



Greenboard™
Insulated Wall Cladding
Sunhoods and Blades
(CodeMark™ Accredited)



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Energy Efficient. Building Systems.

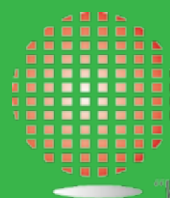
The Wall Store Monash: 2067 Princes Highway, Clayton VIC 3168

Phone. (03) 9544 9989 Fax. (03) 9543 7787

The Wall Store Somerton: 14 Zakwell Crt Coolaroo Victoria 3168

Phone. (03) 9308 8800 Fax. (03) 9308 8866

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CODEMARKTM

GM-09-CM30005

CODEMARKTM ACCREDITATION

NRG GreenboardTM is CodeMarkTM Accredited and
complies with the Building Code of Australia (BCA)



CodeMark™ Certificate



Changes to the 2010 version of Building Code of Australia are that all building products must comply with the BCA.



CodeMark™ certified products comply with the BCA.



NRG Greenboard™ has achieved CodeMark™ Certification.



Each state has regulations, ensuring that a CodeMark™ building solution can not be rejected.



For their own protection, local authorities (certifiers, councils, surveyor, designers, home insurance companies) are insisting on CodeMark™ Certification.



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GREENBOARD™ Insulated wall cladding

Greenboard™ is an Insulated Wall Panel that combines exterior cladding with insulation so designers can achieve the 6 star energy ratings that have been introduced into the building code. Greenboard™'s insulated core of high quality expanded polystyrene puts the Greenboard™ insulated panel in the best place of the building, as far towards the outer side as possible.

Greenboard™ Insulated Wall Panel is a lightweight, energy efficient product and once coated the system provides a weather resistant, seam free rendered finish.

Greenboard™ Advantages

CodeMark Certification

All building products must comply with the BCA (Building Code of Australia). NRG Building Systems has achieved CodeMark on Greenboard™ Insulated Wall Cladding meaning Greenboard™ complies to the BCA.

Insulation Qualities

All insulation materials are rated for their performance in restricting heat transfer. This rating is expressed as an R-value which is a measure of the material's resistance to heat transfer (thermal resistance). The higher the R-value the greater insulating effect.

Total Wall R-value for using Greenboard™				
Thickness (mm)	50mm	60mm	75mm	100mm
R-value on total wall	2.18 R	2.44 R	2.83 R	3.48 R

Sound Rating

NRG Building Systems has tested 60mm Greenboard™ total wall system and the acoustic performance result was Rw35,Ctr-6. Please refer to NRG test results. The Greenboard™ walling system can be further enhanced by using a "sound rated" insulation batt. Please refer to insulation manufacture's specifications.

Fire Retardant

Greenboard™ contains a flame retardant additive and will not support fire, it has a spread of flame index of zero. If in a fire situation the toxic fumes are no greater than that of timber and other building materials.

Grooved Panel

The surface of the Greenboard™ panel is Grooved both sides allowing the inside surface to breathe and channel any possible condensation away through the Grooves, downwards to the base of the wall. This is particularly important where "insulation" or "breather sarking" is used. The additional advantage being that when the

Grooved face of Greenboard™ is rendered the system becomes stronger as the render gets into the Groove to form a core shape for better adhesion and a stronger more rigid Greenboard™ system.

Easy to Use

Greenboard™'s lightweight panel size is 2500 x 1200 allowing installers to cover the external walls quicker and easier. For the builder and their client, Greenboard™ gets the project to lock up stage quicker allowing other trades to start and complete their tasks.

Environmentally Friendly

Greenboard™ requires less energy to produce than other traditional building materials and contains no CFC's nor HCFC's. Greenboard™ does not contain ozone depleting substances and none are used in the manufacturing of this product. Greenboard™ can be recycled or NRG recommends left over Greenboard™ can be placed in the walls as extra insulation.

Termite Retardant

Greenboard™ contains a termite retardant (Bifenthrin) and NRG uses 62% more in their product than the minimum required.

Render Levels of Finish

Reinforced render is applied to the Greenboard™ substrate at approximately 4-8mm in thickness which allows qualified applicators to screed out usual imperfections and form a seam free level 5 finish. NRG recommends render over Greenboard™ should be specified by a coating manufacturer.

Greenboard Product Data

Greenboard™ Energy Efficient Insulative Walling System Product Information.

