Solid Stone Veneers

GAO'S
Environmental Art

Technical Manual

Version 5

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Gao's NZ Holdings Ltd. & M.Y. Stone Ltd
c/- 16A Parkhead Place, Rosewood, Auckland
PO Box 101686 North Shore,
Phone: 0064 9 444 3860
Email: mystoneltd@gmail.com, Website: www.my-stone.co.nz

Solid Stone

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An Introduction To Gao's Solid Stone Veneer Cladding System

Natural Stone has been a proven building material for thousands of years taking everything the environment can throw at it.

Solid Stone veneers are natural stone precision hand cut to thickness and size as individual pieces or formed into set size panels. Easily applied over new or existing, internal or external walls and features. Solid Stone is the ideal way of combining the visual appeal, warmth & texture of natural stone with ease of installation.

Solid Stone facings are site bonded using pre-bagged "Stone Stick" adhesive mortar to fibrous cement sheet, concrete block, brick, pre-cast concrete, tilt slab or other approved surfaces.

When fixed and maintained in accordance with current Solid Stone specifications and details will meet the performance requirements of the New Zealand Building.

Overview

The Solid Stone Veneer Cladding (SSVC) system has a BEAL Appraisal C1820, valid subject to the conditions of the appraisal.

The system is a protective and decorative wall facing system.

It is suitable for cladding of existing dwellings, new building, renovations and alterations on industrial, commercial or domestic applications. The system requires minimal maintenance and will retain its decorative appearance over a long period of time. It provides fantastic weather protection, has great impact resistance and gives timeless visualappeal.

Solid Stone facings are site bonded using pre-bagged "Stone Stick" adhesive mortar to fibrous cement sheet, concrete block, brick, pre-cast concrete tilt slab or other approved surfaces.

The installation shall be carried out by trained and approved installers in accordance with all technical manual details and any relevant technical drawings and in strict adherence to Solid Stone specifications and drawings.

Specific technical advice and detail drawings are available on request.

NZBC Clauses

When installed as specified in this document, installation of the GAO's Solid Stone Veneer cladding system will meet NZBC clauses:
B1.3.1 and B1.3.3
B2.3.1(b)
E2.3.2
F2.3.1

Testing, assessment of buildability, together with expert opinion, has been completed as the basis for this Appraisal. Refer to the BEAL Appraisal Certificate C1820 updated Nov 2023.

Technical Information

"Solid Stone Veneers" are a natural stone veneer precision hand cut to thickness and size by skilled craftsmen specifically for cladding domestic, commercial and industrial features, walls and buildings within the limitations of NZS3604. The scope of this acceptable solution is limited to the materials, products and processes contained herein, for buildings within the scope of clause 1.1.2 of NZS3604.

List of key components and accessories are as follows:

BGC Stonesheet™

- BGC Stonesheet™ is a fibre-cement type sheet, 2400mm by 1200mm, 9mm thick. The method of installation incorporating the use of Render Tape at all vertical and horizontal joints, is covered in the BGC Technical Update of June 2008 and the BEAL Appraisal C807.

Cavity Battens

- Timber cavity battens shall be H3.1, 40mm x 20mm.
- Cavibat Cavity Battens, if used, are manufactured from extruded polypropylene. The battens are cut after extruding to a finished size of approximately 45 mm wide by 18 mm thick. The battens are supplied in 1200 mm long lengths . The battens are 45mm wide by 20mm to 50mm thick and are supplied in 250mm minimum lengths or full length battens can be used.

Fasteners

- For timber framed construction –
  10g x 65mm Stainless Steel 316 screws with m6 x 19mm x 1.6mm washers compliant with AS3566.2 at 200mm spacing.
- For steel framed construction –
  10g x 50mm Stainless Steel 316 screws with m6 x 19mm x 1.6mm washers compliant with AS3566.2 at 200mm spacing.

RL20 Hydrocoat Grey Sealer

- Applied in accordance with the instructions on page 14 of this manual to all surfaces that are to receive the "Stone Stick" adhesive.

Stone Stick Adhesive Mortar

- A two part adhesive specifically designed for stone veneer is used; Part A is a liquid general purpose latex polymer, which is added to Part B, which is a pre-bagged premium grade cement based adhesive.
- Part A and B are mixed in the correct proportions to be suitable for use with the SSVC system. Refer to the technical literature pages 15 – 18 of this manual.

Solid Stone Veneer

- Solid Stone is a natural stone veneer supplied as loose individual pieces of pre bonded panels approximately 30mm to 50mm thick with an average weight of 50kg per square metre, though some patterns and styles may vary slightly.

