Building with conscience.

StoTherm Masonry Insulation

Energy-efficient insulation for solid masonry construction

Facade

With over 50 years of system development and testing, StoTherm external wall insulation systems lead the way in energy-efficient facades, for both new-build and refurbishment projects. Wrapping the building in a thermally-resistant envelope; saving energy, preventing CO_2 emissions and providing a healthy living environment.

Energy-efficient insulation for solid masonry construction

In a typical dwelling, around 30% of the energy used to heat or cool a room is wasted due to poorly insulated walls. StoTherm external wall insulation systems dramatically cut energy loss by wrapping the building in a thermally-resistant envelope, helping to reduce energy bills, prevent CO_2 emissions and provide a healthy living environment.

Exterior wall insulation systems embody our belief in,
'Building with conscience'.

Installing the right insulation harbours vast potential for new buildings. Furthermore, more than half of all houses that are over 30 years old are either inadequately insulated or lack any form of insulation at all. This leads to continual heat loss and vastly diminishes the quality of the home environment. As a rule, energy-efficient insulation actually saves more money than it costs – especially when installed during renovation work.

Cover: Piha House EnerPHit, Auckland
Architect: Sang Architects
Engineer: Sustainable Engineering

Right: Frame Apartments, Wellington
Architect: Archaus

Insulate New Zealand's future

Building healthy living environments

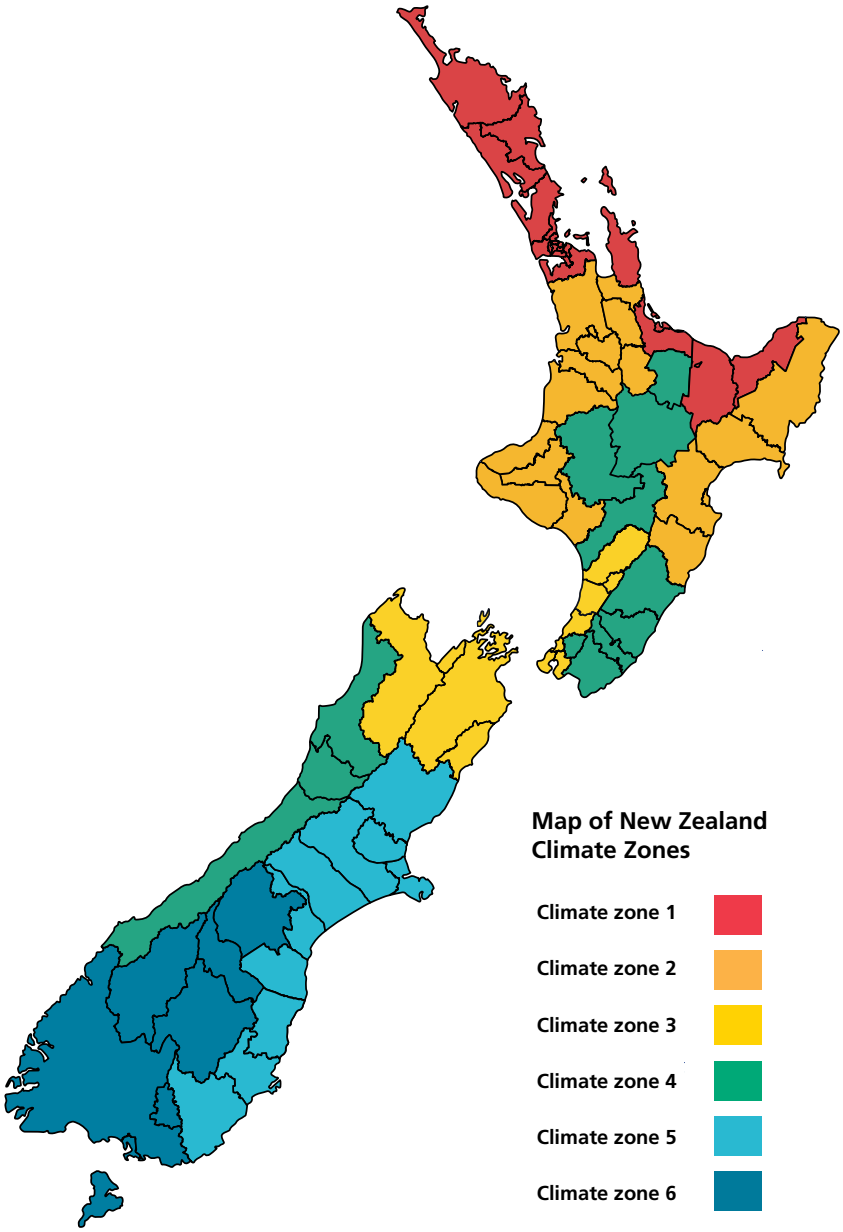
High energy consumption comes at a high price – as becomes painfully apparent to many home owners when they take a look at their power bills. Many older buildings, as well as some newer ones, consume far more energy than they need to, because their insulation is not up to date.

