

THE WAY TO BUILD

ODAY AND FOR THE FUTURE

www. green precast systems. com

GREEN PRECAST SYSTEMS





SALVATORE SAKER GREEN PRECAST SYSTEMS AND TECHNOLOGIES INTERNATIONAL

Our goal at Green Precast Systems is to continuously research, develop, manufacture and deliver highest quality, environmentally friendly, 3D monolithic precast concrete structural dwellings to be utilized for large scale projects with repetitious design, requiring strong, high quality, speedy modular construction (achieving up to 10 dwellings of 500sqm each, per 24 hour cycle).

The patented 3D monolithic Green Precast System is extremely responsive to architectural designs, highly efficient for repetitious projects and can be adapted in any situation, from urban cities to more remote, isolated locations. The Green Precast System is currently managing a global demand for its patented technologies.

Following decades of research and development, it is with great pride that Green Precast's mission is proving highly successful. We are systematically changing the way the construction world once looked at and evaluated the precast construction element and the precast industry.

Green Precast with it's patented 3D monolithic system has managed to make the precast industry greener, stronger, faster, safer and more sustainable. Everyone in the 'development chain' is a winner!

Our vision to provide all nations around the world with a 'superior' sustainable and environmentally friendly building solution. We understand the real needs of the consultant's and developer with regards to time and efficiency; the contractor's need for a safer working environment and the end user who demands a high quality product, peace of mind and minimal maintenance. The ability to meet all these criteria is why the Green Precast System is proving successful!

The Green Precast System is making its mark in establishing a strong footprint in the international markets; with remarkable demand from different world market segments in both developed and developing countries.

Green Precast Systems is a SMART technology that has made concrete and steel 'greener'! Integrating a thermal UV-IR reflective paint solution, which has an SRI (Solar Reflective Index) rating of 113%, reflecting Ultra Violet and Infra Red Light to ensure savings up to 50% on ongoing cooling costs; water system, offering up to 90% saving on irrigation and flushing water, and a light solution, offering a saving on energy bills of up to 85%.

Green Precast Systems and Technologies is

NTRODUCTION



GREEN PRECAST SYSTEMS & TECHNOLOGIES

Green Precast Systems and Technologies is a modular precast concrete manufacturer specialising in providing robust, innovative and sustainable building solutions to the construction industry.

Green Precast Systems & Technologies delivers the world's most advanced 3 dimensional monolithic precast concrete building system. A proven technology with over 60 years in the precast industry and continual research and development, the Green Precast System is the most efficient precast system of its kind, delivering superior advantages over most other building systems solutions.

Unlike other precast systems, Green Precast has developed an innovative way to create a fully integrated seamless '5 panels in 1' concrete housing module that can be poured complete with window and door frames, electrical and plumbing conduits already inlaid.

Green Precast Systems and Technologies when combined with other products such as Energy Star Infrared Heat Reflective Shield, Ecobulb lighting systems and grey water gravity operating technology, provides an integrated sustainable approach to construction.

WHAT IS THE GREEN PRECAST SYSTEM?

The Green Precast System is a sophisticated modular precast building method providing a concrete structure finish which that is accurate, with a high quality dramatically reduces overall construction time and provides superior acoustic, thermal and fire rating properties within one process.

Underpinning the construction method are the unique smart moulds employed to produce each module. Each mould is an intricate piece of machinery, manufactured to Green Precast's patented design and specifications and is fully customizable, aside from its fixed internal dimensions.

This means every time a new unit is made, the mould can be customized to meet the architectural requirements specified. Furthermore, doors, windows and any provision for services (electrical, plumbing, etc) can be cast into the outer concrete walls. Each mould is fully automated and hydraulically driven with fine tolerances (+/- 2mm - 5mm) to allow accurate, repetitious casting on a daily basis.

Durable concrete, reinforced with steel, super-plasticised with a low shrinkage rate is poured into a pre-made three dimensional mould and when set, forms the block containing the main components of a structure - the walls and ceiling or walls and floor. These monolothic 3D modules can then be simply arranged and stacked as rooms to produce a self supporting building structure, up to 10 storeys high.

The Green Precast System is ideal for repetitious building projects such as apartments; high end, as well as medium to low end villas, motels/hotels, labour camps, housing units, age-care villas, student accommodation, site offices, industrial buildings and schools - all built to the highest environmental specifications.

A D V A N T A G E S of using the Green Precast System

up to 80% FASTER than traditional construction methods.

up to 50% CHEAPER material and labour costs.

up to 90% WASTE FREE totally relocatable recyclable.

up to 50% STRONGER each unit 1 piece.

On-site manufacture

eliminates transportation and multiple handling.
Stronger, one piece, stackable
3D monolithic concrete construction.

Improved

thermal and acoustic performance. Reduced

operating and ongoing maintenance costs.

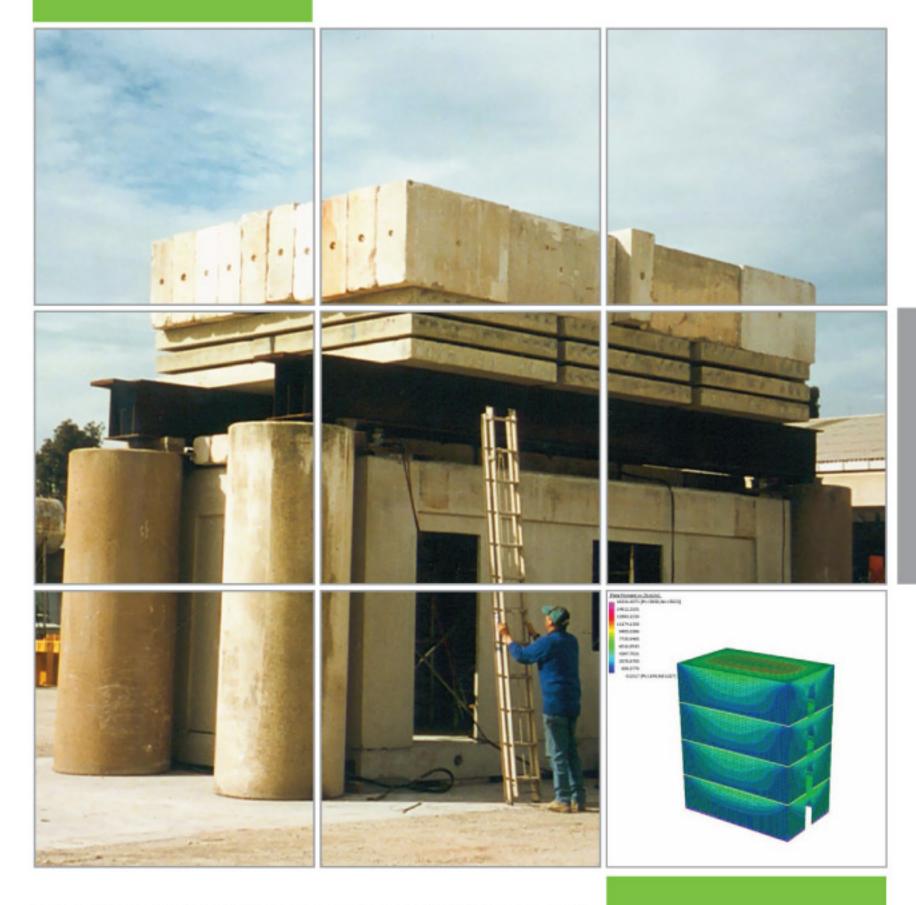
NB. Depending on: 1. Design 2. Time Frame and 3. Project Size.

SPEED



The Green Precast System delivers construction times up to 80% faster than traditional superstructure systems and is ideal for large and repetitious projects where onsite manufacturing delivers optimum benefits.

STRENGTH



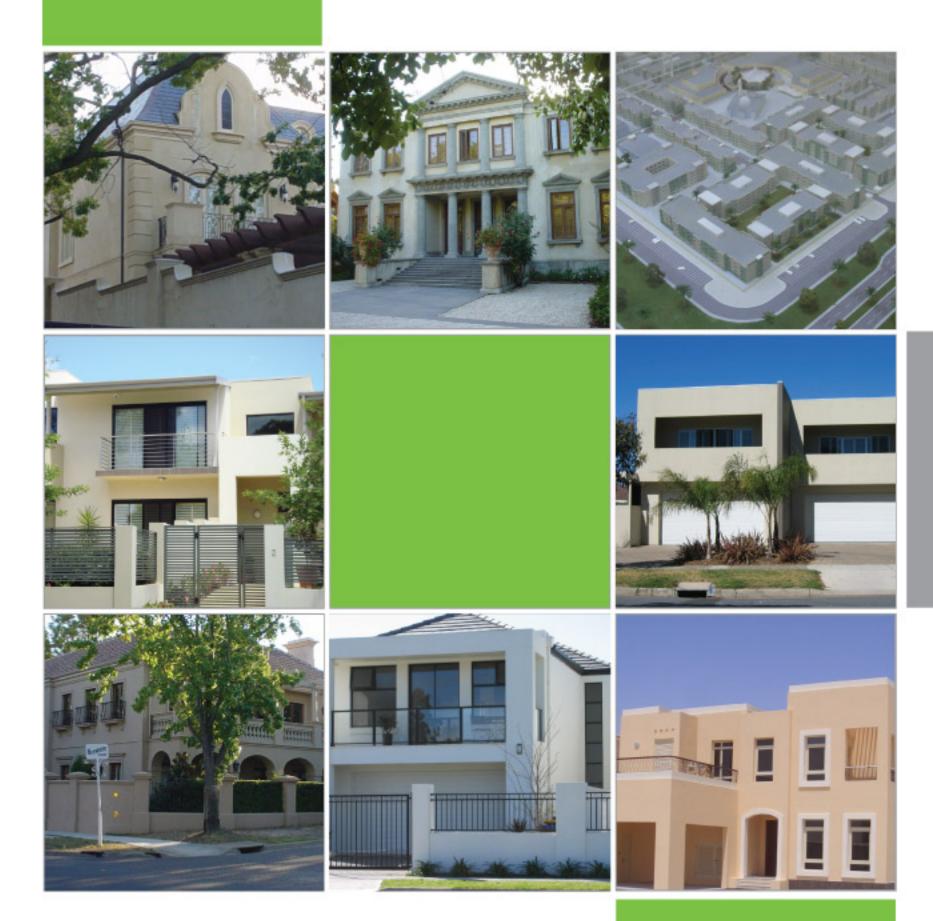
The inherent load bearing strength of each module means that multi-level constructions of up to 10 storeys can be economically and more safely achieved than using tilt slab or traditional practices. The system provides a highly flexible precast building that is strong, durable, fire, termite, cyclone, water and weather proof.