Components supplied by the owner or main contractor are:

- Bottom cavity closer or Vents
- Proprietary pipe seals or flashing tape for sealing around pipes and the like to the BGC board
- A Frame Protection System incorporating building wrap (underlay), complying with the performance requirements of the NZBC, self-adhesive boots to seal all pipe penetrations to the wrap, and self-adhesive tape suited to seal all overlaps and edges of the wrap in order to make the wrap water and wind tight.
- Window head, jamb and sill flashings complying with the performance requirements of the NZBC, installed in accordance with the Technical Literature.
- Flexible flashing sill and jamb tapes - flexible flashing tapes complying with AAMA 711-07, or a

flexible flashing tape covered by a valid BEAL and/or BRANZ Appraisal for use around window and door joinery openings.
Air seals around windows and doors - air seals

- complying with NZBC Acceptable Solution E2/AS1 9.1.6, or low foaming self expanding, moisture cure polyurethane foam air seals covered by a valid Appraisal for use around window, door and other wall penetration openings or manufactured to comply with AAMA 812-04.
- Building wrap strapping - Polypropylene tape for securing the building wrap in place and preventing bulging of the insulation into the drain cavity where cavity battens are installed at greater than 450mm centers as per NZBC Acceptable Solution E2/AS1 9.1.8.5 (b).

Handling and Storage

Handling and storage of all the materials supplied by Gao Stone Art or the licensed contractor, both on and off site are under the control of Gao Stone Art trained and approved contractors.

Dry storage must be provided on site for the BGC Stonesheet, Sealer and Stone Stick Adhesive Mortar and protected from physical damage. CaviBat battens if used must be protected from direct sunlight, physical damage and stored flat and under cover. All liquid components shall be stored in dry, frost free conditions.

Handling of BGC Stonesheet requires care to prevent damage to corners or excessive flexing.

Handling and storage of all the materials supplied by the building contractor, both on and off site is the responsibility of the building contractor. Materials must be handled and stored in accordance with the manufacturer's instructions.

Warranty
Solid Stone carries a 15 year limited product warranty.

Health and Safety

When cutting, drilling or grinding the BGC Stonesheet, this must be carried out in an open air or well-ventilated area, and a dust mask, eye protection and gloves must be worn.

All aspects of cutting, drilling or grinding must comply with the latest regulations of the occupational safety and health division of the labour department.

Refer to the Technical Literature from the relevant manufacturer for the safe use and handling of the components that make up the Solid Stone Veneer Cladding system.

Frame Protection System

A wind-tight Frame Protection System is required to be installed before the installation of a cladding system over typical timber and light gauge steel framing.
A system for the protection of framing will include at least the following components all complying with the performance requirements of the New Zealand Building Code:

1. Underlay – also known as 'wall wrap' or 'building wrap';
2. Seam tape – which may be suited forflashing around openings
3. Flashing tape – designed for waterproofing around openings such as windows and doors
4. Boots – for sealing between round pipes and the like of various diameters, and the underlay

A system may have additional components such as flashings between round pipes and the like and external cladding substrates.
The installation of the Frame Protection System shall be the owner, or typically the builder, representing the owner.
It is essential that the owner provides subsequent trades with assurance that the Frame Protection System has been installed according to the manufacturer's instructions, according to good trade practice, and to ensure compliance with the performance requirements of the New Zealand Building Code.
To achieve the latter requirement, installers of cladding systems, need a suitable check-sheet, which the owner (or their representative) signs off before installation of the cladding commences.

