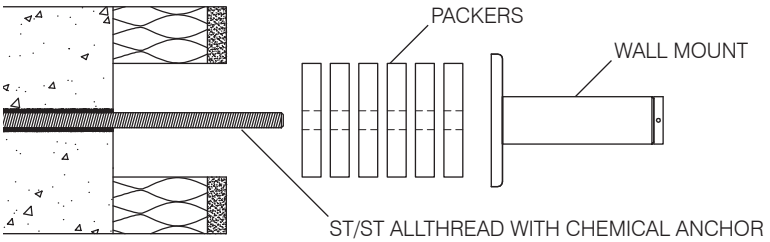
Concrete / Masonry



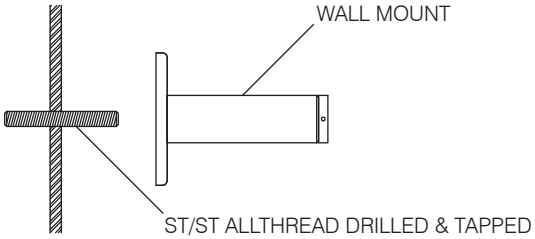
Timber

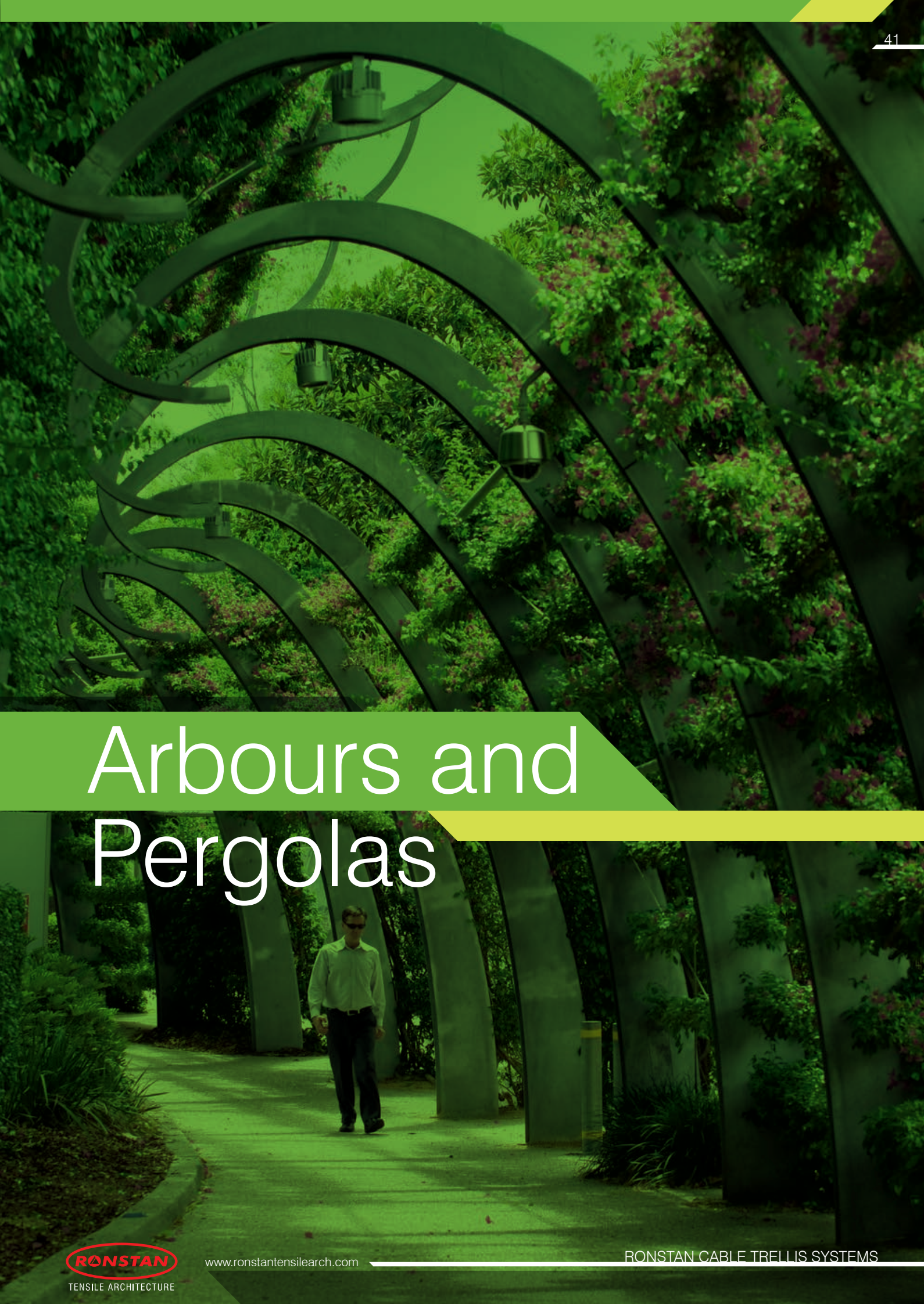


Cladded Surfaces



Steel Sections





Arbours and Pergolas

Owner SOUTH BANK CORPORATION
Architect DENTON CORKER MARSHALL
Builder CONCRETE CONSTRUCTIONS

South Bank Grand Arbour

Brisbane, Australia

The iconic Southbank Grand Arbour is both an architectural and a horticultural masterpiece. It spans approximately one kilometre and stands resolutely on 443 custom fabricated steel tendril-like columns, of which no two are the same.

Ronstan supplied 16km of 6mm stainless steel cables providing the essential support to facilitate plant growth and to transfer plant loads to the columns. The vibrant display of magenta coloured bougainvillea is the result of a rigid maintenance program which ensures the arbour always looks it's best. This award winning arbour has become a defining symbol of Brisbane's South Bank.

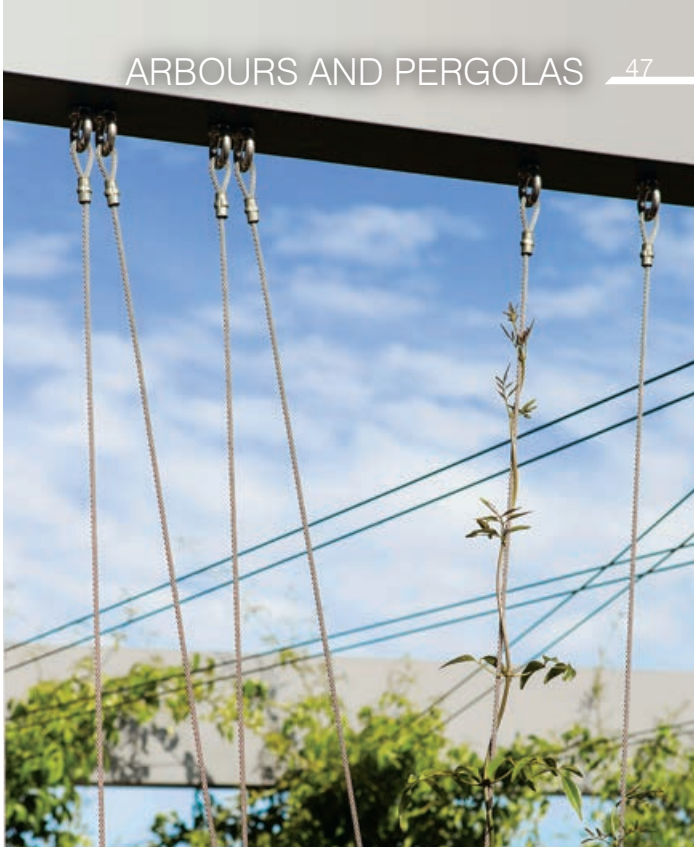
Owner NATIONAL GALLERY OF VICTORIA
Landscape Architect SINATRA MURPHY

National Gallery of Victoria

Melbourne, Australia

Sinatra Murphy's vision for the cantilevered wisteria arbours at the National Gallery of Victoria was to create elegant living canopies with a light structural language that would be concealed as the climbers matured over time. The two structures were considered important additions to the garden's sculpture collection and spatial organisation. They are unique to the National Gallery of Victoria and were conceptualised independently from Sinatra Murphy's broader scope of resolving and realising Mario Bellini Architect's concept for the sculpture garden.

Phin Murphy, Sinatra Murphy Studio



Architect HASSELL
Builder GROCON

Government Services Offices

Dandenong, Australia

The “Loggia” as it is called is a communal roof garden for the employees of the Government Services Offices in Dandenong. The designers used Ronstan stainless steel cables, arranged in zig-zag patterns, to create a unique structure for plants to climb up and across the canopy of the pergola. In addition to its aesthetic interest, the plant canopy also provides protection to users of the space from the hot Australian sun.