SAFETY



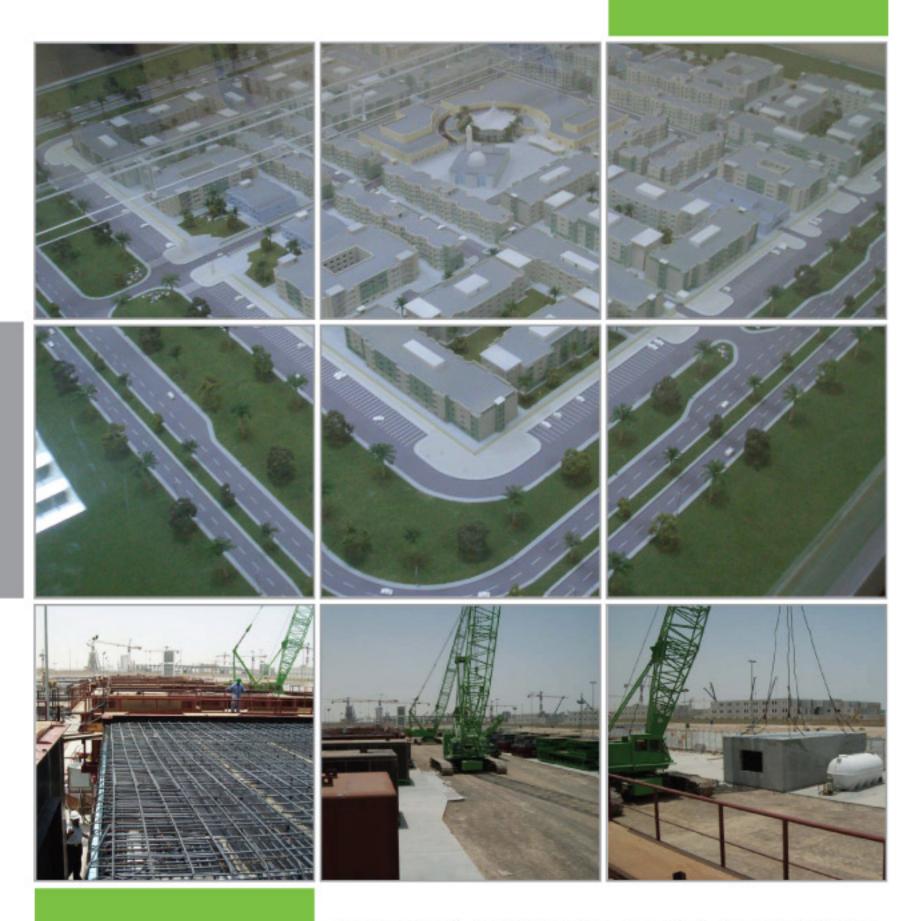
The self supporting system provides a safer work environment than traditional tilt slab construction methods. Requiring no propping, brackets or expensive scaffolding.

DESIGN FLEXIBILITY



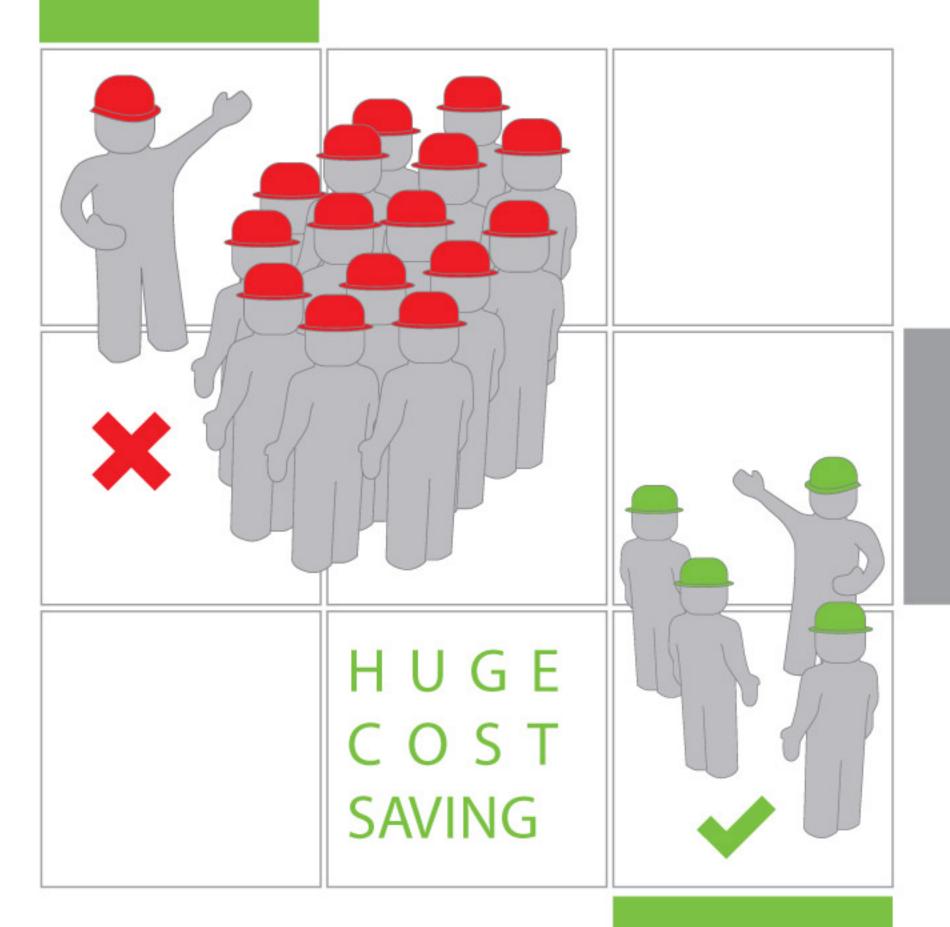
The Green Precast System allows wall, door, window and ceiling openings to suit design requirements and modules can be arranged to create design structures including multi level.

ONSITE PRODUCTION ECONOMICAL



Daily controlled production, fully committed to each individual project, with a Green Precast plant per project.

PRODUCTION EFFICIENCY



Onsite factory controlled fit-outs such as windows, doors, joinery, insulation and even painting can be pre-installed prior to installation, to reduce onsite labour and construction costs.

SURFACE FINISHES



With a Class 1 finish, the off-form quality of wall and ceiling means that plasterwork can be in most instances eliminated.

THERMAL AND ACOUSTIC



The thermal and acoustic qualities of the modules are tremendous, with insulation being embedded within each concrete sandwich. High tech external finishes can further enhance efficiencies.

RELOCATABLE

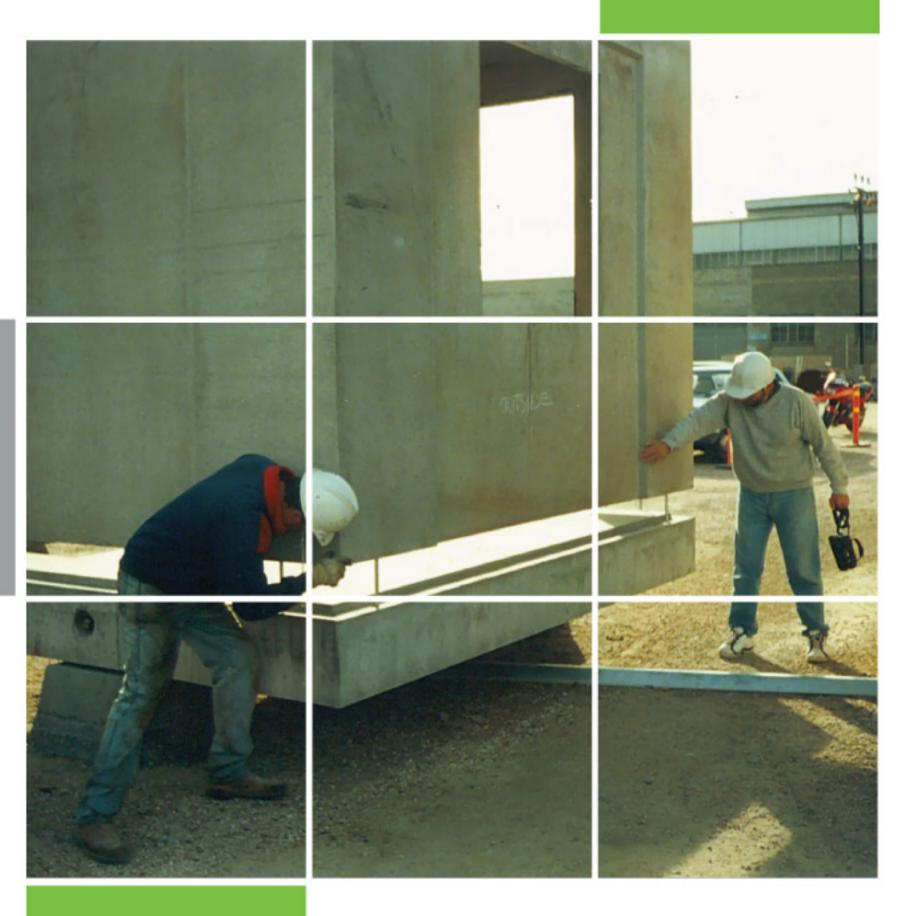


Wastage Free



Virtually wastage free, Green Precast Systems utilises lean manufacturing processes incorporating precise controls of mix formulations, materials and labour input.

PRECISE Engineering



CONSTRUCTION SYSTEMS COMPARISON

Factor	Green Precast Modular	Blockwork	Conventional Panels
Build Concept	 A single trade and subcontract package Cast complete rooms in one piece and install with a single lift Sub-terrain structures 	 Requires separate structures of beams, columns and floor system using precast Wall in-fills need more jointing detail Must use separate floor system for multi-level 	 Flat elements cast on flat table and installed individually and require numerous joints, brackets and grouting
Factory Production	 Monolithic cast of wall units and ceiling, to between the equivalent of 5 and 14 flat panels No brackets, props or vertical joints required Customizable for penetrations and openings Repetitious production of a module 	 More on-site trades: reinforcement, brick or block laying and rendering On-site labour intensive Load-bearing needs to be steel and concrete reinforcement Concrete pump and untidy 	 Larger factory area for equivalent production and many more vertical joints
Insulation	 Closed joints reducing locations for air transfer Mould internal foam layer sandwich panel (200-210mm) External UV reflective coating (up to 100%), available in 45 colours 	= N/A	 Must be cast in foam, walls have a perimeter boarder not containing insulation Many vertical joints Cast in foam layer does not extend to full area of panel
Wastage	 Walls and roof act together structurally minimizing the volume of concrete, steel and reinforcing bars leading to less wastage 	 Excessive site wastage, cleanup, disposal: cutting of bricks and blocks, pallets, mortar, sand piles, hoses and water 	 Minimum 2 layers of reinforcing for insulated walls Requires extra 12m of vertical jointing per room
Finishes	 Internal and external paint can be applied in the production process 	 Only achieved by site application, increased labour cost and inferior accuracy Coloured bricks available but generally need to apply another finish or lining 	 Factory painting not possible due to multiple joints Colour variation as panels are poured separately More visible joints
Labour	 Hydraulic mould requires 8 men to operate up to 80m² per 12 hours Installation requires 3 people 	 Labour intensive Requires more site amenities, supervision, temporary services and scaffolding 	■ Each panel requires 2 man-days (~10 man-days for 5 panels)
Installation	 A single lift No propping or levelling Minimal site fittings, brackets and dowels Solid working platform immediately available for subsequent levels Erect 4-5 levels in one day Greater accuracy, monolithic construction reduces bracket and joint costs ~\$100 per room 	Slow Labour intensive Greater overhead costs	 Multiple small lifts causes delays, 2 levels per day max 5 crane movements to install 1 panel Individual propping and levelling Less accuracy with accumulating errors No immediate working platform until all jointing is completed
Transport and lifting	 1 crane to extract and place for yard and site 	 Extensive scaffolding, materials hoist and safety provisions 	 Need approximately 8 cranes on site
Services	 Windows and door frames, electrical and plumbing conduits built into mould Can cast holes in roof slabs for vertical plumbing service running from top to bottom of building 	Must be progressively manually built in or chased in later	 Impractical to factory install windows Corner electrical joining impossible Plumbing service holes more difficult
Hydronic cooling/ heating	 Pipes can be cast into floor for efficient cooling/heating 	■ Not possible	Difficult/impossible to do with hollow core planks
Safety	 Modern lifting techniques Safe working platforms Limited access to external surface required 	 Excessive site labour with potentially high injury risk Loose power leads, hoses and scaffolding creates safety risks 	 Installation requires temporary phase (propping) with added safety requirement