Apart from cutting costs, energy-efficient insulation helps protect the environment by reducing the amount of energy used, and helps to keep buildings warm, dry and healthy. High quality, professionally installed insulation also creates a pleasant indoor climate throughout the year. In the winter, insulation ensures a cosy and comfortable environment indoors, while in summer, maintaining a refreshingly cool interior.

This investment in the future benefits building owners and investors alike.

Two factors are decisive here:
1. Thermal resistance of building materials used.
2. Avoidance of "thermal bridges" which allow valuable heat to escape.

StoTherm external wall insulation systems for masonry construction are free of thermal bridging and consist of building materials with minimal thermal conductivity.

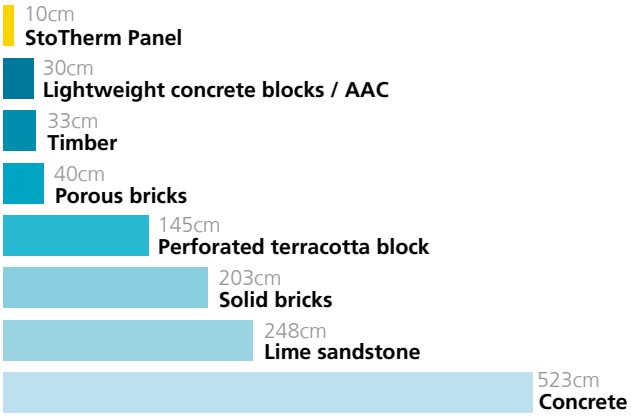


R-values for different climate zones for unheated building elements for housing up to 300m².

Climate zone	1	2	3	4	5	6
Roofs	R6.6					
Walls	R2.0					
Slab floor	R1.5				R1.6	R1.7
Other floors	R2.5			R2.8	R3.0	
Windows & doors	R0.37		R0.46		R0.50	
Skylights	R0.46		R0.54		R0.62	

Note: There are separate R-values for buildings over 300m², which are not presented in the table.

Required layer thickness of different building materials to achieve the same R values (in cm)



All building material layers have the same thermal resistance: R = 2.50 m²*K/W

Requirements for better energy-efficiency

The Ministry of Business, Innovation and Employment (MBIE) has updated the Energy-Efficiency (H1) requirements for insulating new homes and commercial buildings in the New Zealand Building code. Taking effect in May 2023, these changes support, amongst other benefits, increased insulation requirements, an increased recognition of the appropriate use of thermal mass, energy-efficiency and healthy living environments.

The country is split into six zones. All new homes and major extensions across New Zealand are required to meet the insulation requirements.

The requirements affect all houses and buildings up to 300m², alongside separate R-value requirements for buildings over 300m².

The amount of heat transmitted by a building material has nothing to do with its thickness

The R-value unit : [m²*K/W]; is the resistance to heat flow of a given component of a building material. It means, the higher the R-value, the greater the insulation provided. The lower this value, the poorer the material's insulating properties – irrespective of its thickness or the individual installation scenario.

Changes to the building code regulations mean that new houses will need to achieve higher R-values. Typically, walls, windows and roofs will require insulation modelling so that the sum of the components achieves the required R-value.