The Government Services Offices has been awarded the Australian Institute of Architects (Victoria) Award for Commercial Architecture. It has also received a 6-Star Greenstar rating from the Green Building Council of Australia.

Owner MODERN INVESTMENT PTY LTD
Architect WILLIAMSON ARCHITECTS
Landscape Architect DUNN MORAN LANDSCAPE ARCHITECTS
Builder BLACK WATER PROJECTS

Lakes Vista

Brisbane, Australia

Even the simplest of projects can achieve spectacular results when creativity and good design are combined. The designers included an interesting twist in the design of Lake Vista with the inclusion of a striking green arbour at Lakes Vista. The strong architectural presence of the slanted columns and roof is softened by a light screen of creepers and balanced on the other side by a series of impressive “pillars” of green. The plant pillars are actually tensioned members made up of Ronstan stainless steel cables. Stainless steel cables were also used to form the base net structure of the creeper screens.

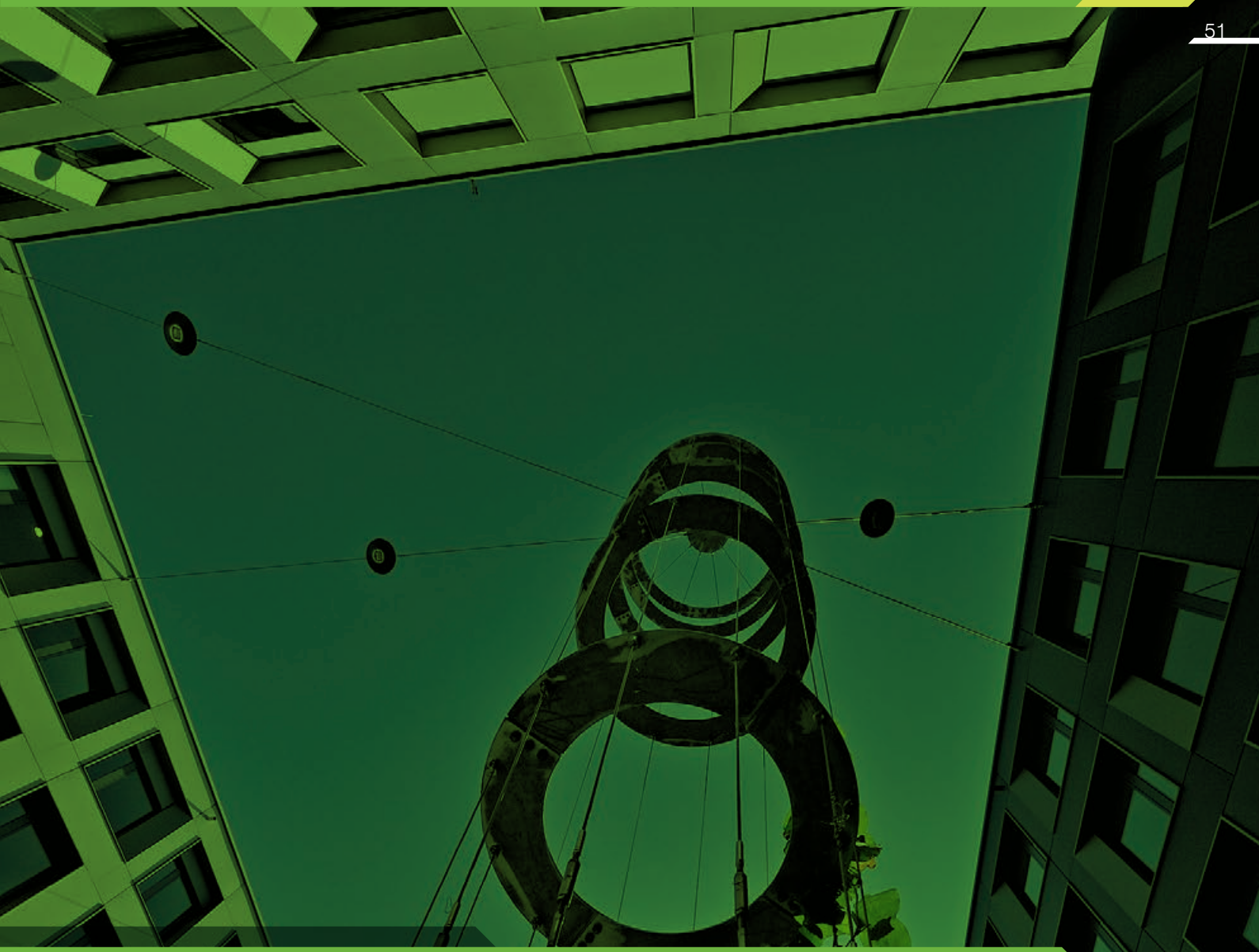
Owner UNIVERSITY OF QUEENSLAND
Architect WOODHEAD
Landscape Architect WILSON ARCHITECTS
Builder BAULDERSTONE