ECO FRIENDLY





Astec Paints









Waterwise **Systems**



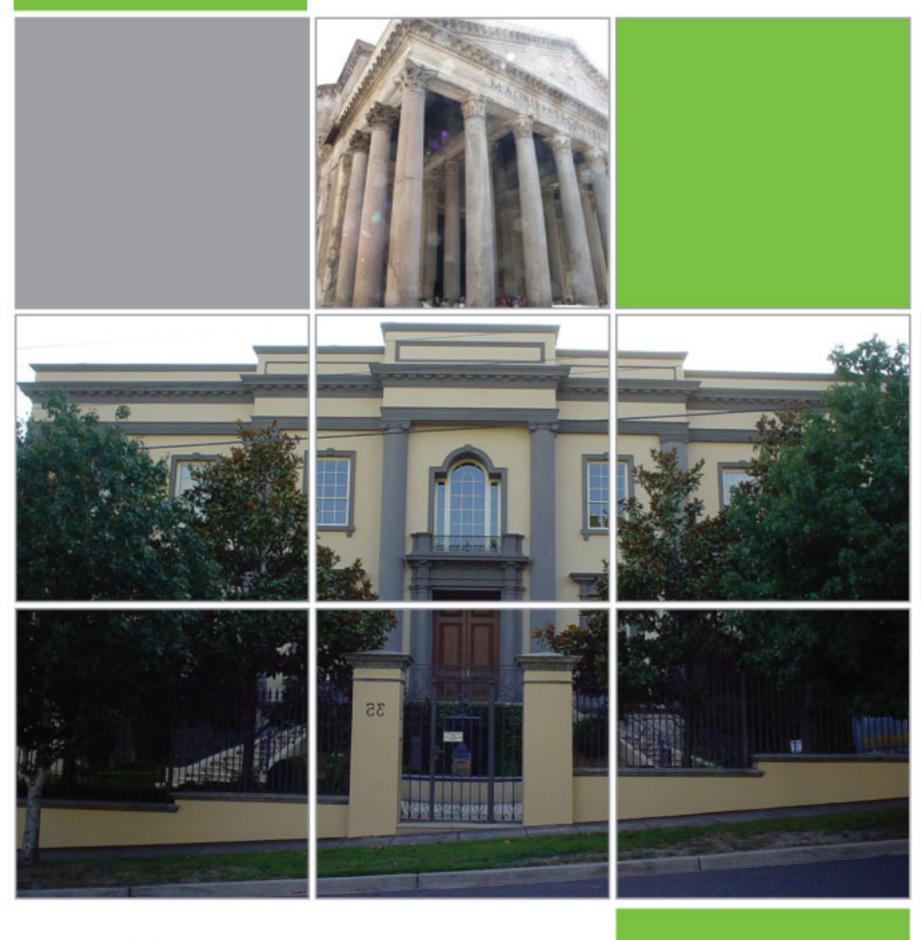
The Green Precast System uses less energy than either structural steel frame components or glass curtain walling.

Recycled materials such as fly ash and slag cement can be incorporated into the concrete mix.

On site construction creates less air pollution, noise and debris as well as eliminating energy intensive multiple handling and haulage.

Incorporating other Green Precast initiatives such as UV-heat reflective thermal shield, grey water system and eco bulb to further enhance as an environmentally friendly unit.

LONGEVITY



50 years + life span.

GREEN PRECAST SYSTEMS



















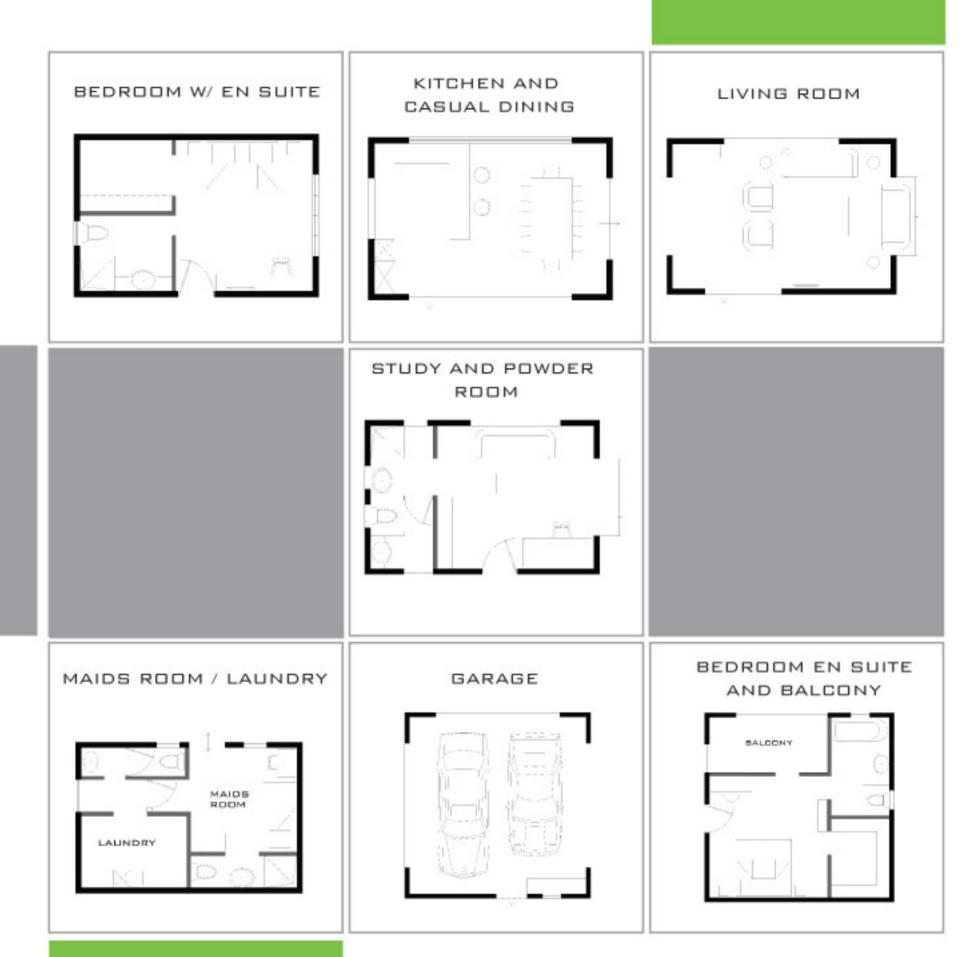


THE WAY TO BUILD TODAY AND FOR THE FUTURE

- Less material and less structural joints.
- Faster construction time regardless of the weather conditions.
- Less detailing and shop drawings (margin for error), production accuracy.
- Less pieces to transport and install.
- Dramatically reduces brackets, bolts, vertical joints to fill.
- In situ fit-out and installation of windows, painting, doors can be done prior to erection.
- Accurate within tolerances of +/- 2mm 5mm.
- Flexible to meet the demands of your design.
- High quality, Class 1 finish.
- Scaffolding NOT required.
- Automated Production System.
- Earthquake resistant

The Green Precast System provides developers with a highly flexible building system that delivers strength, cost and time savings, durability, thermal and acoustic efficiencies and provides structurally superior resistance to natural disasters!

DESIGN PHILOSOPHY



Examples using 6m x 4m and two 3.5m x 7m modules combined.

FLEXIBLE DESIGN

The Green Precast System provides architects and developers with endless design options with wall openings and windows, doors and stairwells that can be pre-moulded into each module. The Green Precast modules are assembled on site according the plans and the rest of the structure is added (roofing, veranda/s, facade decoration, flooring, plumbing and finishing touches such as light fittings, final painting, tiles, carpet etc).

When designing to use the Green Precast System, it is advisable to involve our expert personnel at the earliest stage of concept preparation. Through consultation with your architect and designers, the optimum module sizes can be determined and the maximum efficiencies obtained, without unnecessary change to your concept.

To minimise the number of moulds required to construct a villa, we recommend standardizing dimensions wherever possible in line with the following guides.

Master Bedroom + Robe + Ensuite 4m x 8m

Typical Bedrooms (divisional wall) 4m x 8m

Living Room 4m x 6m

Family Room 4m x 6m

Laundry/bathrooms 3.5m x 3.5m

Garage 7m x 7m

Other module sizes, 10m x 6m and 12.5m x 4.5m can be made to suit your, unique design requirements.

THE MODULAR DESIGN

Every accommodation style designed is a series of rectangles arranged to suit the site parameters, the function, the brief etc. Many of the traditional 'block by block' or 'piece by piece' construction systems can cope with as many different shaped rectangles in a single villa or unit as required. However with a modular precast construction, and in particular the Green Precast technology, the mould sizes are pre-determined so as to maximise the repetitive advantages, therefore the sizes of the rooms need to be standardized or rationalized.

To take this a step further, we need to set sizes for particular functioning rooms and work with the designers to use these parameters when designing their structures. Points of difference in adjacent or subsequent dwellings can be easily achieved using different orientations of the preset modules and using different facade treatments and finishes both internally and externally.

DESIGN PHILOSOPHY



VERTICAL LOAD PATHS

It is important to ensure that the loads of the building are taken to the ground through continuous supports. For this reason it is best the similar sized moulds sit above each-other so that wherever possible the walls from levels 1 and 2 line up above those of the ground level.

However this is not always essential for 2 and 3 level constructions, as the modules have enough strength to take accentric loading subject to engineering approvals.

STRUCTURAL PROPERTIES

The patented Green Precast System uses a hydraulically operated mould which is fully automated and operated so that it can be used many times over. It re-sets itself within 5 minutes for daily use to within 1mm - 5mm accuracy. It has every time been designed to be 'foolproof' so that the harshest site conditions will still enable a module to be poured a on daily cycle.

Penetrations and openings can be cast into the module or cut out later. The roof slab can also be moulded for stair openings, skylights, service ducts, lifts and the like. The Green Precast System modules have even been inverted to provide a concrete base which can be utilised for a range of applications including usage as underground water tanks.