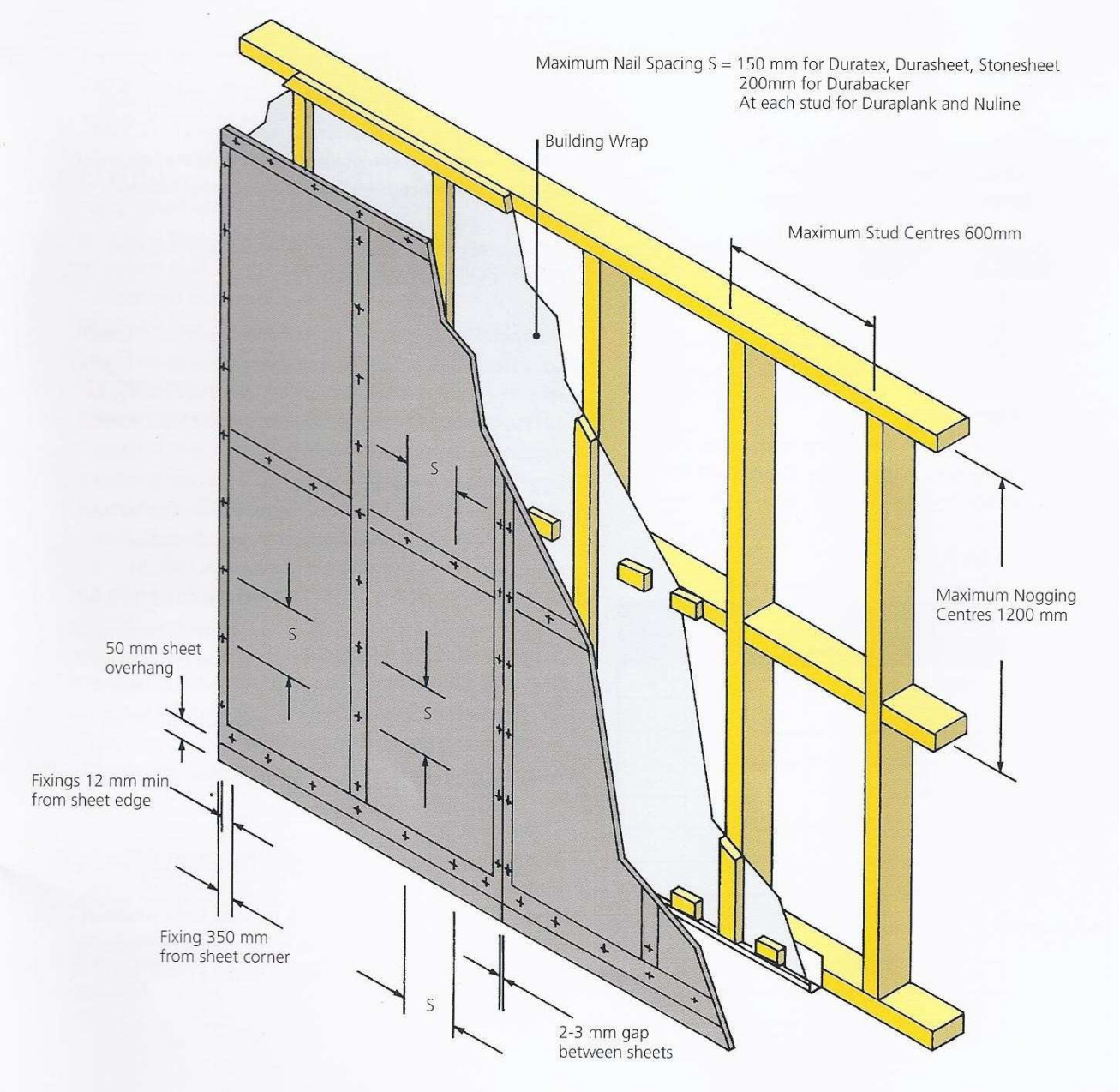
WHY THE NEED?
With the laser-like focus of lawyers of seeking recompense from anyone associated with a building defect, especially leaky houses, the need for risk management has never been more pronounced here in New Zealand.
To add more risk to the situation, Government advice from the old DBH in relation to weather tightness, simply can't be relied on. For example the compliance document E2/AS1 published by the Government and many in the industry absolutely rely upon, contains numerous errors, omissions and misleading statements. Hiding behind such documents when a claim has been made, may not be a good defence, especially if it is shown that someone ought to have known better.
For these reasons, BEAL have conducted their own research and arrived at their own criteria and design principles for materials and systems used for construction in New Zealand, ensuring the performance requirements of the Building Code are really met.
The result of this, is the requirement by BEAL for certain criteria, designs and best trade practice to be incorporated into a product or system. Examples of this include all types of cladding systems, roof protection systems and waterproofing systems.

Substrates

Fibre Cement Sheet

Solid Stone has been tested and approved only for installation over the BEAL appraised "BGC Stonesheet and Butyl Tape for use with manufactured or natural stone slip veneers" appraisal number "BEAL/C807". Full technical data and installation details for BGC Stone Sheet can be found on the BGC website – www.bgcfibrecementsheet.com.au

Substrate and frame protection system should be installed by a Licenced Building Practitioner in strict accordance with the manufacturer's instructions and all components of BEAL appraised system C807 in order to comply with NZBC requirements for E2 External Moisture.



Detail drawing from BGC Manual- Refer to BGC website for most recent detail

Concrete and Masonry

Solid Stone can be installed over masonry materials meeting NZS 4210 and concrete provided it meets NZS 3109 with a compressive minimum compressive strength of 12.5mpa after 28 days.

Before commencing any work, concrete and masonry should be dry (check AS/NZS 2311 recommendations), smooth, clean and free from dust or any contaminants, such as release agents (particularly relevant on pre-cast concrete). Cleaning should be done with compatible products, for specific advice contact adhesive system supplier.

Maximum vertical and horizontal surface variations must be within NZS 3604 limits of 2mm over 1200mm and 3mm over 3000mm.

Concrete and masonry substrates to be clad require the “Stone Stick” 2 part Waterproofing and Adhesion system to be installed as per details and specifications prior to installation of Solid Stone Veneers.

Installation

Preparation

Stone veneers should be clean and dry at the time of application to ensure full bond strength of Stone Stick adhesives is achieved.
All stonemasons should use drop sheets to reduce any mess and the time needed to clean up. All porches, drives, decks, entry–ways etc must be covered.
Any joinery or areas adjacent to stone being applied should be masked to prevent the possibility of staining from adhesives and associated materials.
Ensure areas for mixing mortar and cutting stone are suitable for safety and ease of cleaning and are kept tidy throughout the job.
Have materials on hand to clean any splashes or dropped mortar/ fixing materials as soon as is practical before they dry or stain.