NRG Greenboard™ is an insulative walling system suitable for external cladding of timber or steel framed buildings as well as solid concrete and masonry walls. The system provides a weather resistant, seam free rendered finish in a wide range of textures and colours. It also provides continuous thermal insulation over the entire wall. Developed in Germany in 1973, these systems have been extensively used throughout Western Europe and North America where strict environmental laws are in place governing the energy efficiency of both private and commercial buildings. The system is now well established in Australia ranging from dry arid areas, to tropical and alpine regions, whilst proving energy efficiency, cost effective and flexible construction alternative. The NRG Company is providing and increasing research and development of the system to improve the product.

NRG Greenboard™ Insulative Walling System consists of:

- 14.1.1 An enhanced expanded polystyrene (EPS) insulation board impregnated with an insect repellent compound and flame retardant. The board is mechanically fixed to timber/steel stud framing or reinforced concrete or masonry wall. The surface of the Greenboard™ panel is grooved both sides allowing the inside surface to breath and channel any possible condensation away through the grooves, downwards to the base of the wall. This is particularly important where 'insulation' or 'breather sarking' (refer 16.1.9) is used. The additional advantage being that the grooved 'face' surface of the Greenboard™ panel provides an excellent 'key' to accept the reinforced render system.
- 14.1.2 NRG Greenboard™ Washers and Screws (Class 3) are used for fixing to timber or steel framing, while special anchors are used for fixing to masonry wall surfaces.
- 14.1.3 External PVC (UV Stabilised) angle beads and window trims.
- 14.1.4 A polymer modified cement render reinforced with an alkali resistant fiberglass mesh.
- 14.1.5 Acrylic texture coating and or pigmented membrane finished in your selected colour.
- 14.1.6 The NRG Walling System incorporating reinforced renders and textured finish coatings form a complete cladding system from the frame to the finished surface.
- 14.1.7 Vermin Retardant.
- 14.1.8 A high impact strength finish.
- 14.1.9 NRG Greenboard™ Insulative Walling System: Sound insulation value - 60mm Greenboard™ Refer (16.1.5 - Acoustic Values (Table D)) = Rw 35, Ctrr -6
- 14.1.10 NRG Greenboard™ Insulative Walling System: is an extremely high-energy, efficient product reducing heating costs in winter and cooling costs in summer.
- 14.1.11 NRG Greenboard™ Insulative Walling Systems unique grooved surface provides strength and flexibility of finish, allowing a vast range of architectural designs, finishes and colours to complement any surroundings.
- 14.1.12 NRG Greenboard™ Insulative Walling Systems is the ideal substrate for lightweight construction, 2nd storey additions, reactive soil and mine subsidence areas are concerned.

Properties and Advantages of the NRG Greenboard™ Walling System

NRG Greenboard™ panel is manufactured from high density, rigid, expanded polystyrene. The raw material is gained as a by-product of the manufacture of oil.

Greenboard™ is manufactured without the use of CFC's and does not contain or emit any poisonous gas. In fact, NRG Greenboard™ is made up of 98% air entrapped in a closed cellular structure of polystyrene. This entrapped air accounts for the extremely good insulation properties of the Greenboard™.

The off cuts of NRG Greenboard™ can be glued within the wall cavity prior to the installation of the internal linings as additional insulation. This cuts down on the impact to our environment as all the material is being used, leaving a minimal amount of material to be removed from site.



- **98% ENTRAPPED AIR**
- **SUPPORTING THE ENVIRONMENT**
- **NO CFC'S USED IN THE MANUFACTURING PROCESS**
- **NO SITE WASTAGE - USING ALL OFF-CUTS AS ADDED INSULATION**
- **SUPPORTING THE CONSUMER BY REDUCING HOME AND BUSINESS**
- **GREENBOARD™ RENDER, REINFORCED WITH 150G/M² FIBERGLASS MESH FOR HIGH IMPACT STRENGTH.**
- **ADDED FIRE RETARDANT WILL NOT SUPPORT COMBUSTION**
- **DESIGN FLEXIBILITY.**
- **FULL RANGE OF COLOURED FINISHES AND STYLES**
- **EXCEPTIONAL THERMAL QUALITIES**
- **ACOUSTIC VALUES**
- **VERMIN RETARDENT**

15.1.1 Insulation for Energy Efficient Buildings

The Greenboard™ system is the most cost efficient method of insulation in terms of R-value per dollar. Unlike some other methods of insulation that allow thermal bridging across the timber or steel studs framing, NRG Greenboard™ provides a continuous insulative sheath around the entire building.

15.1.2 Warranty - 10yr

- i. NRG warrants that the Greenboard™ sheets (the "Product") will be free from defects due to defective factory workmanship or materials prior to the installation of the Product for a period of 10 years from the date of purchase, subject to compliance with the conditions published in NRG Product Warranty 2007 - Free Call 1800 674 001 www.nrggreenboard.com

15.1.3 Easy to Render

The surface of the NRG Greenboard™ is grooved providing an excellent substrate for Reinforced Render Systems.