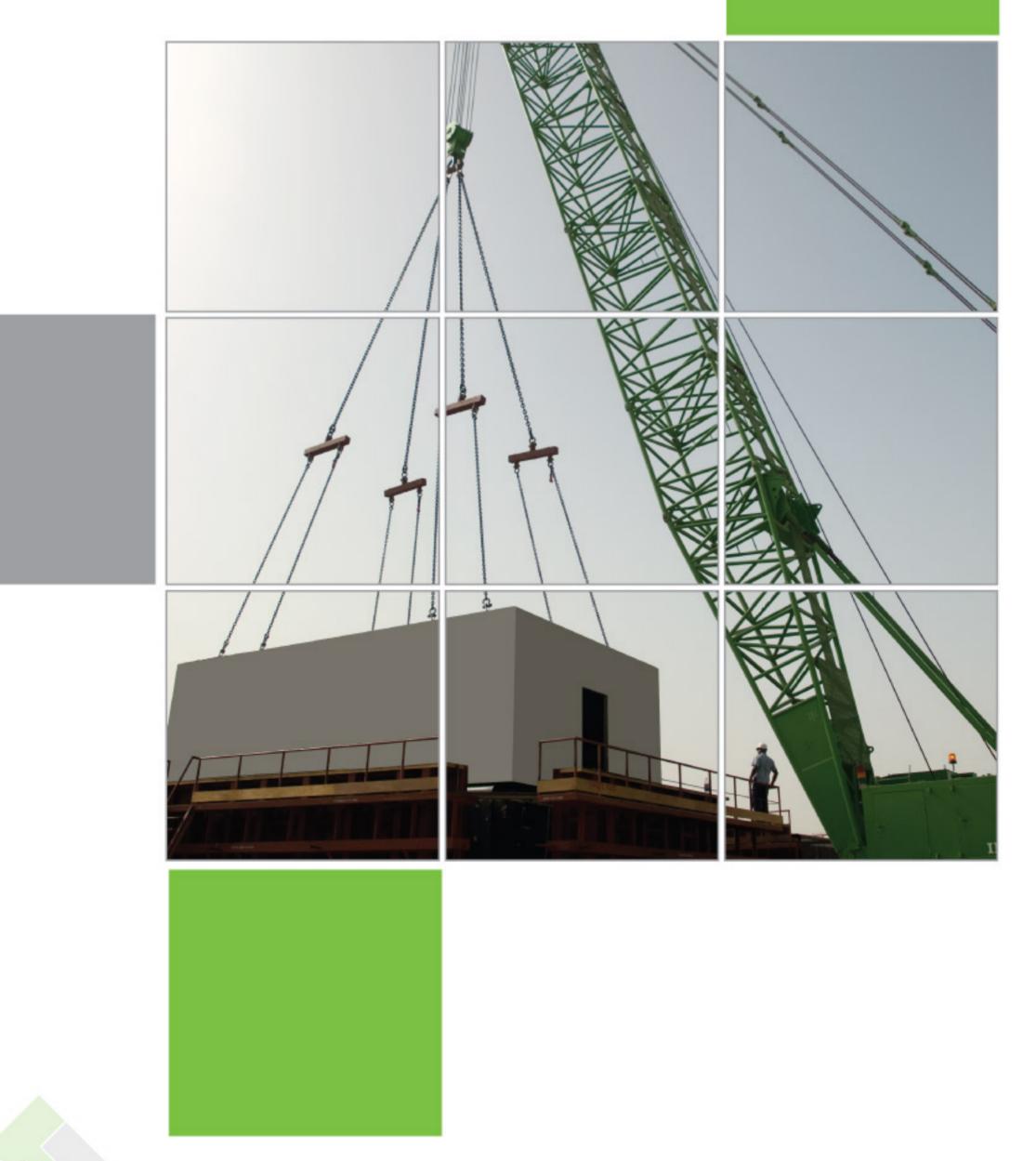
LARGER AND MORE EFFICIENT

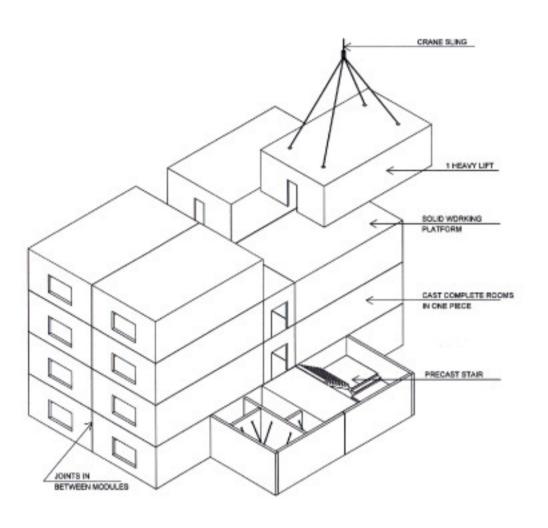
In general the larger the module sizes are the more cost effective they usually are per square metre. However the limit is reached when the cranes required to lift them become too big (and therefore expensive) and engineering of the units themselves required thicker sections or more reinforcement.

The optimum sizes range from 3m x 5m, 3.5m x 3.5m, 3.5m x 7m, 4m x 6m, 4m x 8m.

DESIGN

PHILOSOPHY





GREEN PRECAST MODULAR SYSTEM SOLUTION

BUILD CONCEPT:

Cast complete rooms in one piece with no joints, full moment capacity to vertical and horizontal corners.

Install in 1 lift.

ONSITE PRODUCTION:

Cast walls and floors monolithically, equivalent to a minimum of 5 and up to 14 flat pieces, depending on element size.

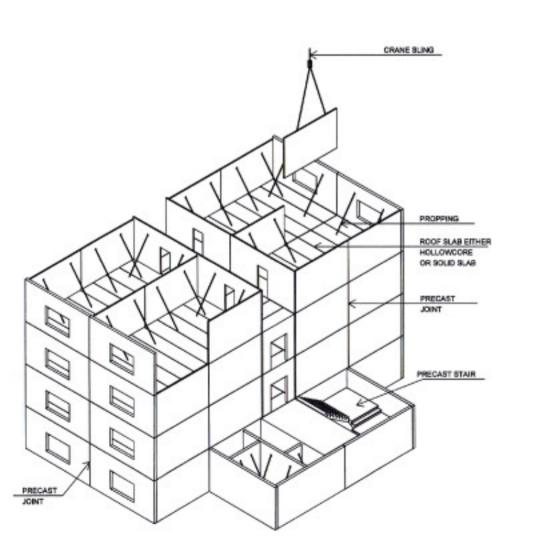
No brackets, props or vertical joints per room.

INSTALLATION:

1 heavy lift, no propping, no levelling, minimal site fittings and brackets, dowels etc. Joints are between moulds only.

Solid working platform are immediately available for subsequent levels without back propping.

Can erect 4 levels in the same day, precise accuracy because of monolithic construction and automated formwork giving cost savings of bracketing and jointing.



CONVENTIONAL PRECAST SYSTEM SOLUTION

BUILD CONCEPT:

5 flat elements cast installed individually and requiring numerous joints, brackets and grouting.

FACTORY PRODUCTION:

Larger area required: tables and equipment for equivalent production.

Many more vertical joints.

INSTALLATION:

Multiple small lifts, individual propping and levelling.

Less accuracy resulting from small individual piece, with accumulating errors in level and line.

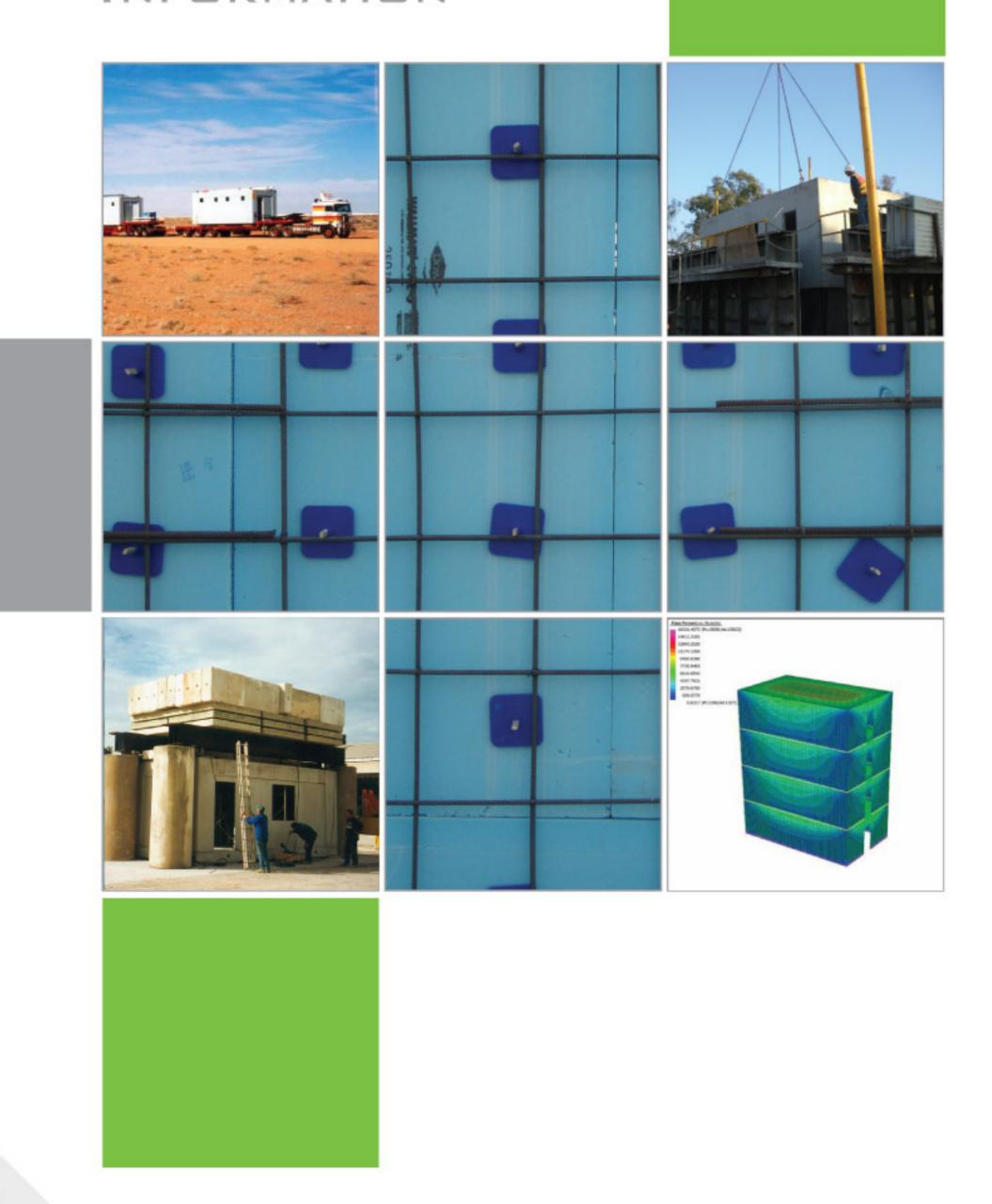
No immediate working platform until all jointing is completed.

Delays in processing to subsequent lifts.

Props, ladders, bolts, brackets.

Difficult to erect more than 1-2 levels per day.

TECHNICAL INFORMATION



CONCRETE

The concrete used in the production of the modules is a minimum of 40 MPa, low shrinkage, super-plasticized mix with steel reinforcement. Class 1 & 2 finish is achieved on all internal and external surfaces, which is suitable for direct finish application.

