

CYCLONE PROTECTION AUSTRALIA

**Protecting homes and businesses from cyclone damage throughout
Australia and the South Pacific**

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AstroGuard

- Immensely strong synthetic fabric
 - Used to create lightweight cyclone shutters
 - Attaches to permanently installed wall anchors
 - Only deployed when required
 - Totally wind proof
 - Totally waterproof
 - Can fit any size or shaped opening
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- SunCorp Insurance offers up to 20% discounts on home insurance premiums if your home is protected by AstroGuard
 - System pays for itself in a few years



Key Features

- **Strength**
 - **Wind load resistance**
 - **Impact protection**
- **Pressure Envelope Protection**
- **Prevention of water entry and damage**
- **Ease of deployment**
- **Ease of storage**
- **Incredible versatility**



Wind load resistance

- Tested to withstand winds of over 300km per hour
- Proven in Cat 5 cyclones
- **Wind load more likely to lead to structural failure than impact damage**
- Buffers the intense loads and forces applied to structures
- Prevent failure
 - Locks
 - Latches
 - Glass
 - Doors
 - roller mechanisms






Wind load resistance

- **Garage and roller doors**
 - **Identified as major points of failure in post cyclone Larry and Yasi reviews by Cyclone Testing Station, James Cook University**
 - Huge surface area
 - Mechanisms inadequate to deal with forces
 - Loss of integrity can be precipitant to further damage and loss of the pressure envelope
 - AstroGuard sheets can cover any sized opening
 - Easy solution for your garage doors





Door and adjacent window covered in a single piece – straightforward deployment when needed

Large and small openings covered. Massive wind loads removed off this large door and roller mechanism.



Large opening covered by 'stitching' sections of fabric together with our fabric clips