Sheet Layout, Joints And Surface Preparation

Construction of substrate to be clad must be carried out in accordance with current NZBC and manufacturers' details and specifications by a licensed buildingpractitioner.

Any inspections required by local authorities must be signed of prior to commencement of installation of any Solid Stone veneer or related product.

Where Solid Stone is to be applied on fibre cement sheet, all sheet layouts, joints and fixing must be done in strict accordance with the manufacturers' instructions and in adherence with NZ Building Code. BGC Stone Sheet specifications are available at www.bgcfibrecementsheet.com.au

Where applied to brick, concrete block, pre-cast concrete or tilt-slab the substrate must be clean and free from paint or surface treatments and use of a sealer or primer as required.

Penetrations

Any penetrations of substrate must be waterproofed according to the details in this manual and substrate manufacturers' technical details by an approved technician prior to stone installation using approved flashing and/or waterproofing systems.

Sealing and Priming

Prior to application the "Stone Stick Waterproofing and Adhesion System" should be used in accordance with application instructions (see page 14).

Gauging

All walls shall be gauged (level horizontal lines drawn) fully, before stone application commences.
Use lines as a guide to ensure Solid Stone is kept level throughout the application process.
A chalk line and gauging rod shall be used at a maximum line spacing of 150mm.

Stone Application

Substrate should be sealed and/or primed using if required and left to dry for the required time period and sheet joins and corners sealed and/or taped in strict adherence with the substrate manufacturer's technical details.

Always plan how the progression of the laying of stone is to take place. Take note of such things as access to the work area, any corners or obstructions that may need to be incorporated or worked around, sills, doorways, etc.

Application Mortar Mix

Stone Stick Mortar Powder – Pre bagged premium grade cement based adhesive
Stone Stick Mortar Liquid – General purpose modified Latex Polymer additive
Oxide – if required to desired colour (not exceeding 5% by volume of cement)

- The mixing ratio of Stone Stick is 20kg powder mixed into an emulsion of Stone Stick Liquid and clean water at a ratio of 1:1 (50% Stone Stick Liquid to 50% clean water) or for immersed applications a ratio of 2:1 (66% Stone Stick Liquid to 33% clean water).
- Pour 4 Litres of mixed emulsion into a drum and then gradually add the Stone Stick Powder while mixing continuously until a smooth lump free mix is obtained. Gradually add additional liquid to obtain desired consistency. Always mix powder into liquid.
- Allow the mix to stand for 5 minutes, re-stir and then apply the adhesive as specified.

NB: Recommended maximum usage of coloured oxide is 0.4 kg oxide per 40 kg bag of pointing or mortar cement. Ensure same measurement is used for each mix to provide colour consistency. This should be added to your mixing water & Stone Stick Mortar Liquid to ensure consistent colour.
IF YOU EXCEED THIS AMOUNT YOU RUN THE RISK OF THE STONE FIXING MORTAR ADHESION BEING COMPROMISED

Corner Stones

When installing "L" shaped corner stone's the mortar is to be applied to the longest leg of the stone only. The short leg without any mortar is to be layed with a minimum 5mm space between the stone and substrate to act as a control joint, allowing for movement.

When corner stones are to be installed they should be applied first starting from the base of the substrate. The stone must not overhang more than 10% of the narrowest part of the individual stones width; i.e. if the narrowest part of the stone is 100mm the maximum overhang will be no more than 10mm.

All corners ("L" shaped and finger jointed) must be applied in an alternating fashion and no two corners of the same profile are to be positioned in the same direction beside one another.

Flat Stones

Apply a 15 -20mm thick even layer of mortar to the ***entire** back of the stone using a masons trowel for individual flat stone or a 12mm square notched trowel for panel stone ***(unless across a joint, including corners on sheet cladding, see control joints on page 8)***

Press the stone firmly into place on the prepared wall surface, use a side to side action while pressing the stone onto the wall to ensure no air is trapped and achieve a good bond.

Continue laying, selecting appropriate stones leaving excess mortar in place to ensure all gaps are filled and entire substrate area has a minimum 5mm mortar coverage. *See "Pointing" instructions on page 11*

Stone can be cut to size as required using a grinder with an appropriate masonry cutting blade, or breaking stone using a stone masons chisel or bolster. Always ensure suitable safety equipment is worn including dust mask, safety glasses and ear defenders when cutting or breaking any stone and cutting surface and surrounding areas are protected.