TRANSPORTATION & INSTALLATION

Centre of Gravity: The manufactured units are very stable rectangular structures with a centre of gravity just over half way up their height. This is affected by the amount and configuration of openings for doors and windows.

Each unit during the shop drawing phase has its own specific centre of gravity calculated and located on the shop drawing so that the lifting points can be positioned to ensure that the modules lift level from the mould and are easy to install.

Lifting: The cast in lifting points are usually from a proprietary precast lifting supplier. We lift from 4 points located depending on the COG calculated. The lifting chains should also be 60 degrees or more from horizontal and in some instances a lifting spreader is used.

Transport: In the event that the units are not cast on site, large steel transport frames are used across a traditional truck tray to transport the units around the manufacture site to their installation position or to another site (upto several hundred kilometres away).

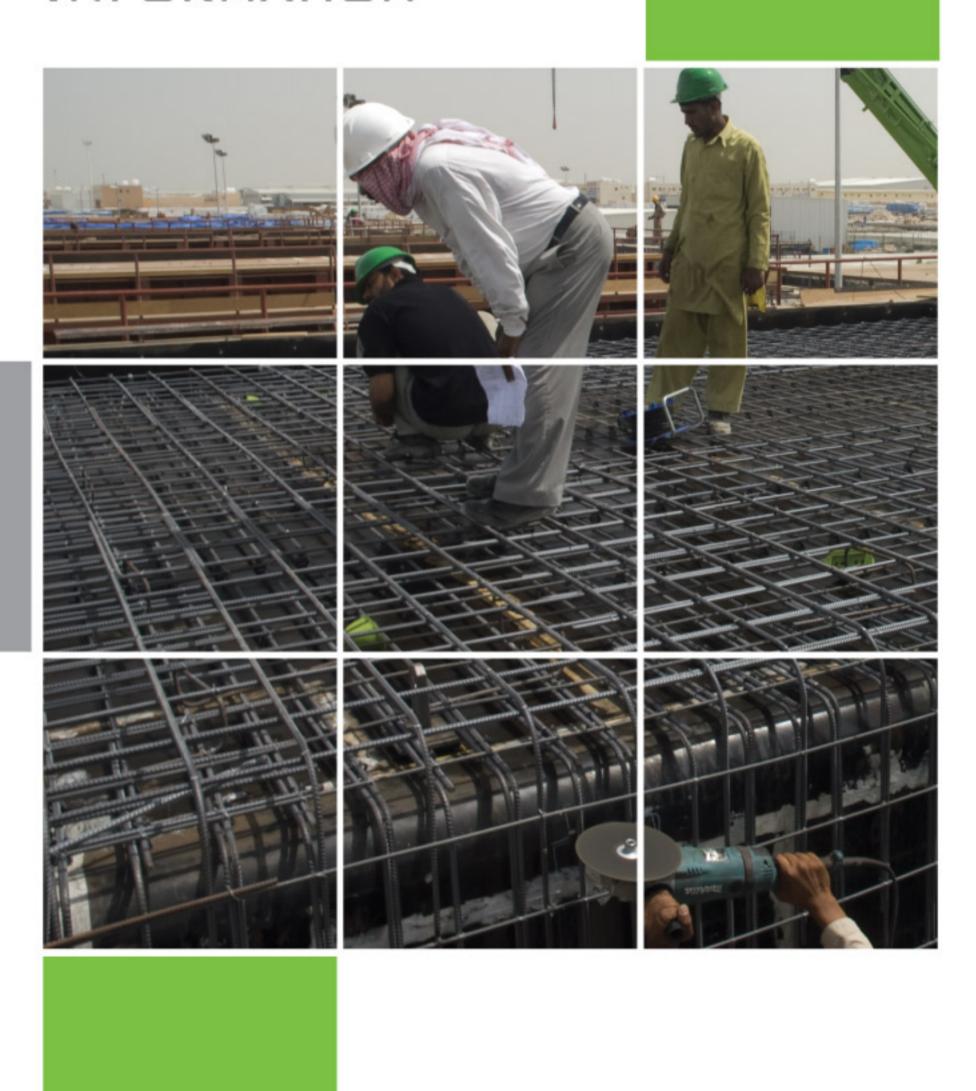
Chains are generally used to secure the loads either over the top or to specifically designed anchor points cast into the underside of the units. This transport method generally has to be decided prior to manufacture so that the relevant cast in points can be catered for.

Local road rules, loading weights, restraint guides etc vary considerably depending on jurisdiction and should be checkedwith the local authority.

LOAD TESTING

Load testing in has been undertaken in a factory environment under supervision by Kinhill Engineers (South Australia) to a 5 storey building. Finite elements analysis has been performed by Connell Wagner Engineers (South Australia)

TECHNICAL INFORMATION



PENETRATIONS/OPENINGS

Can also be cast into each individual module (preferred) or cut out later should extensions to the building be desired. The corner columns and the perimeter top beam are the structural elements and should not be compromised, although some exceptions are possible. The walls on all four sides can have block outs/penetrations wherever required. The roof slab can also be moulded for stair openings, skylights, service ducts, lifts and the like.

PRODUCTION CAPACITY

Each mould can produce one module per day.

Production can commence approximately one week after the shop drawing of the individual is approved. A detailed production program is produced for every job to ensure critical path and onsite production programs are met.

ACOUSTIC PROPERTIES

Mass is the greatest influence on the response of wall to sound. The heavier a wall/partician, the greater the sound insulating it can provide to the increase of energy required to set it in motion.

Acoustic separation by a physical gap is the most effective means by which to stop acoustic vibrations as they do not have a medium by which to transmit the frequency.

For the reason above the Green Precast 'double skin' concrete wall becomes one of the most effective acoustic insulation systems.

Acoustic requirements for different classes of building vary considerably and are often a governing design requirement in modern buildings today. An acoustic consultant can be engaged to give project specific advice as to the requirements, especially in a multi-occupancy building however, the double skin concrete would system satisfies most building class requirements.

As a guide the following values are expected for a single or double skin wall element:

90mm precast concrete wall 45 2*90mm walls with 20mm gap 55

TECHNICAL INFORMATION



THERMAL PROPERTIES

Thermal insulation in building design has become very important, due to heating and cooling energy costs over the life of a building and there are many strict design requirements imposed by building regulators to achieve minimum ratings.

One of the most important properties in determining insulating characteristics of a building product is the thermal mass. Concrete has great thermal mass but poor insulating ability. One of the most effective principles then is to insulate the thermal mass from the extremes of the environment and keeping its temperature ambient.

The Green Precast System is well suited to several methods of applied, or cast in situ insulation such as foam and render, or sandwich panel construction, which help insulate the concrete against temperature variations while keeping the internal thermal mass ambient.

Sandwich panel construction is used extensively in the Middle East, Europe and North America and involves casting an inner structural layer of concrete, a central core of foam insulations, and an outer wythe of concrete simultaneously in the one operation. The cores are held together by a patented thermoplastic resin, shear connector that bridges the 3 layers.

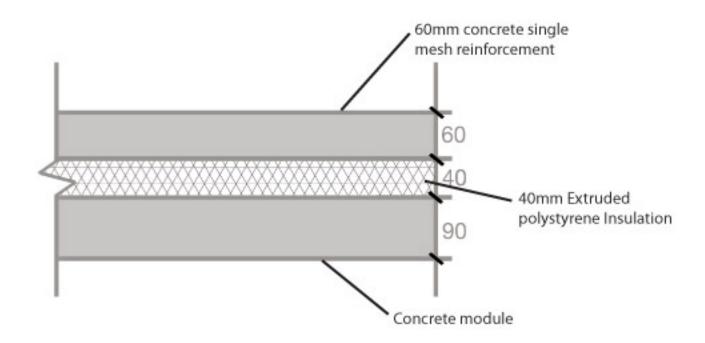
This is not the most cost effective solution but the most permanent solution. It is quite heavy and requires a high levels of factory supervision to achieve. We recommend this for primarily commercial construction.

The mould must be designed and modified specifically to allow the system to be poured, so the exact extent of the insulation requirements must be known prior to manufacture.

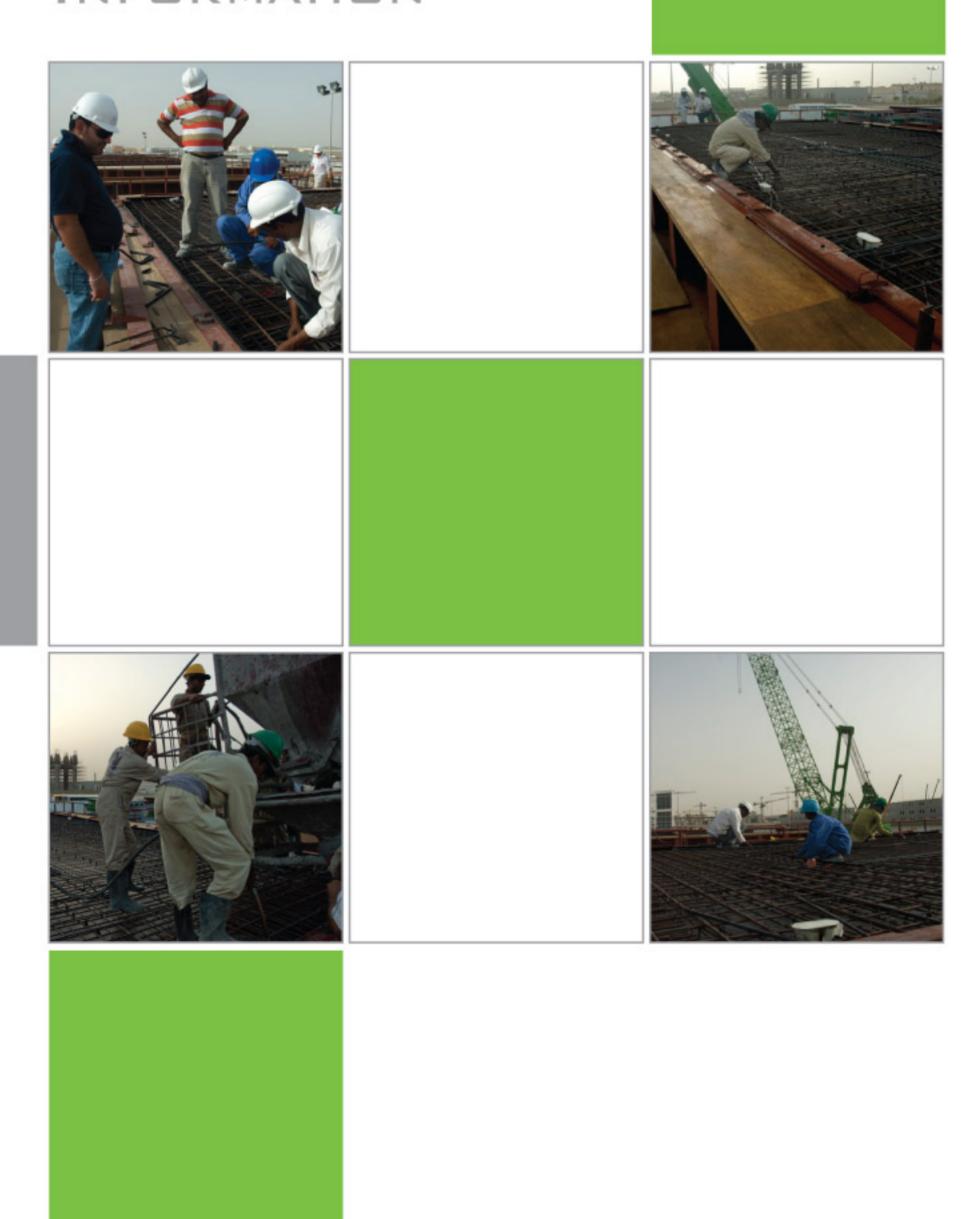
R-value may be defined as 'a materials thermal conductivity divided by it's thickness' and given the following: the metric unit is [m2K/W], solid concrete (2400kg/m3) has a thermal connectivity of 1.44 [W/mK], the published thermal connectivity of Styrofoam (by Dow Chemical) is 0.0.28 [W/mK].