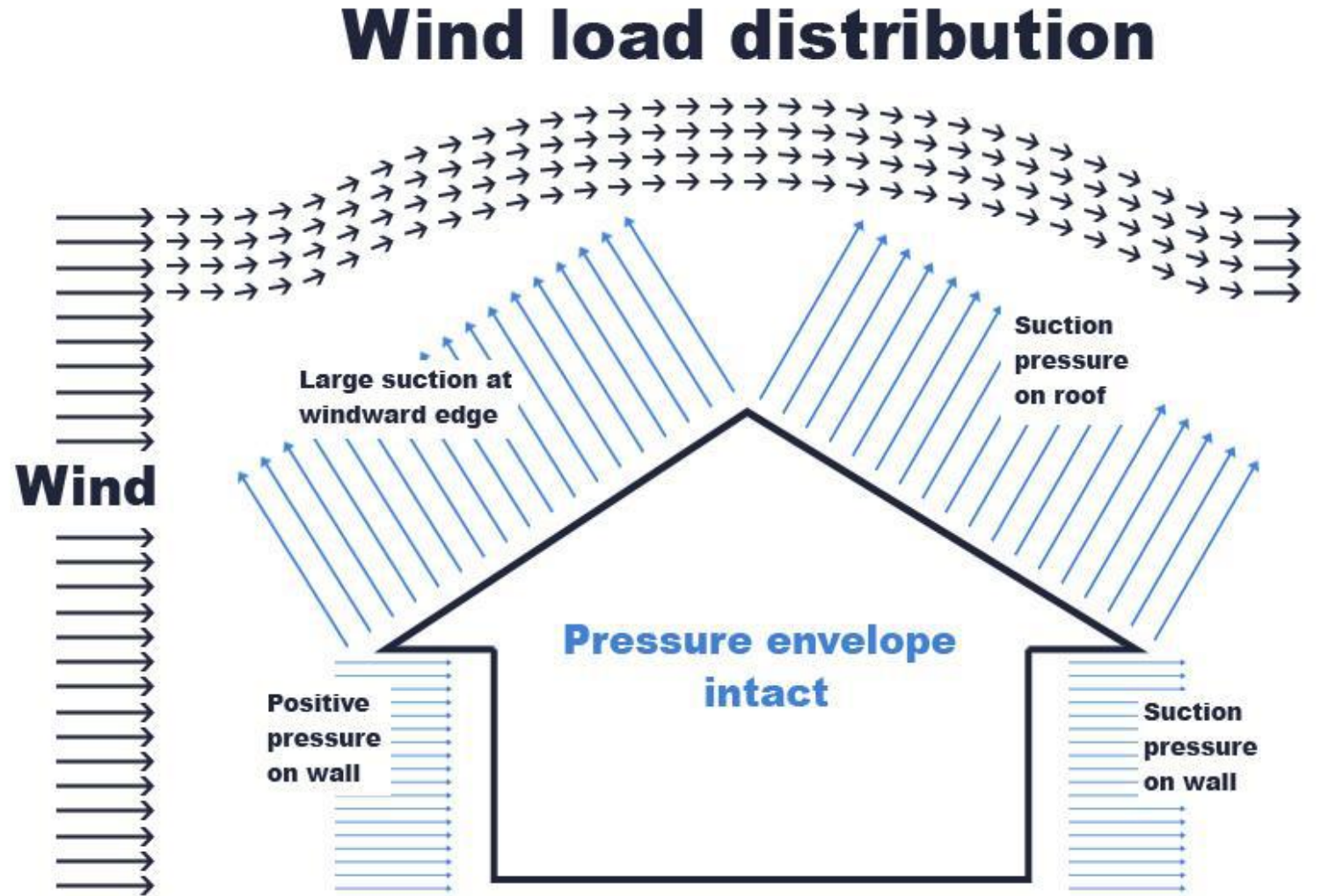
Impact Protection

- Designed to absorb huge impacts
- Unique fabric/clip composition and design dissipates energy into the surrounding structure
- Rigid screens cannot do this – force is concentrated at the point of impact
 - Zone C set up - 4 kg missile > 100km/hr (28m/second)
 - Zone D set up – 4kg missile > 160km/hr (45m/second)
- AstroGuard far exceeds capabilities of plywood and metal screens



Pressure Envelope

- The diagram demonstrates the forces on an intact building during a cyclone
- The roof acts like a wing creating lift
- The shell of the building represents the Pressure Envelope
- Windward edges are exposed to particularly large forces and pressures
- The situation may be finely balanced with only a small change leading to major consequences