15.1.4 Energy Efficient Production

Greenboard™ uses much less energy in its production than conventional building materials such as concrete and masonry.

15.1.5 Fashionable Render Finishes

Available in a wide range of Architectural colours and styles (Refer to your selected manufacturers, texture coating specifications).

15.1.6 Design Freedom

Curved walls, rounded corners, embossed patterns, raised wall areas, mouldings and other architectural features are simple to achieve and cost-effectively with the versatile NRG Walling System.

15.1.7 Vermin Retardant

NRG Greenboard™ is impregnated with a natural insect retardant, (Bithentrin)

15.1.8 Biologically Inert

The board will not rot and provides no nutritive value for insects or micro-organisms.

Design Information General

The NRG Greenboard™ Insulative Walling System forms a continuous weather-resistant thermal envelope around the external walls of the building. The versatility of the building and the workable nature of the Greenboard™ composite panel permits greater design freedom. This system allows the designer to economically provide a fashionable, long lasting render finish as well as comply with the strictest energy ratings required in modern building codes.

Tests show that a properly insulated building can reduce energy costs by up to 75%. This greatly reduces the running costs of the building in terms of energy savings and reduces the amount of green house gases released into the atmosphere

16.1.1 Structure

NRG Greenboard™ 50mm, 60mm, 75mm and 100mm thick has sufficient strength and rigidity to be supported by wall framing spaced at 450mm maximum centres. NRG Greenboard™ can be installed over masonry walls (e.g. 40mm Greenboard™) to increase the "R-value" of the masonry wall system or brick veneer construction.

16.1.2 Building - Wind Zones (Table A)

When mechanically fixed to a variety of substrates in accordance with the "NRG Greenboard™ Walling System – Installation Manual for use in the following categories.

Intermediate Region	Description	pd =
Type B - W33	Sheltered Suburban	0.990 kPa
Type B - W41	Exposed Suburban	1.485 kPa
Type C - W50	Open Rural (Tropical Cyclone)	3.289 kPa
Type D - W65	Open Rural (Severe Tropical Cyclone)	4.719 kPa

16.1.3 Minimum Stud & Fastener Spacing's (Table B)

NRG Greenboard™ Minimum Stud & Fastener Spacing's				
Regions - Wind Category		Stud Spacings (mm)	Fastener Spacings (mm-Vertically)	Number of Fasteners /m ₂
Non Cyclonic	N1	450	300	12
	N2	450	300	12
	N3	450	300	12
	N4	450	200	18
	N5	450	150	24
Cyclonic	C1	450	200	18
	C2	450	150	24
	C3	450	100	37
* In accordance with AS1684 – 2006 / AS4005 – 1992				

16.1.4 Insulation Values (Table C)

All insulation materials are rated for their performance in restricting heat transfer. This rating is expressed as an R-value which is the measure of material's resistance to heat transfer (thermal resistance). The higher the R-value, the greater the insulating effect.

Thickness	50	60	75	100
Thermal conductivity at 23°C (W/m ² .k)	0.037			
R-value of insulation material	1.30	1.56	1.95	2.60
Total R-value of wall from Rendered Greenboard™ Reflective sarking, cavity plasterboard	1.92R	2.44R	2.83R	3.48R

16.1.5 Acoustic Values - NRG Greenboard™ (Table D)

Summary of Acoustic Test Results: - 60mm NRG Greenboard™		Acoustic Performance
Side 1	6mm concrete render applied to 60mm thick expanded polystyrene foam. The polystyrene applied with sheet lengths vertical.	R _w 35, C _{tr} -6
Framing Side 2	90mm timber studs at 450mm centres 10mm Plasterboard applied with sheet lengths vertical. Edges caulked with expanding polyurethane foam.	
Ron Rumble Pty Ltd, Consulting Acoustical & Vibration Engineers - 28th August 2006		

The NRG Greenboard™ walling system can be further enhanced by using a 'sound rated' insulation batt (Refer to Insulation manufacturer's specifications).

16.1.6 Impact Resistance

The Greenboard™ Walling System when installed in accordance with "NRG Specifications & Installation Manual" will have adequate resistance to impact loads likely to occur in normal residential and commercial use. The likelihood of damage in public areas in or around residential, commercial or industrial buildings where heavy impacts could occur should be considered at the design stage. Heavier grade fibreglass reinforcing mesh or multiple layers should be used and appropriate protection or barriers should be provided in vulnerable areas.