Application Tips

- All patterns of stone laying are to be done in a craftsman like manner. The finished wall should look structurally correct and aesthetically pleasing. Smaller fill in pieces of stone must be spread evenly through the wall, and not grouped near the finishing point.
- Starting from the base applying the corners stones first then filling in with the flat stones keeping in mind the size of the gaps between the Solid Stone required to achieve the desired finish.
- Where Solid Stone is to be laid to the bottom line of backing sheet. The stone must not overhang more than 10% of the narrowest part of the individual stones width; i.e. if the narrowest part of the stone is 100mm the maximum overhang will be no more than 10mm.
- The bottom course of fibre cement sheet shall be a minimum of 35 mm clear of decking and roof flashings, 100mm clear of paved surfaces and 175mm clear of unpaved ground.
- Where applicable, all vertically cut stone edges are to face away from doors, windows or similar. No stone is to be cut when in place on the wall.
- Alternate the internal corners to achieve a stacking effect

Movement Control Joints

These fall into two categories: THERMAL and EXTERNAL/INTERNAL – and are used to minimise maintenance.

Thermal movement control joints shall be used over all vertical joints in the backing sheet, except external corners. Where the stone crosses a joint, ***(this includes corners)*** do not apply the mortar to the full back of the stone. The Stone Stick Adhesive shall be applied to only one side (the longest/largest) of the stone back, and the Stone Stick Adhesive is not to cross the join in the sheets. The pointing will locate and support the non-bonded portion of stone. This will allow movement to occur at the join.

External movement control joints are to be used above and below windows and doors where the vertical surface is less than 300 mm. The stone is to finish in a straight vertical line at these points and a standard (10 mm) pointing gap left. As above, movement will occur through the pointing.

Control joints must be constructed in accordance with the Technical Literature (drawing on page 5) and as follows;

- Horizontal control joints - To be installed when intermediate floor joists are not seasoned and/or when the height of the wall exceeds 8m
- Vertical Control Joints - at maximum 5m centres; aligned with any control joint within the structural framing, or where the system abuts other cladding systems.
- Located at both internal and external corners.

(Note: Where possible control joints shall be located in line with window and door openings. Horizontal and vertical control joints must be located over structural supports. The Technical Literature provides some guidance for the design of vertical control joints where the system abuts different cladding types. Details not included within the technical literature or those that are marked as 'Specific Design Only' are outside the scope of this Appraisal Certificate and are the responsibility of the designer.)

Interstorey Junction

Inter-storey drained joints must be provided for walls over 2 storeys in height in accordance with the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.9.4 (b).

Pointing

Solid Stone can be pointed with either deep or full pointing to achieve the desired effect provided minimum substrate coverage of 5mm is achieved.

While the grout needs to be pressed in firmly, you can leave it quite rough until it starts to set / 'go off' then brush it smooth with a brush, e.g. hearth brush or similar, until you have a satisfactory finish.

Brush and/or sponge off any mortar or grout that may have accidentally dropped or is on the face of the stone before it sets to allow for ease of clean up and to ensure no staining occurs.

The pointing mortar is:

3 parts by volume sand ***Supplied or approved by Solid Stone Veneer supplier**
1 part by volume Portland Cement
Mixed into an emulsion of Stone Stick Liquid and clean water at a ratio of 1:1 (50% Stone Stick Liquid to 50% clean water)
Oxide – if required to desired colour (not exceeding 5% by volume of cement)

Mix to desired consistency

NB: recommended maximum usage of coloured oxide is - 0.5 kg oxide per 40 kg bag of pointing or mortar cement, mixed to as dry a consistency as can still be used. Ensure same measurement is used for each mix to provide colour consistency.
IF YOU EXCEED THIS AMOUNT YOU RUN THE RISK OF THE STONE FIXING MORTAR NOT ADHERING TO THE SURFACE

Clean-Up

Any excess or dropped mortar must be cleaned off before it has any chance of drying to avoid any staining of the stone or surrounding area.
Any masking should be removed as soon as practical and disposed of appropriately.
Ensure areas for mixing mortar and cutting stone are suitable for ease of cleaning and kept tidy throughout the job.
All mess created through stone laying shall be cleaned up and put in drums or bags and removed from the site on completion and disposed of in an appropriate manner.
All stonemasons should use drop sheets to reduce any mess and the time needed to clean up. All porches, drives, decks, entryways etc must be covered.

All rubbish is to be stacked tidily and removed on completion of the job by the applicator.

Health and Safety

When cutting, drilling or grinding the BGC Stonesheet, this must be carried out in an open air or well-ventilated area, and a dust mask, eye protection and gloves must be worn.

All aspects of cutting, drilling or grinding must comply with the latest regulations of the occupational safety and health division of the labour department.

Refer to the Technical Literature from the relevant manufacturer for the safe use and handling of the components that make up the Solid Stone Veneer Cladding system.

On-site Checklists

On-site checklists are shown in the GAO Stone Building Product Quality Plan.

Solid Stone Specifications

Stock Colours

Solid Stone veneers are available in a range of colours including greys, browns, creams and whites. See the Solid Stone website www.my-stone.co.nz or contact your nearest distributor for details of the full range.