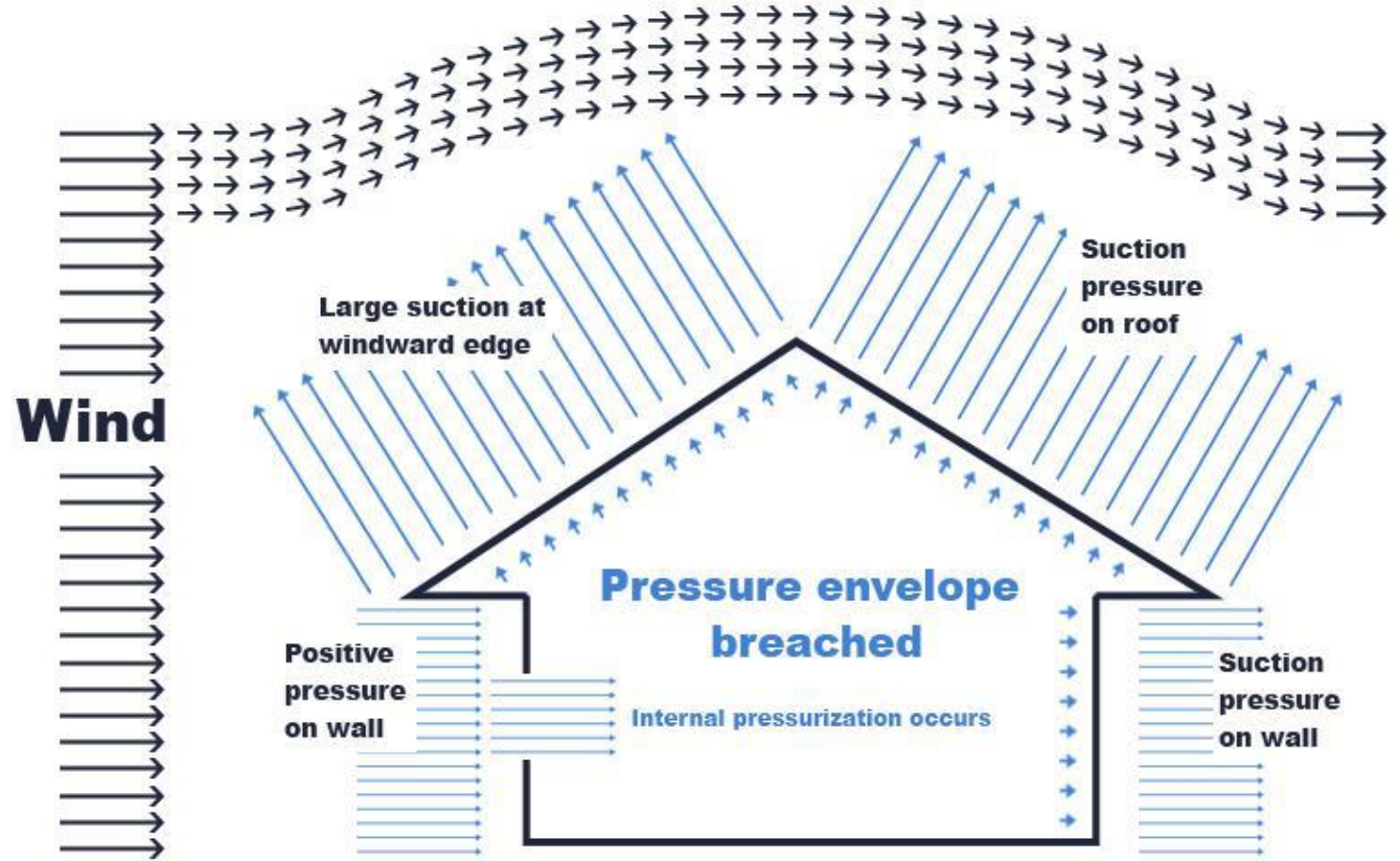


AstroGuard is designed to maintain the pressure envelope even with breakage behind it

Pressure Envelope breach

- A breakage from wind load or impact leads to a **breach of the pressure envelope**
- **Internal Pressurization** occurs within the building
- Major forces are in play and relatively minor changes can cause major changes
- This can precipitate catastrophic events with suddenly changes to the balance of forces
- Catastrophic damage following a breach of the pressure envelope in what was a relatively stable situation is well described
- Risks to those inside can be major

Wind load distribution



AstroGuard is designed to maintain the pressure envelope even with breakage behind it

How does AstroGuard protect the Pressure Envelope and prevent wind and water damage ?

- AstroGuard is installed with a minimum 100mm overlap around openings
- AstroGuard is
 - Completely windproof
 - Completely waterproof
 - Withstands wind forces of 300 km/hr
 - Protects against impacts of 4 kg at over 100 km/hr
- AstroGuard protects and keeps the structures behind it intact

***Even with a breakage behind it
AstroGuard is designed and installed to
maintain an effective pressure, wind
and waterproof barrier***



Consequences

- Pressure envelope breach may lead to complete destruction of the building
- Even without major structural failure wind and water damage can be very severe
 - Internal structures and contents may be destroyed
 - Buildings made uninhabitable
 - Not uncommon that internal walls and rooms need replacement
 - Inevitable long delays with insurance claims and repairs
- Flying debris can break glass and fixings in openings leading to any of the above
- All scenarios are extremely dangerous for the occupants

AstroGuard is designed to keep the wind and driving rain out even if the door or window behind it has been broken by a large impact

Easy Deployment

- **Simple**
- **Rapid**
- **Safe**
 - **Lightweight, easy to lift and carry up ladders**
- **Cordless drill only gear required after initial installation**



Easy Storage

- **Lightweight**
- **Folds easily**
- **Synthetic – unaffected by fungus or rot**
- **This box contains the entire coverage for a 4 bedroom home**



Testing and approvals

- Extensive testing
- USA
 - Wind load
 - Deflection
 - Impact
 - UV stability
- *Cyclone Protection Australia*
 - Cyclone Testing Station, James Cook University, Townsville
 - Much higher Australian standards
- Building Code approval for use in Australian zones C and D and USA
- Only product of it's kind with this Building Approval
- All testing data available at www.cycloneprotectionaustralia.com.au