16.1.7 Hazardous Building Materials

When installation is complete the NRG Greenboard™ Walling System and the Greenboard™ Reinforced Render System is non-hazardous.

16.1.8 External Moisture

The "NRG Specifications & Installation Manual" contains specific details and instructions for flashing around windows, finishing to edges and sealing penetrations. Head, sill and jamb flashings must be used as specified. The NRG Greenboard™ Walling System must not be allowed to come into contact with the ground.

16.1.9 Sarking

NRG Building Systems highly recommends the use of vapor permeable sarking, equivalent to Sisalation® Wall Wrap (Breather) or similar, fixed directly behind the NRG Greenboard™ Walling System.



16.1.10 Early Fire Hazard Properties (Table E)

NRG Greenboard™ contains a flame retardant additive to inhibit accidental ignition from small flame source.

Note:

NRG Greenboard™ System must be separated from heat sources such as fireplaces, chimneys or flues. NRG Greenboard™ System Does not provide a fire rated wall.

NRG Greenboard™	Index	Rating
Ignitability	(0-20)	6
Spread of Flame Index	(0-10)	0
Heat Evolved	(0-10)	1
Smoke Developed	(0-10)	4

NRG Greenboard™ Installation Procedure

17.1.1 Installation Procedures NRG Greenboard™

Walling System

This manual provides information on the correct procedures and materials to be used for the installation of NRG Greenboard™ Walling System over standard framed and solid structures. The drawings and details are provided to assist building designers in specifying the correct design and detail of the NRG Walling System. These details cover most common applications. If the details are to be altered or new ones proposed please contact NRG to discuss the changes. Failure to do so may void the systems warranty.

These components that make up the NRG Greenboard™ Insulative Walling System are.

- Screws and washers
- Vapor permeable sarking
- NRG Greenboard™
- NRG PVC beads
- Polymer modified render
- Reinforced mesh
- Texture top coat

These components form part of the complete system and must not be substituted with other possible non-conforming materials.

17.1.2 Timber and Steel Framing

All timber and steel framing should conform to the relevant Australian Standards, as well as the local standards for structural requirements including wind loadings and bracing.

NRG Greenboard™ is not a structural material and therefore should not be considered or used as a bracing material.

17.1.3 Existing framing

When 'over-cladding' existing timber buildings, inspection should be carried out by a fully qualified

person, to identify any deterioration or infestation by wood boring insects. Although NRG Greenboard™ is impregnated with an effective insect repellent, it will not arrest or prevent further infestations of the timber framing structure. Where necessary, repairs must be undertaken to ensure that the timber substrate is sound, straight and true.

17.1-4 Back Blocking (Off Stud Joints)

Where horizontal fixing of sheets 'off stud' join are to be made, it is necessary to back block as follows.

- By fixing an 'off cut' of stud material vertical, (widest face facing outwards) and securely nailing to bottom plate and noggin. Alternatively, between noggin and top plate, making sure to glue both Greenboard™ sheet edges with Bostik No-More Nails and fixing through each sheet into the 'black block' with washers and screws at maximum 300mm centre's.
- Alternatively, horizontal 'back block' using 'off cuts' can be placed at maximum 300mm centre's, following the above procedure except that, with the two sheets in place, take 'off cuts', smear with Bostik No-More Nails over one face, place 'off cuts' against the Greenboard™ sheets and screw through face of Greenboard™ into 'off cuts', pulling both sheets into alignment.

(Refer to DWG o8)

17.1.5 Solid Blocking of Fitting and Accessories

Consideration should be given to the installation of wall mounted accessories i.e. taps, electrical fittings, etc. It is important to allow for adequate back-blocking for these items prior to the installation of the NRG Greenboard™.

17.1.6 Electrical Cables and PVC

Cables penetrating the NRG Greenboard™ Walling System must be installed in conduit or ducts sealed to the cladding or have a sheathing containing migration resistant plasticizer. Cable manufacturers should be contacted for details of suitable cable types.

17.1.7 Flashings

All flashing to wall openings, roof sections and parapets etc. to be installed prior to the fixing of NRG Greenboard™ Walling System (and is always capped off at the bottom edge of the Greenboard™ sheet using a Starter Bead refer DWG 11 – DWG 12) in accordance with good building practice and together with any requirements of the BCA. NRG Building Systems take no responsibility or liability for flashing or installations.