Hence the thermal resistance of the insulated concrete wall assembly made up of 90/50/60 (conc/insulation/conc) is:

outside air film (7m/s)	0.03
concrete 60mm	0.04
Styrofoam 50mm	1.78
concrete 90mm	0.06
inside air film (up, still air)	0.11
TOTAL R-VALUE	2.02
TOTAL U-VALUE	0.495



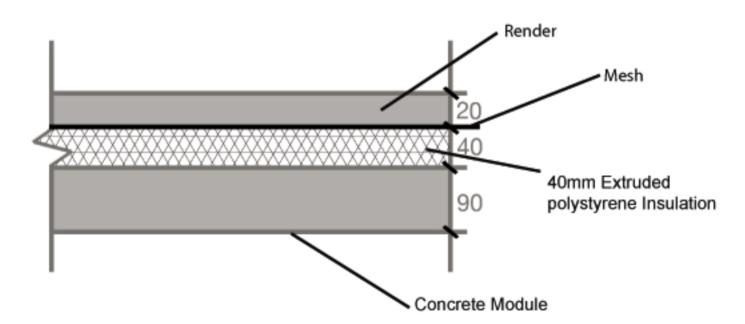
TECHNICAL INFORMATION



THERMAL PROPERTIES (CONTINUED)

Post Fixed Foam and Renderis the most versatile system as it is done independently of the modular manufacture process and can be placed on any wall, returns required can be done in the factory or on site. It is also a relatively simple process that can be out sourced to other trades as required. The insulation value can also be varied quite simply by increasing the thickness of the foam layer at minimal extra cost.

This process is recommended for villa construction



The process involves applying a foam thickness via direct adhesive to the concrete substrate. A fibreglass or plastic mesh is then applied all over with reinforced corner angles. A 2 to 4 coat render system is then applied to give the desired finish. The render can also be coloured to eliminate the need for painting a final coat.

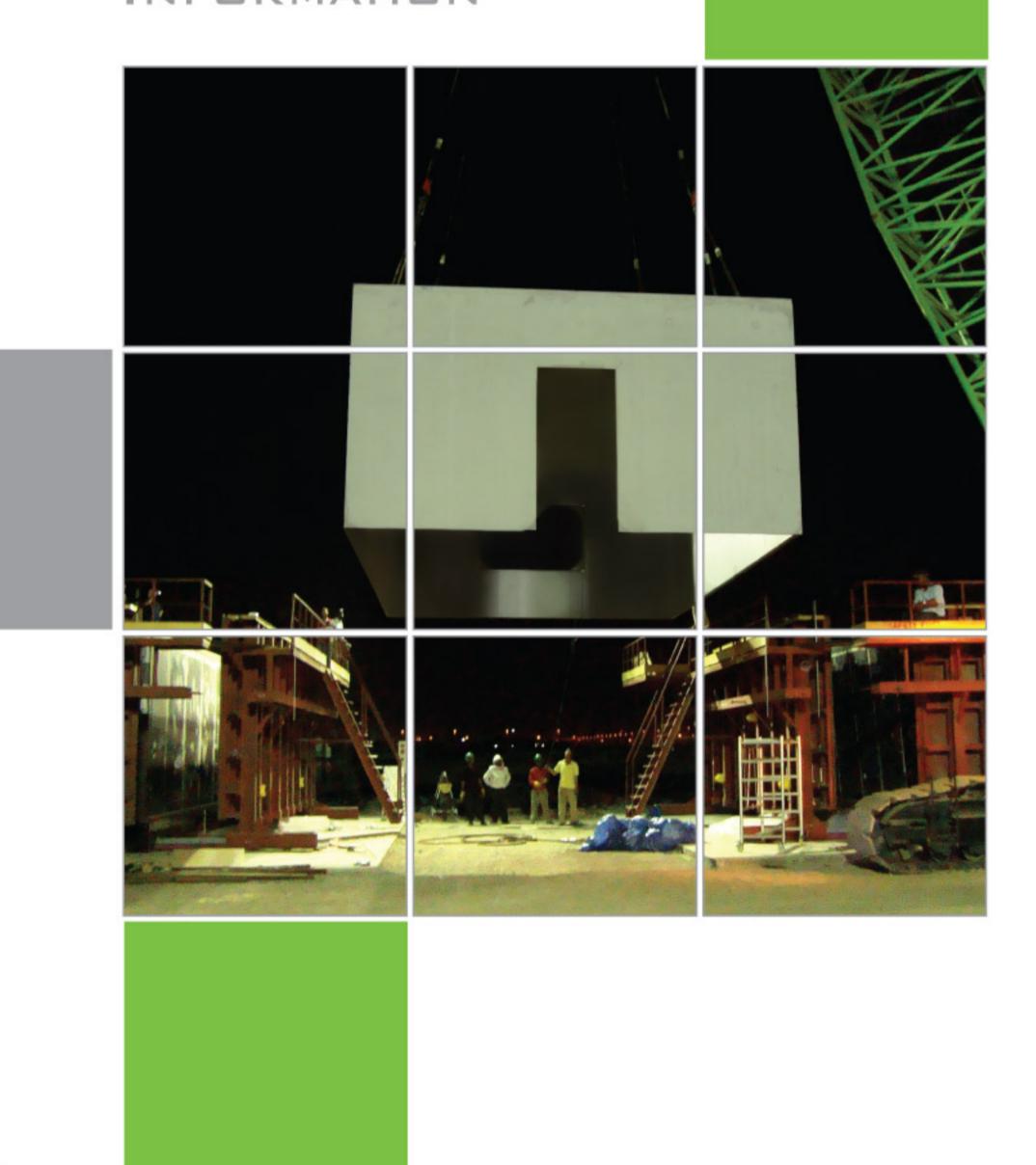
STRUCTURAL DESIGN

Green Precast Systems have been developing the modular product since 1987 and have engaged some of the most sophisticated Finite Element Methods analysis techniques by some of the worlds largest and most respected engineering firms such as Connell Wagner and GHD.

Basically, the module acts as a 3 dimensional frame where the horizontal roof element ties all the walls together and stiffens the unit. Although penetrations, doors, windows etc can be placed practically anywhere, there is a beam on all sides and the corner columns that should not be compromised if possible, especially for multi-storey construction.

A general guide is that the columns should not be reduced to within 600mm from the corners and the perimeter beam should be a minimum 500mm deep. Individual structural certification is required if these conditions are compromised.

TECHNICAL INFORMATION



FIRE RATING

The fire rating of a particular building is a direct function of the design and will need to be calculated on an individual basis however, the controlled cover to reinforcement, double skin concrete wall, and highly vibrated concrete of the Green Precast System gives the maximum possible fire rating (up to 4 hours between rooms) for the particular thickness of walls.

Other fire design considerations and modular construction benefits include:

- Smoke propagation kills more people in 'high density fires' than the actual fire or structure collapse itself.
- The fire and the smoke spread is generally through the breakdown of the joints from room to room and floor to floor.
- The collapse mechanism in a majority of fires in precast structures is the yielding of the steel brackets and support structures.
- The combustible material in each room is limited to its contents which is very limited (in fact negligible) when considering the total fuel load for beds, clothes and furniture and the maximum temperature achievable in each room cannot possibly exceed a 'structural failure' temperature.

The advantages of the Green Precast System, modular structure and the current design, is that we have:

- Fully integrated vertical and horizontal joints give complete and contained 3hour+ fire and smoke containment per room.
- There are no brackets, bolts, exposed steel fixings that will yield.
- The egress distance is small as there are exits at the end of each corridor.
- Coupled with other aids such as smoke compartmentalisation doors it can be shown that a 3+ fire rating exists without a need for the fully reticulated system.

DURABILITY

Maintenance and operating costs are low. Precast concrete is more durable than other materials; it is fire-proof, termite proof and water-proof. The superior finishes Green Precast achieve with controlled manufacturing processes means that the concrete may be left in its natural state and not finished, painted or covered at all, if so required.

RESEARCH AND DEVELOPMENT

Green Precast Systems as a company is committed to a continual R&D program to ensure adherence to the ever changing building code requirements and different types of applications.

In particular we have embarked on an ambitious approach to increase thermal, acoustic and fire rating properties while maintaining the existing benefits of the modular system.

Current research and development includes:

Lightweight Concrete

Coloured Concrete

Polished Floors

Sandblasted Finishes

Carbon Credit Trading

ENVIRONMENTAL BENEFITS



Unlike traditional building methods that utilise precious raw materials that are highly wasteful, highly labour intensive and costly, the Green Precast System is a uniqe, highly flexible 3 dimensional modular precast building system that utilises lean manufacturing processes to produce an eco-efficient, energy efficient, acoustically efficient, structurally efficient more durable low maintenance building solution.

LESS WASTE

Tight controls of quantities of materials and precise mix proportions mean the optimum use of materials. The modules are manufactured repeatedly in the same moulds meaning little or no wastage of materials.

ENVIRONMENTALLY FRIENDLY

Precast concrete is environmentally friendly in a variety of ways. The ingredients of concrete (water, aggregate and cement) are abundant in supply and take a lesser toll in their extraction than other construction materials.

As a nearly inert material, concrete is an ideal medium for recycling waste or industrial bi-products. Many materials that would end up in a landfill can be used instead to make concrete; blast furnace slag, recycled polystyrene and fly ash are among materials that can be included in the recipe for concrete and further enhance its appeal.

Green Precast regularly incorporates fly ash and slag cement into our precast modules.

ENERGY EFFICIENT

Another environmental plus for concrete is energy efficiency. From manufacture to transport to construction, is modest in its energy needs and generous in its payback. Additionally, once in place concrete offers significant energy savings over the lifetime of a building. In homes and buildings concrete thermal mass, bolstered by insulating materials, affords high R-factors and moderates temperature swings by storing and releasing energy when needed for heating and cooling and the light reflective nature of concrete makes it very easy to illuminate.

RECYCLING

Further commendable characteristics of concrete are waste minimization and long life. Whether cast-in-place or precast, concrete is used on an as needed basis. Leftovers are easily reused or recycled and concrete is a durable material that actually gains strength over time, conserving resources by reducing maintenance and the need for reconstruction.

(source: NRMCA WEBSITE, WWW.NRMCA.ORG/ABOUTCONCRETE/ENVIRONMENTAL.ASP)

ENVIRONMENTAL BENEFITS







Cooling our Urban Environment! Infrared Heat Reflective Paints.