Thermal bridges

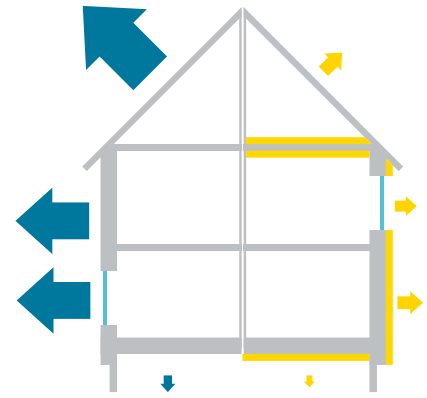
Costly heat stays indoors with Sto

Avoid thermal bridges to prevent the escape of expensive heat

Thermal bridges are points where more heat is able to escape to the outside environment than through the rest of the exterior envelope. This leads to increased heat losses, often accompanied by mould formation. Parts of structures which are frequently critical in this respect include, balconies; window frames; window lintels; wall penetrations and fittings; ceiling junctions; and corners in houses. Professional installed insulation reduces thermal bridging and subsequent structural damage.

Annual heat losses for a detached house

Heat losses can be cut by almost 70% by installing modern windows and insulating the entire external envelope.



Insulated

Un-insulated

Above: Wanaka House, Wanaka
Architect: Richard Shackleton Architects

Breakdown of energy consumption by private households
Heating and cooling costs make the largest proportion of private energy consumption.

approx. 34%	Heating and cooling
approx. 29%	Hot water
approx. 29%	Appliances, refrigeration and cooking
approx. 8%	Lighting

StoTherm insulation through thermography.

StoTherm Anchor installed on a masonry substrate.

Detecting thermal bridges with thermography

Heat losses through the facade can be identified with the aid of infrared thermography. A thermographic camera produces coloured images indicating various levels of heat emission from buildings. The lighter the colour, the poorer the thermal insulation at a given point.

Thermal bridging? Not with Sto's technology of countersunk and capped anchors

A thermal bridge is created when poor insulators create a path for heat to flow through. Insulation around a bridge is of little help in preventing heat loss, in order to eliminate the problem insulation needs to be introduced over the bridge.

Sto has devised a solution to terminate thermal bridges caused by face fixed fixings and avoid unsightly spots appearing on the facade during cold weather. The StoTherm Anchor, designed for masonry construction, is screwed in with an ST Fixing Tool which cuts and compresses StoTherm Panels to a depth of 20mm, leaving the anchor securely fastened into the substrate. After installation, the anchors are then capped with ST Insulation (EPS) Caps, resulting in a covered anchor with no thermal bridging and a smooth homogeneous surface ready to be rendered.

A comfortable home environment begins with the walls

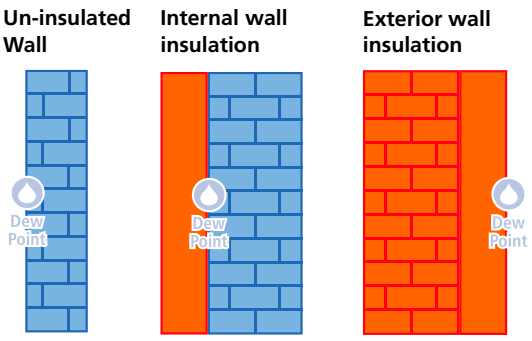
Sto provides for uniform ambient room temperatures

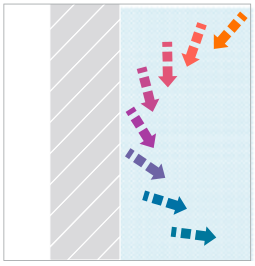
The perceived ambient room temperature is a result from the heat of the room air and the temperature of the surrounding wall surfaces, including the ceiling and flooring. The cooler the walls, the higher the air temperature needs to be in order to ensure an ideal indoor climate. A professionally insulated facade produces a higher wall surface temperature than the rooms air temperature.

Mould – a threat to health and building environments

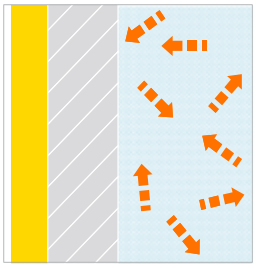
Cold air absorbs less moisture than warm air, which is a particular problem in homes in the winter, as moisture condenses on cold parts of the building. Wall areas, which are subject to dampness and moisture penetration as a result of thermal bridging, provide an ideal habitat for mould. This is harmful not only to the building environment but also to health. Moisture arises from all types of in-house activity, from cooking and baking, through to washing and showering, and even keeping house plants. In order to avoid exposing parts of structures to moisture penetration, it is necessary to eliminate thermal bridges at the planning stage. Proper heating and ventilation is also crucial.