Pharmacy Australia Centre of Excellence

Dutton Park, Australia

The current buildings form the eastern and southern edge of a building precinct which may in time encircle the entire outdoor plaza. The pergola's were proposed as a means of providing shaded seating along the westerly exposed edge of the space and became paramount to the success of the plaza. The tensioned wire pergola structure allowed for a cost efficient light weight response, which retained the views through to the city beyond yet provided shade over head. The wire structure provided an excellent support system for the scrambling Tracheospermum Jasminioides, which festoons itself along this edge providing a green, perfumed edge to the plaza.

John Harrison, Wilson Landscape Architects



Green Sculptures

Owner QUEENSLAND GOVERNMENT
Architect ARCHITECTUS + GUYMER BAILEY ARCHITECTS
Builder BOVIS LENDLEASE

QEII Courts of Law Complex, Brisbane Supreme Court

Brisbane, Australia

Brisbane's new Supreme Court Building houses a wonderfully unique application of 'vertical greening'. Within the building's transparent atria, located from Levels 3 to 5 and 12 to 17, stand forty floor-to-ceiling cable trellises. Spanning 20m in height these custom trellises provide structure for the plants to weave their way upwards. The results are spectacular with the structures providing a refreshing and unique experience for those lucky enough to visit.

Owner RMIT UNIVERSITY
Architect LYONS ARCHITECTS
Landscape Architect RUSH WRIGHT ASSOCIATES
Builder BROOKFIELD MULTIPLEX

RMIT Swanston Academic Building

Melbourne, Australia

The Swanston Academic Building is the new state-of-the-art educational facility at the RMIT University. The building is a community hub for students, as well as a formal learning space. Break out areas for studying and socialising have been designed as vibrant environments that encourage engagement between students. Each of these areas has its own unique landscape features. Four of the breakout areas feature bespoke stainless steel cable structures designed for climbing plants. Ronstan provided assistance to the landscape architects in the early stages to ensure that the detail of these structures was buildable and then installed the works, ensuring that none of the design intent was lost in translation.

Owner DEPARTMENT OF SUSTAINABILITY & ENVIRONMENT + DEPARTMENT OF JUSTICE
Architect HASSELL ARCHITECTS
Builder GROCON

Government Services Office

Dandenong, Australia

These custom seats/planter boxes were installed in two “pocket atria “ within the award winning Government Services Office Building. Each seat features Ronstan stainless steel cables radiating from a circular ring on the planter box which split into two smaller circles at the ceiling. In keeping with the minimalist design of the surrounding space, the custom fabricated brackets, which support the cables ,were concealed within the planter box and the ceiling ensuring only the plants and cables were visible. Devil’s Ivy was chosen for its low light tolerance and fast growth rate.