ENERGY STAR TAKES THE HEAT OUT OF A BUILDING!

The exponential growth of urban areas has produced what science now calls 'urban heat islands' with the main contributing factor being heat-absorbing roofing, walls and pavements. In a world that now demands we are more energy efficient and resource conscious, Astec Paints Energy Star Products provide a solution!

As a result of ongoing research and development into heat reflective coatings Astec developed a new technology of colour infused nano ceramics that reflect heat by selective reflection of infrared light. This technology has enabled us to offer dark colour exterior coatings that reflect fully 50% of Solar energy and provide positive results for our environment and consumers.

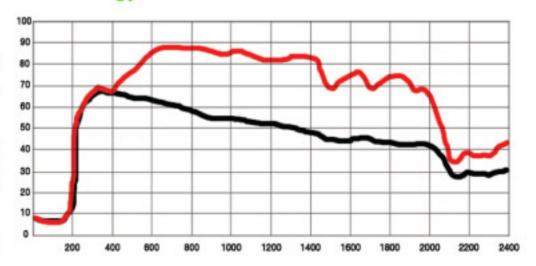
BUILDING TEMPERATURES ARE LOWER AND LESS URBAN HEAT BUILD UP. AIR CONDITIONING POWER CONSUMPTION IS REDUCED ALONG WITH GREEN HOUSE EMISSIONS

Global warming and climate change caused by increased greenhouse gas emissions are among the most serious environmental, economic, social and political issues ever to be confronted by society.

Source: Text ENERGYSTAR Australia

Through the use of ENERGY STAR labelled coating products, external building temperatures can be reduced, energy consumption lowered, and cost savings achieved. Additionally, lower surface temperatures will ensure product, substrate life and maintenance cycles are greatly extended. Apart from the most obvious benefits of offering energy savings to consumers by using ENERGY STAR qualified coatings, Cool buildings also mitigate the "urban heat island effect". Heat islands occur where many buildings and paved surfaces in close proximity are designed with dark coloured surfaces that absorb heat from the sun. Research indicates that this can cause cities to become as much as 12 degrees warmer than the surrounding countryside.

Spectral Reflectance of standard versus Energy StarPanels for 8085 Off White



By specifying and installing coating products that have earned the ENERGY STAR label, Architects, Builders, Homeowners and our environment can reap many benefits. Coating products that meet the ENERGY STAR requirements to qualify as ENERGY STAR labelled products are helping building owners and design teams meet the requirements for reduced energy and comply with mandatory standards and rating systems that are becoming commonplace throughout the global construction industry.

Energy Star Coatings are available in the following exterior colours

The numbers next to each colour chip represent the Total Solar Reflectance of the colour in Energy Star products. The number in parenthesis represent the Total Solar Reflectance of a standard exterior acrylic of the same colour. The S.R.I. Solar Reflectance Index number next to each chip was tested in accordance with ASTM E 1980-01. The S.R.I. number represented was for medium wind conditions.

Reflectance Tests are performed by independent laboratories in accordance with ASTM C 1549 and to ASTM E-903.

S. S. S. S. S. S. S. S.	French Green	(36.7)	Sandalwood	(66.1)		(66.8)
C/B Mist Green 24.5		53.9		76.7		78.5
Align Alig						
South S.R.I. C/B Rivergum (15.2)	C/B Mist Green		Tuscany	(54.2)	Pale Buiscit	
C/B Rivergum (15.3) 44.5 51.14 S.R.I. Warm Clay 44.5 30.14 S.R.I. (6.9) 59.5 71.23 S.R.I. Broken white (71.1) (
A4.5 S1.14 S.R.1 C/B Ironbark S2.5 S2.5 S1.3 S.R.1						
St.14 S.R.L C/B Ironbark (8.6) (8.6) (9.6)	C/B Rivergum		Warm Clay			
Color Colo						
March Marc	Olive Green		C/B Ironbark		Chino	
Carriege Green	Circ diceri	39.4	C/B IIOIIDaik	40.9	311113	60.6
24.6 25.17 S.R.I. 36.9 41.26 S.R.I. (1.0.9) 70.5		44.41 S.R.I.		45.99 S.R.I.		72.72 S.R.I.
24.6 25.17 S.R.I. 36.9 41.26 S.R.I. 71.64 S.R.I. 78.5 78.5 78.5 78.5 78.5 79.32 S.R.I.	Carriege Green	(6.3)	Yallara Brown	(6.6)	Quarry	(40.2)
Blue Grass		24.6		36.9		59.8
36.0 39.95 S.R.I. Nimbus (10.7) 35.5 39.30 S.R.I. Charcoal (5.6) 39.77 S.R.I. Botanic (6.4) 27.9 29.42 S.R.I. Cobalt (14.2) 33.8 37.08 S.R.I. Gull Grey (47.8) 68.3 37.08 S.R.I. C/B Birch Grey (19.7) 68.3 68.32 S.R.I. C/B Birch Grey (19.7) 68.3 68.32 S.R.I. C/B Slate Grey (16.6) (16.6) C/B Slate Grey (16.6) C/B Heritage Red (7.8) C/B Heritage						
Nimbus (10.7)	Blue Grass		C/B Beige			(66.8)
Nimbus						
State Grey			C/D Wasthawad Cannar		I tobal one	
Charcoal 39.30 S.R.I. (5.6) 22.8 35.77 S.R.I. (6.4) 27.9 29.42 S.R.I. (14.2) Pioneer (6.4) 23.8 37.08 S.R.I. (7.8) 68.3 37.08 S.R.I. (14.2) 68.3 83.23 S.R.I. (14.2) 68.3 68.40 S.R.I. (15.5) 68.9 68.3 68.3 68.40 S.R.I. (15.5) 68.3 88.405 S.R.I. (15.5) 68.3 88.405 S.R.I. (15.5) 68.3 88.405 S.R.I. (15.5) 68.3 88.405 S.R.I. (14.2) 68.3 88.405 S.R.I. (15.5) 68.3 88.23 S.R.I. (14.5) 68.9 68.3 88.23 S.R.I. (14.5) 68.9 68.3 88.23 S.R.I. (14.5) 68.9 68.3 88.23 S.R.I. (14.5) 60.9 73.13 S.R.I. (15.8) 60.9 73.13 S.R.I. (15.	Nimbus		C/B weathered Copper		Light Latte	
Charcoal (5.6) (5.6) (5.7) (5.8) (5.8) (5.8) (5.8) (5.8) (5.8) (5.8) (6.9) (6.4) (6.4) (7.8) (7.8) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (8.4) (9.7) (9.7) (7.8) (9.7) (9.7) (9.7) (9.7) (9.7) (9.7) (9.8) (9.8) (9.7) (9.7) (9.8)						
Section Sect	Charcoal		Clay Tone		Stone	
Botanic (8.4) Regal Brown (9.7) C/B Merino (52.5) (52.5) (68.3 a)	S. I.a. S. Sa.	32.8	,	46.7		68.9
Cobalt 27.9 38.6 68.3 43.36 5.8.1		35.77 S.R.I.		54.06 S.R.I.	the second second second	
Cobalt	Botanic	(8.4)	Regal Brown	(9.7)	C/B Merino	(52.5)
Cobalt (14.2) Pioneer (6.4) C/B Saltbrush (28.7) 33.8 37.08 S.R.I. Gull Grey (47.8) Off White (58.7) Autumn (45.8) 68.3 83.23 S.R.I. C/B Birch Grey (39.7) Mocca (34.5) Mid Buiscit (53.5) 62.2 74.90 S.R.I. C/B Slate Grey (16.6) Terracotta (15.8) Light Cream (69.6) 40.3 45.59 S.R.I. Mid Brunswick Green (6.9) Red Oxide (14.6) 25.9 26.84 S.R.I. C/B Mountain Blue (7.8) C/B Heritage Red (14.2) Pewter (37.3) 60.7		27.9		38.6		68.3
State Grey			-:			
37.08 S.R.I. Gull Grey (47.8)	Cobalt		Pioneer		C/B Saltbrush	
Gull Grey (47.8) Off White (58.7) Autumn (45.8) 68.3 74.7 60.9 83.23 S.R.I. (39.7) Mocca (34.5) Mid Buiscit (53.5) 62.2 74.90 S.R.I. C/B Slate Grey (16.6) 40.3 45.59 S.R.I. (6.9) 25.9 26.84 S.R.I. C/B Mountain Blue (47.8) Off White (58.7) Autumn (45.8) (58.7) Autumn (45.8) (69.9 60.9 73.13 S.R.I. (53.5) 69.5 68.66 S.R.I. (15.8) Light Cream (69.6) 78.7 97.60 S.R.I. 48.36 S.R.I. 97.60 S.R.I. 43.88 S.R.I. C/B Heritage Red (14.2) Pewter (37.3) 60.7						
68.3 83.23 S.R.I. C/B Birch Grey 68.3 Mocca (34.5) Mid Buiscit (53.5) 69.5 74.90 S.R.I. C/B Slate Grey (16.6) 40.3 45.59 S.R.I. (6.9) 25.9 26.84 S.R.I. C/B Mountain Blue (7.8) C/B Heritage Red (14.2) 25.5 (34.5) Mid Buiscit (53.5) 60.9 73.13 S.R.I. Mid Buiscit (69.6) 109.6 109.	Cull Croy		Off White		Autumn	
Salate Grey	Gull Grey		Oil Wille	74.7	Adtaiiii	60.9
62.2 74.90 S.R.I. C/B Slate Grey (16.6) Terracotta 40.3 45.59 S.R.I. (6.9) Red Oxide 25.9 26.84 S.R.I. C/B Mountain Blue (7.8) C/B Heritage Red 25.5 (69.5 69.5 69.5 Light Cream (69.6) 42.4 48.36 S.R.I. 48.36 S.R.I. 48.38 S.R.I. 43.88 S.R.I. 43.88 S.R.I. Pewter (37.3) 60.7				92.05 S.R.I.		
62.2 57.6 69.5 74.90 S.R.I. 68.66 S.R.I. Light Cream 84.88 S.R.I. C/B Slate Grey 40.3 42.4 78.7 45.59 S.R.I. 45.59 S.R.I. 97.60 S.R.I. Mid Brunswick Green 66.9 39.0 25.9 39.0 26.84 S.R.I. (7.8) 43.88 S.R.I. C/B Mountain Blue C/B Heritage Red 43.88 S.R.I. 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 14.6) 14.6) 78.7 <t< th=""><th>C/B Birch Grey</th><th>(39.7)</th><th>Mocca</th><th>(34.5)</th><th>Mid Buiscit</th><th>(53.5)</th></t<>	C/B Birch Grey	(39.7)	Mocca	(34.5)	Mid Buiscit	(53.5)
C/B Slate Grey (16.6) Terracotta (15.8) Light Cream (69.6) 40.3 42.4 78.7 45.59 S.R.I. (6.9) 48.36 S.R.I. 97.60 S.R.I. (6.9) Ped Oxide (14.6) 25.9 39.0 43.88 S.R.I. C/B Mountain Blue C/B Heritage Red 43.88 S.R.I. Pewter (37.3) 60.7 60.7		62.2		57.6		69.5
A0.3 A2.4 78.7						
## A5.59 S.R.I. Mid Brunswick Green ## A5.59 S.R.I. (6.9) Red Oxide 25.9 26.84 S.R.I. (7.8) C/B Heritage Red 25.5 C/B Heritage Red 25.5 ## A3.88 S.R.I. (14.2) 14.2) 14.2) 15.5 Pewter (37.3) 60.7	C/B Slate Grey		Terracotta	(15.8)		(69.6)
Mid Brunswick Green (6.9) Red Oxide (14.6) 39.0 C/B Mountain Blue (7.8) C/B Heritage Red (14.2) Pewter (37.3) 60.7						
25.9 26.84 S.R.I. (7.8)	Mid Brupowiek Green		Red Ovide			97.60 S.R.I.
C/B Mountain Blue C/B Heritage Red 26.84 S.R.I. (7.8) C/B Heritage Red 25.5 C/B Heritage Red 37.5 Pewter 60.7	wild Brunswick Green		Red Oxide			
C/B Mountain Blue (7.8) C/B Heritage Red (14.2) Pewter (37.3) 60.7						
25.5 37.5	C/B Mountain Blue		C/B Heritage Red		Pewter	(37.3)
26.32 S.R.I. 41.91 S.R.I. 72.86 S.R.I.		25.5	a, a riornago rioa	37.5		60.7
		26.32 S.R.I.		41.91 S.R.I.		72.86 S.R.I.