Correctly installed exterior insulation systems protect walls, maintain a warm and dry substrate, and substrate temperature above the dew point. This effectively deals with dampness, mould growth and other environmental issues.





Warm room air cools on contact with a cold un-insulated wall. This results in a continual draught and can create an uncomfortable room environment.



With facade insulation, wall temperature is close to room temperature. This results in steady air movement, while the higher wall temperature prevents mould formation.

Internal insulation

While internal insulation allows a room to be heated quickly, this is its only plus point. The temperature curve is poor and the external wall remains vulnerable to the elements. The heat retention capability of the masonry wall is not utilised in winter and is susceptible to an internal dew point, resulting in condensation, damp and mould. In summer, the process is reversed with the masonry wall heating the interior environment, creating overly-hot conditions.

Save as you preserve your building environment

Insulation pays on existing and new buildings alike

StoTherm: Refurbishment
Aorangi House, Wellington
Architect: Studio Pacific Architecture

A new building affords the opportunity to create energy-efficiency from the outset. Aside from the ecological merits, this also pays in economic terms for building owners and investors. Existing buildings harbour even greater potential, with well over half being in urgent need of energy-efficiency measures; a veritable "energy-saving Eldorado" – especially amongst houses over 30 years old with an inadequate standard of insulation.

Insulating existing buildings
Since every property is in need of restoration at some point in time, planning and specifying insulation systems can boost savings. The energy efficiency of the majority of existing buildings can be improved substantially with external wall insulation systems from Sto. The current condition of any property should be assessed first by a specialist, so that any building damage can be incorporated into an overall restoration solution. Good planning cuts costs: For example, if a new coat of paint, crack repair work or window replacements are due to be carried out, insulation can be installed at the same time.

Insulating new buildings
Correct planning and execution pay off from day one. A whole range of energy factors need to be considered when designing a new building. These factors include, orientation and location of the house; ratio of exterior surface area to enclosed space; room layout; heating system; windows; and facade insulation. It is particularly important to choose the correct insulant and appropriate insulant thickness. Not only does an ideally designed external wall insulation system reduce energy costs, it also provides long-term protection for the building environment.

StoTherm: New build
The Village Exchange, Havelock North
Architect: Architecture HDT, Hawkes Bay

Insulating is worthwhile ecologically…

The rise in CO_2 emissions is a major cause of global warming, with catastrophic consequences such as a drastic increase in hurricanes and flooding etc. Energy-efficient insulation helps preserve resources and actively contributes towards protecting the environment and climatic conditions.

and economically

Insulation costs for facades, roofs and flooring pay off quickly - and with noticeable effects, as heating costs are by far the largest share of energy expenditure for private households. In principle, the better the insulation, the higher the savings potential. Insulating the facade alone cuts heating costs by 30-40%. In the face of annual price increases, such as presently apply to fuel and oil, modernisation measures quickly prove worthwhile.

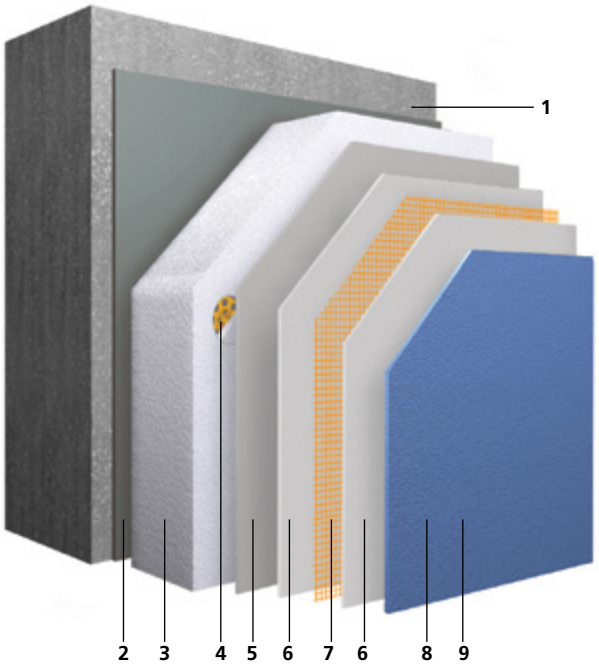
StoTherm Armat Masonry Insulation System

Well-engineered down to the finest detail

Over 50 years of development and carefully chosen components have made StoTherm Insulation Systems a durable, functional and versatile choice for meeting building insulation requirements.