Owner CITY OF MELBOURNE
Architect DESIGN INC.
Builder HANSEN YUNCKEN

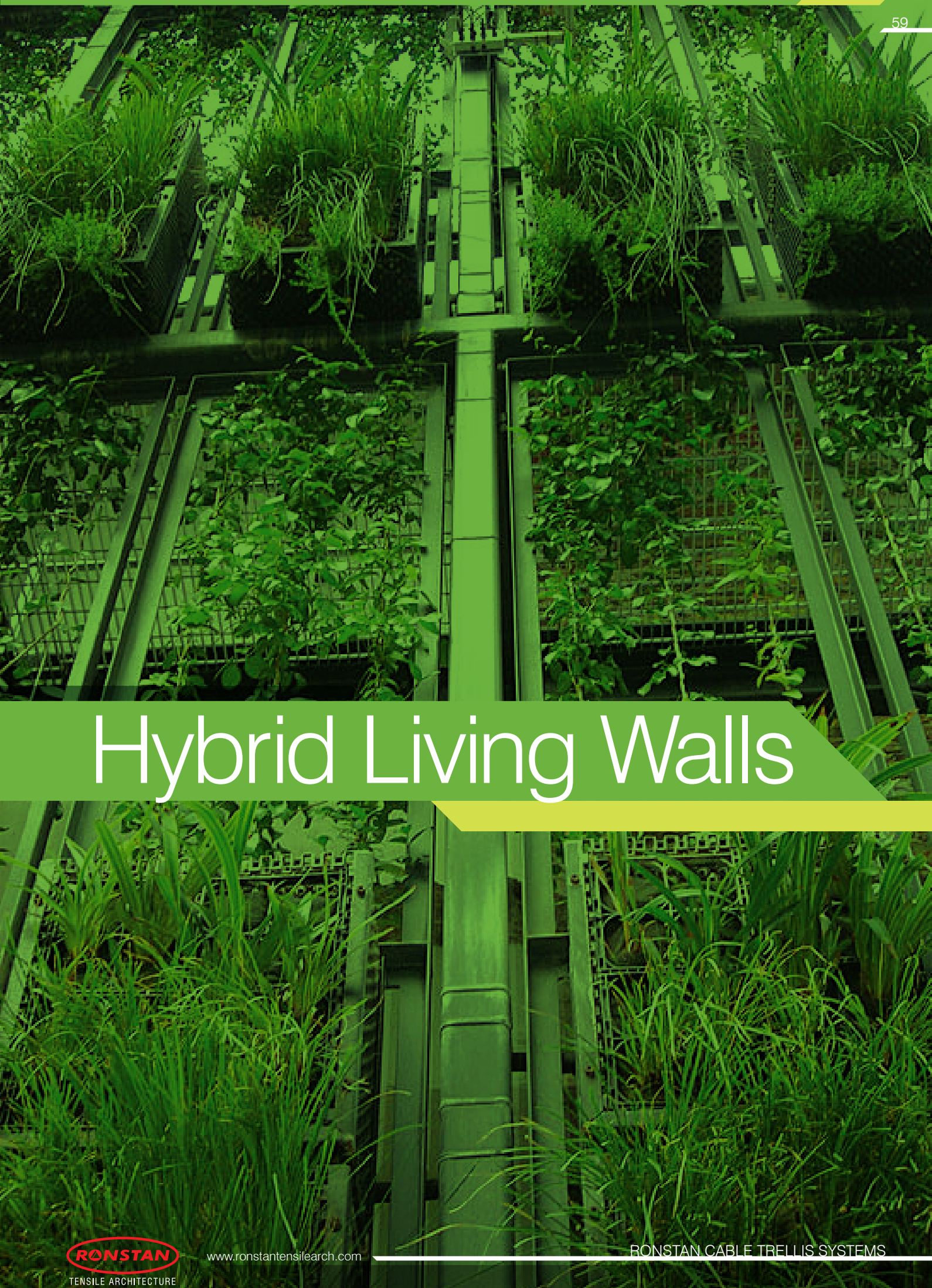
Council House 2, Rooftop

Melbourne, Australia

Adequate space for passive recreational activities is an important part of sustainable design. Design Inc considered this well at the City of Melbourne's 6 Star CH2 Building, which has a roof top garden displaying a wide range of Ronstan mesh cable trellis solutions. Collectively, they provide a calming leafy environment where staff can relax and revitalise.

Greening columns

RONSTAN
TENSILE ARCHITECTURE



Hybrid Living Walls

Owner CITY OF MOUNT GAMBIER
Architect CHAPMAN HERBERT
Builder WALTON CONSTRUCTION

Main Corner

Mt Gambier, Australia

This is one of the very first projects in Australia to use the hybrid design. In this green wall, the lower section of the wall uses vertical cable trellises as support for vines planted in the garden beds on the ground. X-TEND mesh was installed on the upper sections of the wall providing structure for the creepers growing from central living wall planters.

The wall is perfectly located in front of the glass wall of the reception area behind. It provides shading and privacy while still allowing occupants a view to the outside.