Specifications for Flat Stone:

Solid Stone veneers are available as selected pieces of stone hand cut and fixed together to form rectangular panels with a flat back for ease of application and a natural face surface.
Average panel dimensions: 610mm long x 150mm high (0.092m²)
Average stone thickness: 35mm
Average weight: 4.5Kg/panel (approx. 50kg/m²)
Approximately 11 panels per square metre

Solid Stone veneers are also available as individual hand selected pieces cut to have a flat back for ease of application and a natural face surface.
Average piece dimensions range from 100mm – 500mm long x 10mm – 150mm high.
Average stone thickness: 35mm
Average weight: 50kg/m²

Specifications for Corner Stones

Solid Stone external corner panels come with pre formed staggered lapped finger joins.

Solid Stone individual external corner stones are hand selected pieces of stone with the rear side cut out in an “L” shape to ensure the most authentic finish possible

Note – all sizes, weights and quantities above do not include substrate or mortar are approximate best estimates and may vary depending on modules supplied or used

Product Warranty

Solid Stone products come with a 15 year Manufacturers Limited Product Warranty from the purchase date of the Solid Stone Veneer. Provided the substrate, building/structure the product is applied to, complies with relevant NZ and Local Building Code and installation was performed in strict accordance to the current manufacturers application instructions. The product warranty does not include any labour component for application of the Solid Stone or adhesives used in the application of the Solid Stone.

The Stone Stick adhesive/ mortar mix carries a 10 year Limited Product Warranty from the purchase date of the adhesive materials (this warranty does not cover Solid Stone application). Provided all components were sourced from or approved by a Solid Stone or an authorised supplier and preparation and mixing was performed in strict accordance to the manufacturer's instructions and the substrate, building/structure the product is applied to is deemed acceptable by Solid Stone supplier and complies with relevant NZ and Local Building Codes.

This warranty does not cover any damage caused by the following:

- Incorrect Installation
- Damage or discolouration due to contact with chemicals, paint, staining, UV and/or oxidation.
- Building/ structure, wall or foundation movement trough settlement or external forces.
- Wilful abuse or negligence.
- Non-compliance with management and maintenance recommendations.

Installation Warranty

Any warranty on the application of Solid Stone is the responsibility of the registered product installer. A list of registered installers is available on request.

Solid Stone Veneer Maintenance

Solid Stone Veneers require minimal maintenance.
In the majority of situations annual light pressure water wash or a hose down and scrub with a soft brush is all that is required.
However if Solid Stone Veneers require more aggressive cleaning please contact your Solid Stone Veneer supplier for recommendations and advice.
Any chemical or mechanical cleaning carried out without prior approval from the Solid Stone Veneer supplier may void any warranty.

Water Resistant Adhesive & Substrate Technical Information

Stone Stick Water Resistant Adhesion System

The following **NZ MADE SYSTEM** is warranted for use on specified cement board, masonry block and precast walls complying with NZBC that require waterproofing and application and adhesion of stone up to 100kg per square metre. (Please note that this is the maximum weight of stone or tile when wet, however the products must be dry when adhered).

Ensure all substrate is clean and free of any release agents or curing compounds which could inhibit adhesion and therefore final bond strength. This is especially relevant if adhering to precast or tilt-slab walls.

1) Waterproofing: Apply two coats of RL20 Hydrocoat Grey. Mix Part A and Part B evenly, and apply the second coat after the first coat is touch dry. Apply the second coat in a perpendicular direction (@ 90 degrees) to the first coat.
2) In the event cracks are found in walls contact manufacturer for instructions.
3) All control joints or gaps should have the RL20 Hydrocoat Grey 'turned down' into the joint, and after the application of two coats, these joints should be filled with Sikaflex MS.
4) After application of the second coat of RL20 Hydrocoat Grey, wait approximately 1 hour in fair curing conditions (or until touch dry), and then immediately apply a skim slurry coat of Stone Stick Powder mixed with approximately 10% additional cement and mixed into an emulsion of Stone Stick Liquid and clean water at a ratio of 1:1 (50% Stone Stick Liquid to 50% clean water). Allow to cure. The substrate is now ready for adhesion of stone.
5) No spot adhesion. 100% surface adhesion is only acceptable. Other than as required at control joints.

The features of this system are:

- Waterproofing is easy to mix and apply, and forms an extremely strong bonding and cohesively strong moisture barrier
- Coverage of up to 80sq metres per 20 litre kit of RL20 Hydrocoat Grey for two coats.
- Rapid cure
- A membrane which also acts as a hydrostatic pressure barrier, and can be used on walls and floors with dampness coming through the substrate
- Can be applied to green concrete with a very high relative humidity still present in the concrete (up to 96%RH).

Stone Stick Liquid Technical Specifications

Characteristics:

- Stone Stick Liquid is a modified latex polymer designed for general purpose use as an additive in conjunction with “Stone Stick Powder” cement based adhesive mortar to enhance bond strengths, water resistance and chemical resistance.
- Stone Stick Liquid main uses are: Primer prior to tiling or plastering, Slurry bonding coat, Plastisiser for mortars, Reducing efflorescence, Adhesion enhancer in conjunction with cement based tile adhesives for: Vitrified tiles, Glass mosaics, Pavers and Cobbles, Swimming pools, Industrial and commercial floors, Dense smooth substrates.
- Stone Stick Liquid will improve the flexural strength of a cement based adhesive, providing greater resistance to the stresses in installations where the tiling may be subject to limited movement.