StoTherm Armat Masonry Insulation is a BRANZ appraised, high performance insulation and render system installed over masonry construction. The system includes StoTherm Panels, a mineral-basecoat render, followed by StoArmat synthetic render with fibreglass mesh, providing engineered reinforcement to reliably dissipate tensile, seismic and shear stress. Finished in your choice of Stolit coloured finishing render and StoColor facade paint or StoClear sealer.

Installations are carried out by a Sto Registered Contractor (Licensed Building Practitioner), with the added protection of a StoArmat 20 Year Warranty with StoService Assurance, ensuring the materials used and application meets building code standards, including a service plan for long-term security.



StoTherm Armat Insulation System

1. Substrate: Solid masonry
Such as concrete block, precast, brick & insitu concrete

2. Adhesive: Gluecoat Mortar

3. Insulation (EPS): StoTherm or StoTherm+ Panel
60/100mm self-extinguishing panel, manufactured to AS 1366 Pt 3 by an approved manufacturer.

4. Fixing: StoTherm Masonry Anchors
Drill, install, countersunk and capped with an ST Insulation Cap to avoid thermal bridging.

5. Basecoat: StoLevell Novo / LevelLite Render
Lightweight, EPS bead mineral render with good build properties, water retention agents and machine application properties.

6. Reinforcement Render: StoArmat Render
A weather resistant, cement-free and breathable, high-impact render, with a crack resistance six times higher than that of standard cement-based plasters.

7. Mesh: Sto Glass Fibre Mesh
Easy-to-install, meets the highest requirements for crack, stress and alkalinity resistance.

8. Coloured Finishing Renders: Stolit Renders
Organically bound, highly weather resistant, strong, hard-wearing, impact-resistant, pre-coloured finishing renders.

9. Facade Coating: StoColor or StoClear
StoColor coating based on IQ Net Technology for functional facades or a StoClear sealer.

BRANZ Appraisal No. 604

StoArmat 20 Year Warranty

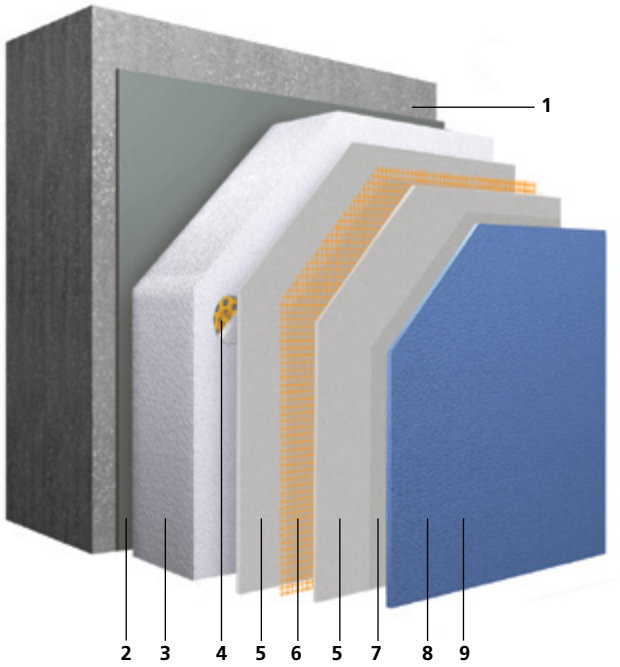
StoTherm Miral Masonry Insulation System

Mineral based - similar to traditional New Zealand systems

StoTherm Miral Masonry Insulation is a BRANZ appraised, high performance, cost-effective insulation and render system installed over masonry construction.

The system includes StoTherm Panels, a mineral-basecoat render reinforced with fibreglass mesh, finished in your choice of Stolit coloured finishing render and StoColor facade paint or StoClear sealer.

All StoTherm builds are specified by Sto and implemented by a to Registered Contractor (Licensed Building Practitioner), with a Sto 15 Year Warranty with StoService Assurance, ensuring the materials used and application meets building code standards, including a service plan for long-term security.