Owner ASPEN DEVELOPMENT
Architect WOODS BAGGOT
Designer/Researcher FIFTH CREEK STUDIO

Central City Tower 8

Adelaide, Australia

This project was primarily built to research the benefits and feasibility of installing Green Wall systems on medium to high rise buildings. The clever design combines living wall planter units combined with stainless steel trellising to take maximum advantage of both systems. Ronstan stainless steel cables and mesh of varying spacing and apertures was installed on the modules to test which would provide the best growing structure for different plant species. The project recorded impressive results in terms of reduction in temperature, CO_2 levels and wind speed. The prototype wall was grown on the ground at the same time the City Tower 8 building was being constructed. It was later relocated to the face of the tower upon it's completion.

In 2013, the Hybrid Living Wall project won the AILA (SA) Award for Research and Communication in Landscape Architecture. Ronstan were pleased to be involved in this breakthrough research project.

Owner NORTON ROSE FULLBRIGHT
Architect CARR ARCHITECTS
Builder BUILT

Norton Rose Fulbright Office

Brisbane, Australia

Continuing Norton Rose Fulbright's tradition of striving for innovation and excellence, the new office at One One One Eagle Street Brisbane combines highly considered design and environmentally sustainable principles. The fitout not only meets the building's 5 Star NABERS rating, but also is expecting to receive a 5 Star Greenstar Certification. The workplace has a very strong focus on indoor environmental quality reflecting the firm's commitment to employee wellbeing.

Kate Jackson, CARR Design Group

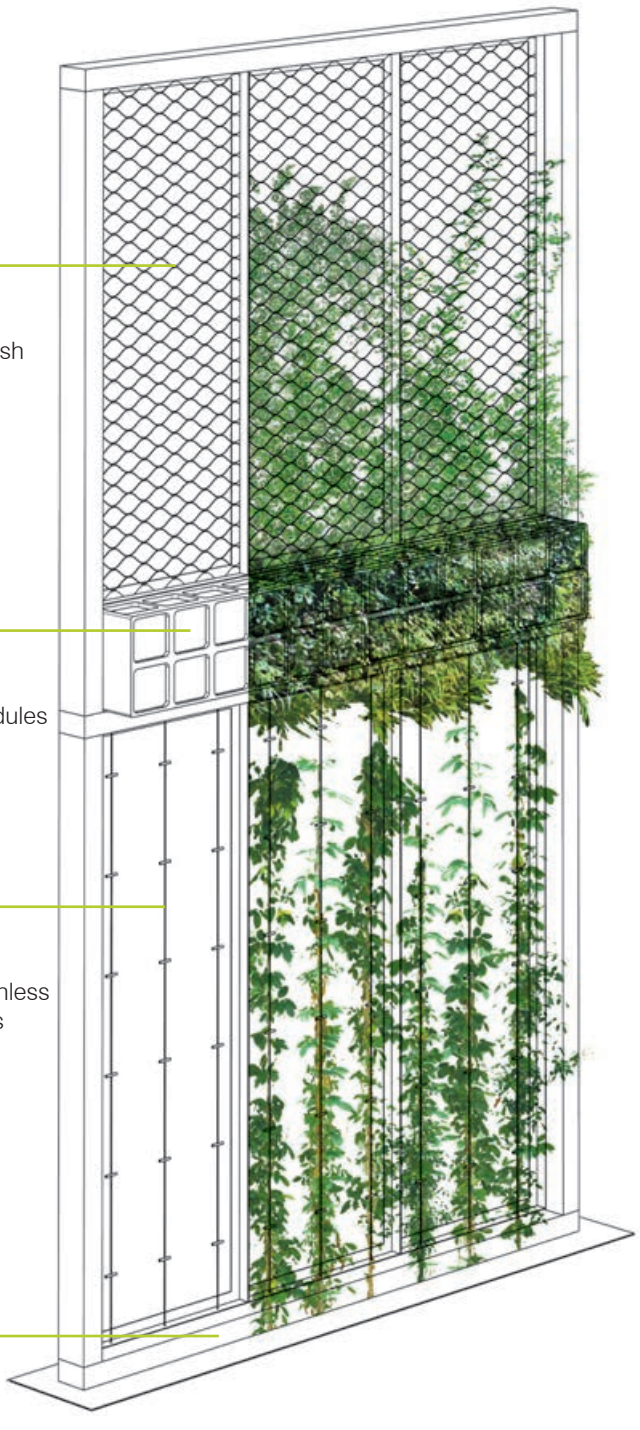
Owner SPARKASSE INNSBRUCK
Architect WIESFLECKER, INNSBRUCK
Builder ZEMAN, WIEN
Installer CARL STAHL, AUSTRIA