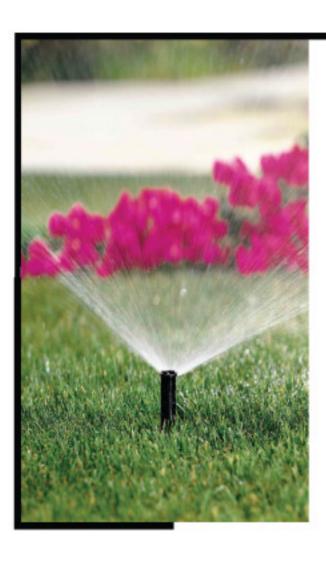
GREEN PRECAST



What Is a Waterwise System?

A state of the art greywater diversion and irrigation system.

- Designed and installed specifically for your garden by certified plumbers, trades-people and landscapers.
- Easy to turn on and service.
- A patented, gravity irrigation system that can run water up and downhill.
- Ideal for nearly all gardens, no matter what their design or size.



How It Works

Just have a shower, bath or wash your clothes as usual and the plumbing that our fully licensed plumbers have installed for you will redirect the water to your great looking compact surge capsule. From there gravity takes over and the system slowly releases your gardens water straight through a network of 100-400 or more meters of irrigation line and down into the soil directly into your plants feed zones, safely nourishing plants through Waterwise Systems'® patented greywater wands.

Benefits

Your permanent Greywater Gardener 230™ system will:

- Reduce the amount of water your garden needs to thrive and bloom by 80% or more.
- Create a self sustainable garden oasis that feels great to come home to.
- Protect the value of your home.
- Give you real peace of mind that your saving Australia's water.





Product Features

The Greywater Gardener 230™:

- Is automatic and you can just click a switch to turn it off.
- Delivers the water directly to where all your plants want it most, every time.
- Saves you so much water and money every year year after year.
- Makes saving lots of water so easy for you and your family.
- Creates beautiful healthy gardens.

Technical Specifications

- Greywater Gardener Slimline Surge Capsule:
- Designed for narrow access areas and front loading washing machines.
- Can also be used with a top loading machine and/or bath/showers.
- Tank Capacity: 115L
- Dimensions: 1020 mm long x 270mm wide x 530mm high (excluding stand height).
- Irrigation system and stand is custom designed according to individual garden requirements.
- ♦ Greywater Gardener 230™ Surge Capsule:
- Larger surge capsule appropriate for a top loading washing machine and/or bath/ shower diversion.
- Tank Capacity: 230L
- Dimensions: 1020 mm long x 520mm wide x 530mm high (excluding stand height) Irrigation system and stand is custom designed according to individual garden requirements.



SYSTEMS & TECHNOLOGIES

ELECTRIC LIGHTING CONSUMES 19% OF THE TOTAL GLOBAL ELECTRICAL PRODUCTION.

Vision - to lesson climate change by saving enough electricity to power Europe.

Target - to replace the worlds 29 billion incandescent and halogen bulbs with Ecobulbs TM

- Save up to \$130 saved per standard bulb replaced
- Brighter than most other energy saving bulbs
- Lasts up to 10,000 hours
- 2 Year Guarantee
- Kindest to the environment

Ecobulb™- ONE OF THE MOST ENVIRONMENTALLY FRIENDLY ENERGY SAVING BULBS

Why is Ecobulb™ so friendly on the environment? ...here are just a few reasons

- High Power Factor means less distortion on the electricity network.
- ◆ Ecobulbs™ last up to twice as long as other energy saving bulbs saving fossil fuel.
- Reduces Green House Gas emissions.
- 10,000 hour life means either 9 standard bulbs or 2 average
- energy saving bulbs are saved from landfills.
- Recyclable packaging.
- Very low amalgam content used.

High Power Factor Ecobulb™ Technology

A key reason for electricity utilities selecting the Ecobulb™ is its high power factor technical superiority. The high power factor Ecobulb™ results in a 50% greater electricity distribution network load reduction (approximately 17VA per bulb) than ordinary CFL's.

This increased reduction is worth approximately \$16 per Ecobulb™™ of deferred new electricity distribution network capital investment for the utilities.







Superior Light Output with Compact Design

It is important to choose a replacement energy saving bulb that will fit your light fitting. Due to the smaller size of the Ecobulbs™, they replace most ordinary bulbs, whereas some of the other energy saving bulbs are too long and may not fit.

The Ecobulb™ is one of only a few energy saving bulbs that give as least as much light as the equivalent ordinary bulb that it replaces. Most energy saving bulbs provide considerably less light, which leaves the room too dark. We also recommend the spiral shape of the Ecobulb™ as it distributes the light down into the room, unlike the 3U shape energy saving bulbs.

Lasts 10 Times Longer Than Standard Bulbs!

The Ecobulb™ energy saving bulb has been independently tested and found to last ten times longer than ordinary bulbs and 2 times longer than other energy saving bulbs. The longer the energy saving bulb lasts the better…less money in spent, less bulbs in landfills and less time between changes! Products with the C-tick have been tested to international standards and are unlikely to cause interference to the reception of radio communications services, including radio and television broadcasting.

Superior Light Colour

Some energy saving bulbs don't give the same colour as an ordinary bulb. Colour is measured in Kelvin and can vary from a warm 2700K to a cool 6400K.

Ecobulb™ energy saving bulbs have the same colour as an ordinary bulb, 2700K.

Save the Most Money

Because Ecobulb™ energy savers last nearly twice as long as other energy saving bulbs, you save money on electricity and on replacement bulbs.

To save the most money on your electricity bills, replace ordinary bulbs that are on the most hours each day with Ecobulbs™. i.e. Lounge, kitchen, hallway, bedroom or outside light.

Energy Saving bulbs help the environment in more ways that one.

Because Ecobulb™ energy saving bulbs last longer than standard bulbs and other energy saving bulbs, they eliminate bulbs that would otherwise end up in landfills. Less energy consumed means the green house gas emissions released by coal fired plants and unrecoverable mercury is not released to the atmosphere. Conserving energy reduces the need for new power generation facilities to be built and also reduce the impact this can have on the environment.



SPECIFICATION SHEET

With a power factor of 0.93, Ecobulb" compact fluorescent builbs free up 69% more transmission capacity than standard power factor CFL's

Compared with standard CFL's, this revolutionary bulb produces 80% less harmonic distortion, contains 67% less mercury, produces more lumens per watt, and comes in 99% recycled and recyclable packaging.

The Ecobulb" CFL, with an industry leading twoyear warranty, is available in 8,12,15, 20 and 65 watt sizes. There is also available a 13W enclosed bulb, a 15W 12 Volt halogen bulb replacement and a 15W minidown light halogen fixture replacement. All products are priced comparable to standard CFL's and halogens.

	STANDARD CFL	ecobulb 72 & 73 240V
Power Factor	555	>0.9 38% less kVAR
ThD Total Harmonic Distortion	100-130%	<30%
Mercury	5.0mg	<1.5mg
Lamp Life	6,000-10,000hours	10,000hours &15,000hours
Warranty	0-1 year	2 years
Recycled Packaging	No	Yes

*Light Output and Efficacy Based on 2700K

																		_
	15W	50W Halogen	Quick Release	T2	100mm	88mm (outer) 50mm (inner)	Yes	No	Yes	900 lumens petrod reflector) 60	2700K, 5000K, 6500K	30,000h (ballast) 10,000h (bulb)	>0.9	30% THD	<1.5mg	Yes	Yes	Two years
0																		
1 1	13W	60W incandescent bulbs	Yes	12	112mm	44mm	Yes	No	Yes	700 lumens 56	2700K, 5000K, 6500K	8,000h & 10,000h	>0.9	30% THD	<1.5mg	Yes	Yes	Two years
	W59	Metal Halide 70-100W, Sodium Vapour 70-100W Mercury Vapour 80-125W	Yes	74	210mm	75mm	No	No	Yes	4000 lumens 61	2700K, 5000K, 6500K	10,000h	>0.9	30% THD	<5.0mg	Yes	Yes	Two years
	20W	100W incardescent subulbs	Yes	E	118mm	64mm	Yes	No	Yes	umens 1	5000K, 6500K	15,000h	ø.	문	Bu	so	Yes	Two years
			, Ye	72	108mm	55mm	N.	Z	, X	1,350 lumens 71	2700K, 500	10,000in & 15,000i	>0.9	30% THD	<1.5mg	Yes	¥.	Two
	15W	75W incandescent bulbs	Yes	T3	112mm	50mm	Ves No	ol	Yes	950 lumens 66	2700K, 5000K, 6500K	10,000h & 15,000h	>0.9	30% THD	<1.5mg	Yes	Yes	Two years
			, Ye	T2	102mm 42mm	42mm		Z	۶	950 10	2700K, 500	10,0 8, 15	×	30%	4,1	×	×	Two
1	12W	60W incandescent bulbs	Yes	Т2	98mm	42mm	Yes	No	Yes	715 lumens 62	2700K, 5000K, 6500K	10,000h & 15,000h	6.0<	30% THD	<1.5mg	Yes	Yes	Two years
	W8	40W incandescent bulbs	Yes	T2	85mm	42mm	Yes	N _O	Yes	440 lumens 55	2700K, 5000K, 6500K	10,000h & 15,000h	\$0°0	30% THD	<1.5mg	Yes	Yes	Two years
ecopulb ecopulb	Rated Wattage	Replaces	Bayonet and screw fittings	Tube Specification	Length	Diameter	Suitable for residential downlights	Suitable for dimmers	Suitable for high on / off switching areas	Light Output Efficacy	Light Colour	Average service life	Power Factor	Total Harmonic Distortion	Mercury content	Recyclable Paper Packaging	Every Ecobulb operated for 2hr before shipping	Guarantee

THE WAY TO BUILD ODAY AND FOR THE FUTURE

www. green precast systems. com