StoTherm Miral Insulation System

1. Substrate: Solid masonry
Such as concrete blocks, precast, brick & insitu concrete

2. Adhesive: Gluecoat Mortar

3. Insulation (EPS): StoTherm or StoTherm+ Panel
60/100mm self-extinguishing panel, manufactured to AS 1366 Pt 3 by an approved manufacturer.

4. Fixing: StoTherm Masonry Anchors
Drill, install, countersunk and capped with an ST Insulation Cap to avoid thermal bridging.

5. Basecoat : StoLevell Novo / Levell Uni Render
White mineral renders with good adhesion and a calibration grain.

6. Mesh: Sto Glass Fibre Mesh
Easy-to-install, meets the highest requirements for crack, stress and alkalinity resistance.

7. Sealer: StoPlex
Water-based, siloxane-enhanced sealer with water repellent and stability properties.

8. Coloured Finishing Renders: Stolit Renders
Organically bound, highly weather resistant, strong, hard-wearing, impact-resistant, pre-coloured finishing renders.

9. Facade Coating: StoColor or StoClear
StoColor coating based on IQ Net Technology for functional facades or a StoClear sealer.

BRANZ Appraisal No. 604

Sto 15 Year Warranty

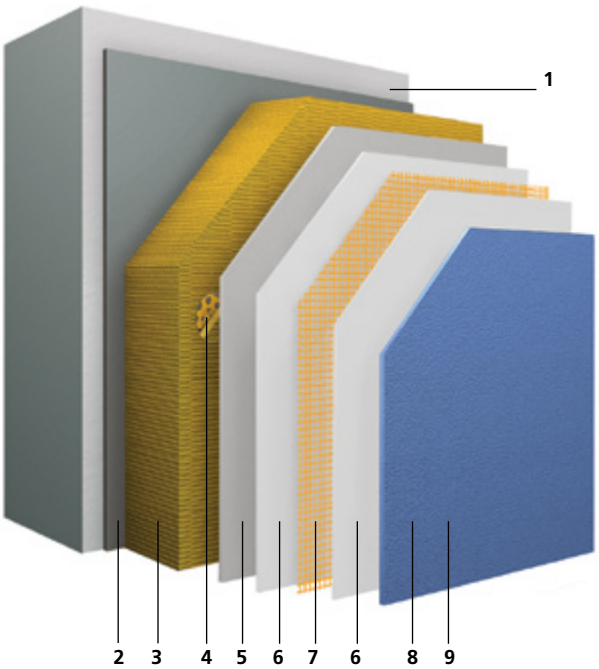
StoTherm Mineral External Wall Insulation System

A non-combustible, mineral-wool insulation system for masonry construction

Fire protection is becoming more and more crucial in the planning stages of new or existing buildings. Masonry External Wall Insulation Systems, which are used for high-rise or public buildings are recommended to consist of non-combustible components.

The StoTherm Mineral Insulation System is based upon the traditional benefits of the StoTherm family, but provides a naturally re-sourced mineral-wool board with four main attributes; non-combustibility for fire resistance, high insulation values for energy-efficiency, moisture management through high vapour permeability and water tightness and good acoustics properties.

StoTherm Mineral Insulation is a reliable non-combustible system for unrivalled fire protection.



StoTherm Armat Insulation System

1. Substrate: Solid masonry
Such as concrete block, precast, brick & insitu concrete

2. Adhesive: Gluecoat Mortar

3. Insulation: StoTherm Mineral Wool
80mm insulation boards made from stone mineral-wool, providing non-combustibility, insulation, acoustic and moisture management.

4. Fixing: StoTherm Masonry Anchors
Drill, install, countersunk and capped with an ST Insulation Cap to avoid thermal bridging.

5. Basecoat: StoLevell Novo / LevelLite Render
Lightweight, EPS bead mineral render with good build properties, water retention agents and machine application properties.

6. Reinforcement Render: StoArmat Render
A weather resistant, cement-free and breathable, high-impact render, with a crack resistance six times higher than that of standard cement-based plasters.

7. Mesh: Sto Glass Fibre Mesh
Easy-to-install, meets the highest requirements for crack, stress and alkalinity resistance.

8. Coloured Finishing Renders: Stolit Renders
Organically bound, highly weather resistant, strong, hard-wearing, impact-resistant, pre-coloured finishing renders.