Nach Optischer Abnahme

This “hybrid” green wall completed by our partners, Carl Stahl®, performs multiple functions. The living wall planter balustrades are bordered by X-TEND mesh of 1.5mm diameter x 120mm aperture, providing structure for climbing plants as well as a protective barrier against falls. When fully grown, plants will cascade from the planters to marry in uniform cover with climbers growing upwards from the floors below.

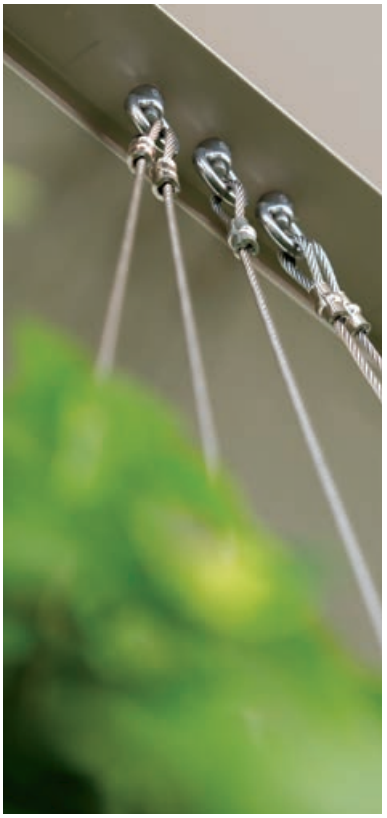
The hybrid living wall system

The hybrid living wall system is a smarter, cheaper and more efficient alternative to living walls, which are typically solely comprised of planter modules and significant volumes of plant growing media. The hybrid system uses a combination of living wall planter modules with the addition of trellises to achieve optimum wall coverage at a fraction of the square metre cost.



DEFINITIONS & CONSIDERATIONS

Further information and warranty



Engineering Loads

The differing growth characteristics of plant species will impose different loads onto the cables – direct plant loads and wind loads. These loads will be transferred through the system connections to the building face. The ability of the mating building structure to withstand these loads must be considered along with any relevant factors of safety or load requirements of the materials used in the mating structure itself. Safety implications, service life, fatigue (as may be caused by wind stresses or repetitive cyclical loading), type of load, exposure to ultraviolet light, corrosion and stress corrosion (such as in high humidity or chlorine environments) must be considered.

System Selection and Growth

Considerations for the selection of the specific species of climbing plant are varied and numerous. There is no short-cut for careful planning. Consultation with a horticulturist is advised to ensure the correct match of system and species is made for satisfactory growth. Plant weight/loads, site conditions like exposure to wind, the proximity of other buildings, aspect, soil conditions and reticulation all need careful consideration.

Product Information Amendments

All catalogue information is subject to specification changes during a product's life-cycle. Any alterations will be posted on the Website: www.ronstantensilearch.com which should be considered the most up to date source of product information.

Useful Life

No guarantee can be provided for product life, load capacity or any other factor due to the variability in usage. While every precaution is taken in the product design and manufacturing processes to minimise the effects of corrosion and stress corrosion, there are also preventative and corrective treatments that can be carried out after installation.
Contact your local Ronstan representative for further assistance and advice.

Warranty

In addition to your rights implied by law, the goods manufactured or sold are warranted to be free of defects in materials or workmanship for three (3) years from the date of purchase by the original purchaser except that:

- This warranty shall not apply to any product which has been improperly fitted, improperly maintained, or used in any application for which it was not intended.
- This warranty shall not apply to normal wear which can reasonably be expected in normal use of the product.
- No warranties are made that any products are fit for a particular purpose.
- The liability shall be limited to the repair or replacement, at the manufacturer's discretion, of the defective goods.
- The useful life of any rigging product is determined by the above factors and must be assessed in each application, and thus no guarantee can be provided for product life, load capacity or any other factor due to the variability in usage.

RONSTAN

TENSILE ARCHITECTURE

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