Versatility

- Easily cut to fit any shape
- Cut edges do not require reinforcement
- Large expanses do not make it weaker
- Easier to install in awkward spaces
- Awkward shapes
 - Sills, ledges, fittings, air conditioners
 - Cover or cut around
- Difficult spots

Fabric installed under existing downpipe and spaces cut for the brackets. The cut fabric does not require reinforcement of the cut edges




Fabric simply installed over the light fitting – see chalk line and pre-drilled holes for anchors

**Different wall angles,
metal beams and
down pipes
obstructing**




**Fabric cut around the
air conditioner – cut
edges do not require
reinforcement**





Stainless steel
anchor screws in
place in a
hardwood frame

This image shows the interior of a building. A wooden frame is visible, with several stainless steel anchor screws installed. The frame is set into a wall made of corrugated metal. Through the opening in the frame, a kitchen area is visible, featuring a countertop with various items like a blender and a coffee maker, and a wooden chair in the foreground.



Timber anchors
inserted into the
timber stud frame
behind the zincalume
surrounding the
window to enable
generous overlap.

This image shows a worker in an orange shirt and a cap, kneeling on a stone-paved area. The worker is using a power drill to install timber anchors into a timber stud frame. The frame is surrounded by zincalume sheeting. The worker is positioned in front of a large, light-colored fabric panel that is being installed over the window area.

Fabric simply
folded around
the metal
corner post of
the window


This image shows a large, light-colored fabric panel being installed over a window. The fabric is folded around the metal corner post of the window. The panel is held in place by several black clips or fasteners. The background shows a corrugated metal wall and a wooden structure on the right side.

A close-up photograph showing two workers in bright green shirts and black shorts installing a tan fabric sheet on a light-colored wall. One worker is on a ladder, using a power drill to secure the fabric with black fasteners. The other worker is standing on the ground, assisting. The fabric is being pulled over a ledge at the bottom of a covered veranda. A gas cylinder is visible in the bottom left corner.

Fabric folds easily over the ledge at the bottom of the covered veranda

Easy to install in difficult spots

TIGHT SPOTS

A photograph of a two-story house with tan fabric sheets installed on the exterior wall. Two ladders are leaning against the wall, one on the left and one on the right. The house is surrounded by lush greenery, including large banana leaves and ferns. The fabric sheets are secured with black fasteners along the edges.

Sheets are light and make carrying up ladders much safer and easier than plywood or metal grilles



Using a single piece to cover both French doors and windows – simple to install and to deploy




Covering multiple separate windows with
a single sheet





Metal attachment



Attaching L section with pre drilled holes and welded nuts allows attachment to metal columns

This balcony has anchors in the concrete and welded onto the metal beam.
(Atherton Shire Council Disaster Co ordination Centre)