9. Facade Coating: StoColor or StoClear
StoColor coating based on IQ Net Technology for functional facades or a StoClear sealer.

BRANZ Appraisal No. 604

StoArmat 20 Year Warranty

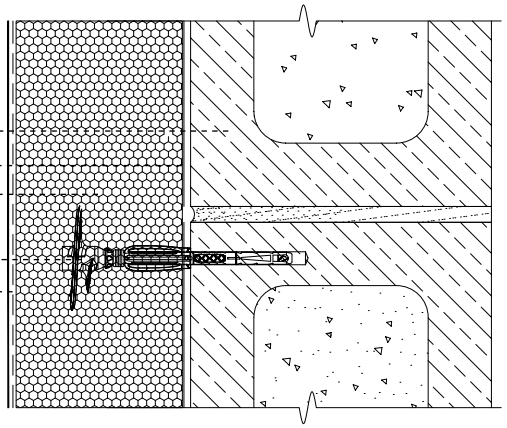
StoTherm Anchors

An innovative solution

Innovative anchors from Sto eliminate thermal bridging whilst removing those unsightly moisture spots in cold weather. The details below illustrate a typical system detail of our StoTherm Eco Twist, self embedding anchor, StoTherm Counter Sunk Anchor and also the StoTherm Impact Anchor.

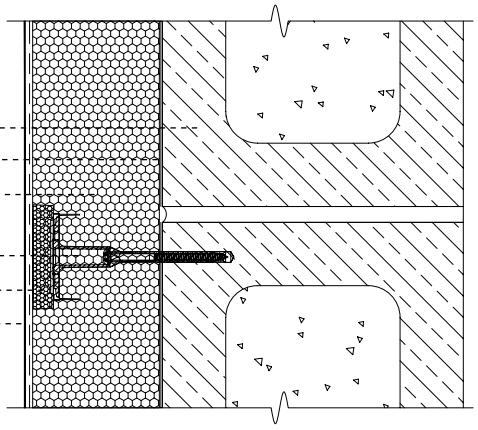
StoTherm Eco Twist, self embedding anchor
For 100mm to 400mm StoTherm Panel,
(Eliminates thermal bridging).
Concrete / Masonry Block
Sto Adhesive Mortar
StoTherm Panel

StoTherm Eco Twist Anchor
StoArmat Miral Render System



StoTherm Countersunk Anchors
For 60mm, 80mm or 100mm StoTherm Panel,
(Eliminates thermal bridging).
Concrete / Masonry Block
Sto Adhesive Mortar
StoTherm Panel

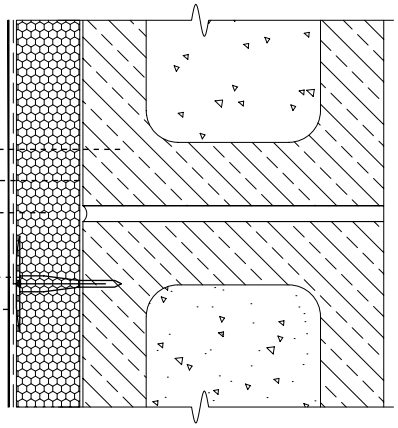
StoTherm Counter Sunk Anchor
StoTherm Insulation Cap
StoArmat Miral Render System



StoTherm Impact Anchors
For faced fixed 50mm, 60mm or 80mm StoTherm Panel.

Concrete / Masonry Block
Sto Adhesive Mortar
StoTherm Panel

StoTherm Impact Anchor
StoArmat Miral Render System



Building with conscience.

Head Office

Wellington
Stoanz Ltd
72 Abel Smith Street
Wellington, New Zealand
Phone +64 4 801 7794
Fax +64 4 384 9828

General Enquiries
Phone +64 4 801 7794
Email info@sto.co.nz
Web www.sto.co.nz

Auckland & Northland
309 Rosebank Road, Avondale
Auckland, New Zealand
Phone +64 9 522 1058
Fax +64 9 522 1054

Central North Island
Phone +64 4 801 7794
Mobile +64 27 299 9290

Christchurch &
Upper South Island
47A Waterloo Road, Hornby
Christchurch, New Zealand
Phone +64 3 338 3570
Fax +64 3 338 3571

Lower South Island
Phone +64 4 801 7794
Mobile +64 27 453 686