Preparation:

- In all instances the surface needs to be well fixed and clean and free from any contamination.
- Special note should be taken of the fixing and sealing requirements of the substrate supplier.
- For waterproofing use “Stone Stick Waterproofing and Adhesion System”.
- Existing paint work must be clean and firmly adhered. Roughen up the paint with sandpaper to provide some suction back into the substrate.

Mixing:

- The mixing ratio of Stone Stick is 20kg powder to mixed into an emulsion of Stone Stick Liquid and clean water at a ratio of 1:1 (50% Stone Stick Liquid to 50% clean water) or for immersed applications a ratio of 2:1 (66% Stone Stick Liquid to 33% clean water)
- Pour 4 Litres of mixed emulsion into a drum and then gradually add the Stone Stick Powder while mixing continuously until a smooth lump free mix is obtained. Gradually add additional liquid to obtain desired consistency. Always mix powder into liquid.
- Allow the mix to stand for 5 minutes, re-stir and then apply the adhesive as specified.

Application:

- Stone Stick Liquid can be used in three ways:
- *As a primer*, to reduce porosity of the substrate and to provide a separating layer.
- *As a bonding coat or slurry*, immediately prior to application of a tile adhesive or sand cement mortar to provide exceptional adhesion to the substrate.
- *As an additive*, to the cement mix. Stone Stick Liquid can be added as a partial or complete replacement of the gauging water. Amongst the advantages conferred by the inclusion of Stone Stick Liquid are improved workability, improved adhesion, improved toughness and flexibility, reduced dusting, improved resistance to chemicals, improved water and frost resistance, reduced salts migration (efflorescence).

Clean Up:

- Excess adhesive from the face of the stone can be cleaned up with damp cloth while the adhesive is still wet.

Coverage:

- As a primer $12m^2/L$
- As a slurry mix with cement $3m^2/L$
- As a additive to Stone Stick Powder adhesive $2\text{-}3m^2/L$

Packaging / Shelf Life:

- Stone Stick Liquid is available in : 4 L, 20 L ,and 1000L
- Stone Stick Liquid, when stored in a cool, dry environment, and is stored above ground level, will have a shelf life of approximately 12 months.

Handy Tips:

- Stone Stick Liquid is classified as a non-hazardous product.
- For a full MSDS on this product available on request

Technical Data:
Properties Results

Properties	**Results**
Appearance	Light Blue Liquid
Density	1.10 +/- 0.05
Drying Time @ 20ºc	Approx. 30 minutes

The information supplied is to the best of our knowledge true and accurate. The actual application of the product is beyond the manufacturer's control. Any failure or damage caused by the incorrect usage of the product is not the responsibility of the manufacturer. The manufacturer insists that all workmanship must be carried out in accordance with AS 3958.1-1991. It is also the responsibility of the end user to ensure that the literature in their possession is the latest issue

Stone Stick Powder Technical Specifications

Characteristics:

- Stone Stick Powder is a premixed premium grade cement based adhesive.
- It is designed for bonding all types of natural and manmade stone veneers and tiles with the exception of light coloured and green marble, onto fibre cement sheet, rigid concrete, render, rendered brickwork and block work surfaces.
- It can be used internally or externally on wall and floor surfaces.
- Stone Stick can be used for fixing approved stone veneers in immersed situations like water features, swimming pools, spas, etc, when mixed with Stone Stick Liquid Additive.
- Stone Stick when mixed with Stone Stick Liquid Additive can be used for facade stone application.
- Stone Stick can be used to fix stone over most waterproofing membranes. However it is advisable to contact the manufacturer prior to commencing.
- Stone Stick Powder is also available in white.

Preparation:

- Ensure all concrete substrates are allowed to cure for at least 6 weeks in accordance with AS 3958.1-1991. A wood float finish is prefered.
- All rendered surfaces must be allowed to cure for at least 7 days prior to commencing stone application.
- Ensure all surfaces are sound, dry and free from movement, oil, dust, grease, wax, curing compounds, release agents and any other loose contaminating materials.
- It is recommended that all surfaces must be prepared with the “Stone Stick System”, especially porous surfaces, to ensure waterproofing and a sound bond of the adhesive to the substrate.
- For waterproofing use “Stone Stick Waterproofing and Adhesion System”.