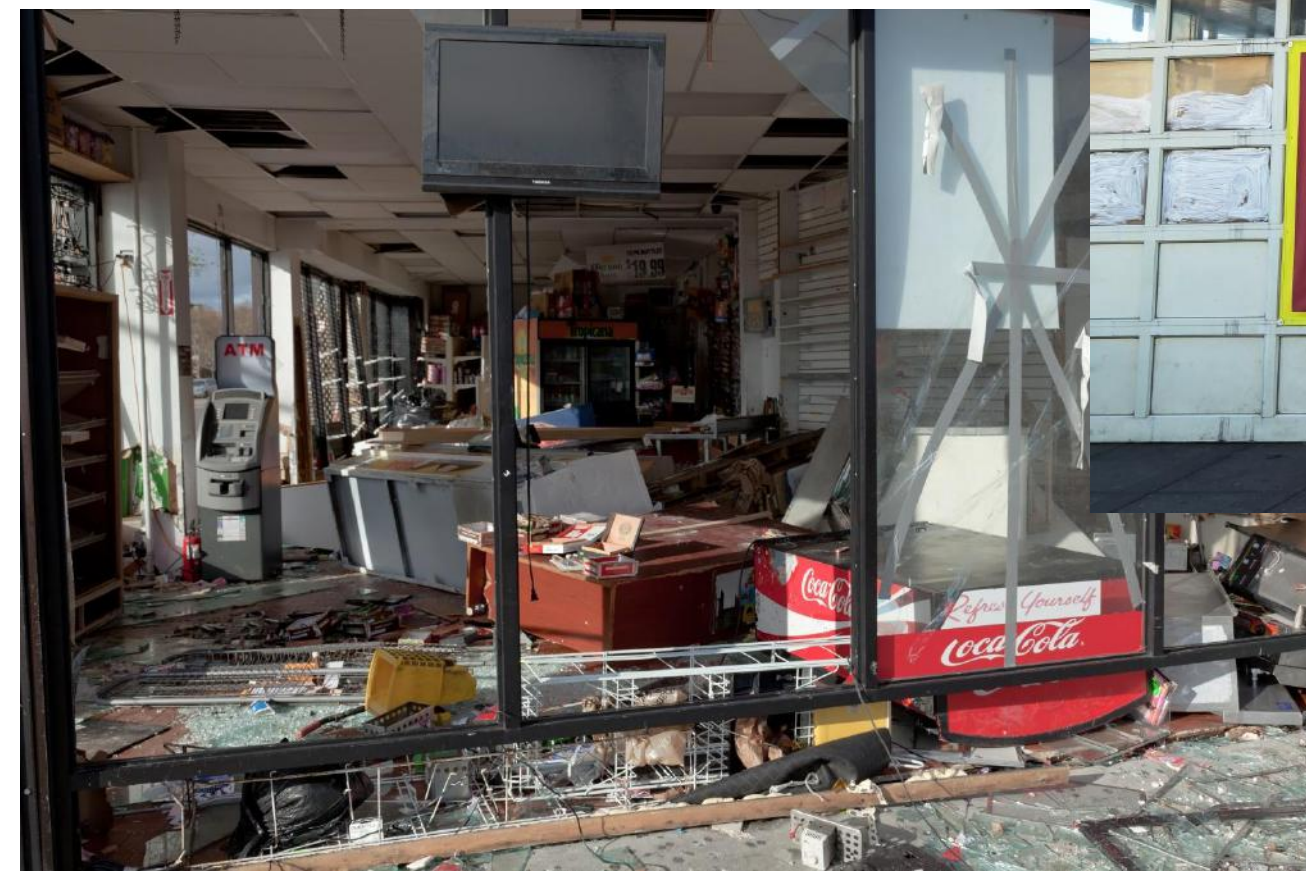
Veranda's and patios

- Protects the space behind
- No need for separate shutters
- Often more cost effective
- Quicker to install
- Translucent – spaces don't become caves



Business Protection

- Loss of workplace
- Stock loss
- Loss of functionality
- Loss of income



Protection is tax effective



Fabric deformation after a large impact ?

Proportional to the size of the impact

- You cannot stretch the fabric under normal conditions and smaller impacts will not lead to significant deformation

Theory

- Large impacts transfer massive amounts of energy to a structure
- That energy has to go somewhere
- If not dissipated it remains at the point of impact
- The **AstroGuard clip design** is such that it attaches the fabric but also flexes and transfers energy to the surrounding structure

This is how AstroGuard fabric is able to provide such effective impact protection

- The distortion as the energy is dissipated may result in breakage of glass behind
- Rigid shutters need to have enough mass/strength in order to withstand the impact without damage because they cannot dissipate energy as effectively
- **The mass/weight required to provide the same impact protection as AstroGuard is generally too much to be financially viable or physically manageable**

- *Impact videos - AstroGuard v 15mm plywood* www.cycloneprotectionaustralia.com.au

Summary

- AstroGuard's inherent strength, impact protection, complete water and windproof properties and it's amazing versatility make it truly unique
- It can easily be made to cover any shape or sized opening
- A large sheet is light enough to put over your shoulder and climb a ladder with
- The fabric protecting a 4 bedroomed house can be folded and stored in a large box
- Once installed a whole house can be protected within a couple of hours

No rigid material providing the same level of protection shares these attributes