Expansion / Movement Joints

- Expansion/movement joints must be provided to allow for movement between adjacent building components. They should be as follows:
- Over existing joints in the substrate.
- Where two different substrates meet. Eg. Timber and concrete.
- Around fixed elements in the floor, Eg. Columns.
- At internal vertical corners.
- Around the perimeter of the floor.
- In internal floors where any dimension exceeds 9m or 5m if subjected to sunlight.
- In external floors where any dimension exceeds 4.5m.
- On wall surfaces at storey heights horizontally and approximately 3m-4.5m apart vertically. Ideally they should be located over movement joints in the structural background and at structural material changes for example, the horizontal joint at the bottom of floor slabs, vertical joints at internal vertical corners, and at junctions with columns. (The above points are in accordance with AS3958.1-1991)
- Movement joints should go right through the tile adhesive bed to the background and kept free from dirt and adhesive droppings. Movement joints must not be less than 5mm and not wider than 10mm. The movement joints must be filled with a flexible sealant like Silicone (Sikaflex MS is recommended).
- When stone veneers are applied across expansion joints it is imperative that Stone Stick is only applied to the stone on one side of the joint and the other side is left to “float” to reduce the possibility of cracking through the veneer. This includes corner stones. For more detailed information see the appropriate stone veneer installation manual.

Mixing:

- The mixing ratio of Stone Stick is 20kg powder mixed into an emulsion of Stone Stick Liquid and clean water at a ratio of 1:1 (50% Stone Stick Liquid to 50% clean water) or for immersed applications a ratio of 2:1 (66% Stone Stick Liquid to 33% clean water).
- Pour 4 Litres of mixed emulsion into a drum and then gradually add the Stone Stick Powder while mixing continuously until a smooth lump free mix is obtained. Gradually add additional liquid to obtain desired consistency. Always mix powder into liquid.
- Allow the mix to stand for 5 minutes, re-stir and then apply the adhesive as specified.

Application:

- Once the surface has been appropriately prepared in accordance with the above instructions, then the adhesive may applied according to the following recommendations.
- For application of stone veneers to walls Using a masons trowel apply 10 -15mm thick even layer of mortar to the entire back of the stone **(unless across a joint, including corners on sheet cladding, see the appropriate stone installation manual for detailed installation instructions)*
- Press the stone firmly into place on the prepared wall surface, use a side to side action while pressing the stone onto the wall to ensure no air is trapped and achieve a good bond.
- For floor tiling use a 10mm x 10mm square notched trowel for tiles up to 300mm x 300mm. For tiles 300mm x 300mm and larger, use a 12mm x 12mm square notched trowel. For mosaic tiles use a 6mm x 6mm square notched trowel.
- Stone Stick should be applied onto the substrate at a rate of 1m² at a time. Application rates greater than this can result in the adhesive skinning before the tiles are laid into it.
- Once the adhesive starts to skin, do not lay tiles into it, but remove it and apply fresh adhesives.
- When placing the tiles into the adhesive press them in by using a twisting or sliding action. Ensure no voids occur and full coverage of adhesive is under the tiles.
- For tiles with lugs, groves or uneven backing it may be required to butter the back of the tile with
  adhesive in addition to trowelling the adhesive onto the substrate.
- The final bed thickness of the adhesive should be at least 3mm for floor tiling.
- Once the installation is completed do not disturb the finished surface for at least 24 hours at 20ºC.

Clean Up:

- Excess adhesive from the face of the stone can be cleaned up with damp cloth while the adhesive is still wet.
- Adhesive that has oozed out into the grout joint must be raked out with a knife / spatula etc.
- Tools and other equipment can be cleaned up using water while the adhesive is still wet.

Coverage:

- A 20kg bag of Stone Stick Powder will cover approximately 3-4m² of wall area when installing stone veneer **NOTE – This is an estimate only quantity for some types of stone veneers may vary*
- A 20kg bag of Stone Stick Powder will cover approximately 4-5m² of floor area using a 10mm notched trowel.

Floor Tile Grouting Application:

- Grouting application can commence 24 hours after the completion of tiling.
- Refer to grout data sheets for the technical information.

Packaging / Shelf Life:

- Stone Stick Powder is available in 20kg bags.
- A bag of Stone Stick Powder, when stored in a cool, dry environment, and off the ground, will have a shelf life of approximately 12 months.

Handy Tips:

- Do not apply Stone Stick in temperatures above 40ºC and below 5ºC.
- For applications / situations not mentioned in this data sheet please contact your nearest Stone Stick supplier
- Stone Stick Powder being cement based is alkaline in nature, and therefore may cause dermatitis. It is recommended that applicators wear PVC Gloves or similar and safety goggles.
- For a full MSDS on this product, please contact your nearest Stone Stick supplier.

Technical Data:

Properties Results

- Appearance Grey Powder
- Bulk Density (Approx.) 1.52 +/- 0.05
- Open Time Approx. 20 minutes at 20ºC
- Drying Time at 20ºC Approx. 24 Hours
- Pot Life 40 Minutes at 20ºC

The information supplied is to the best of our knowledge true and accurate. The actual application of the product is beyond the manufacturer's control. Any failure or damage caused by the incorrect usage of the product is not the responsibility of the manufacturer. The manufacturer insists that all workmanship must be carried out in accordance with AS 3958.1-1991. It is also the responsibility of the end user to ensure that the literature in their possession is the latest issue.