17.1.8 Fitting NRG Greenboard™ Walling Panels

- I. Before commencing to fix panels check that the frames are straight, all windows and flashings are correctly installed and solid backing blocks are in place where required.
- II. Timber frames must have a moisture content of less than 15% before Greenboard™ panels are fitted, horizontally (preferred) or vertically.
(Refer to DRW o8)
- III. Measure and cut Greenboard™ Sheeting using a straight edge and masonry diamond blade in a standard power saw (use of handsaw not recommended).
- IV. Glue both horizontal and vertical Greenboard™ sheet edges to each adjoining sheet using Bostik™ - No More Nails / Power trigger foam.
- V. Fixing NRG washers and screws at 450mm stud spacings horizontally and 300mm spacings vertically (see fixing table for high spacings) : -
(Refer to DRW o8) Greenboard™ sheet lay horizontally, comprising of five (5) rows fixings vertically.

1st – When making butt joint, each sheet is fixed individually to the back-blocking or vertical noggin, corresponding with the above fixing set out. (Refer 17.1.4)
- VI. ‘Infill’ small areas with Greenboard™ (e.g. above and below windows, etc.) – It is recommended to use a minimum height of 300mm to allow for adequate fixing.
- VII. Allow 3mm gap between Greenboard™ panel and openings for bead and sealing procedure ((Refer Table 17.1.15 Beading))
- VIII. External corners - Greenboard™ sheets are overlapped the full thickness of the sheet and glued using recommended construction adhesive,

17.1.14 (Table J). (DRW o7)

17.1.9 Curved walls

40mm and 60mm Greenboard™ panels can be fitted

to curve walls with a radius greater than 2-4 metres’. Where a tighter radius is required use multiple layers by laminating 2 x 20mm thickness Greenboard™ panels (off set joints).

17.1.10 Expansion Joints (Table F)

Expansion joints allow for movement within the building and avoid unsightly cracking within the wall areas. Expansion joints must be provided where NRG Greenboard™ lengths exceed specified dimensions (see table). In addition, it allows for movement between different substrates while affording an opportunity to ‘weather seal’ such junctions. Refer DWG 09 & 10

Placement of Expansion (Control) Joints	Maximum Distance
Horizontal wall areas: i.e. wall length	8 metres
Vertically: Construction joint between floor levels and gable ends, where the total wall height including gable exceeds maximum distance.	3 metres
Scribed’ control joints: above large window and door openings.	
Internal Corner – When rendering, mesh up to but not across corner then later ‘scribe’ a control joint into the render, cutting (nick) the mesh intermittently to relieve the tension within the mesh. Fill with sealant prior to texture coating.	

17.1.11 NRG Greenboard™ Specifications (Table G)

NRG Greenboard™ Technical Specifications	Sheet Sizes	
20mm – Flat panel (Laminate sheets to create curved wall)	2500mm	1200mm
40mm - Grooved	2500mm	1200mm
60mm - Grooved	2500mm	1200mm
75mm - Grooved	2500mm	1200mm
100mm - Grooved	2500mm	1200mm

17.1.12 Fixings – Accessories (Table H)

NRG Greenboard™	Timber Framing Treated CSK Ribbed Head	Steel Framing Treated CSK Drill Point
50mm	10 - 8 x 65mm	55mm
60mm	10 - 8 x 100mm	75mm
75mm	10 - 8 x 100mm	95mm
100mm	10 - 8 x 125mm	125mm
N.B. Screws are to be Galvanised or Treated (Class 3)		
All NRG PVC Washers and fixings are required at 300mm maximum centre's - Refer DWG o8		
Extreme environments - consideration should be given to the use of T316 Stainless Steel fixings		

17.1.13 Cutting and Tools Required (Table I)

NRG Greenboard™ Tools
Power Saw – using diamond blade (This provides the most accurate and preferred method; it is also the most environmentally responsible way).
Screwing - Tek Gun
Straight Edge
Level
Chalk Line
Sealant Gun
Alternatively the use of a 'hot blade' knife. This will provide the ultimate answer to straight/detail cutting. Available from Ironcore Transformers - Styrocut 120 and Styrocut 140 - www.ironcore.com.au

17.1.14 Gluing and Sealing (Table J)

NRG Greenboard™- Gluing and Sealing Components	
Construction Adhesives	Bostik™ - No More Nails / power trigger foam (check compatibility - Polystyrene/Styrene Safe)
Sealants	Bostik™ Seal 'n Flex / Sika Pro2HP (or equivalent – compatibility:– Polystyrene Safe)
Gap Filler	BOSTIK 5077
Primer	Power Trigger Foam (i.e. polyurethane high-resistance foam)
Foam -Backing Rod	10mm diameter (leave 6mm gap)

17.1.15 Beading (Table K)

NRG have a full range of UV stabilized PVC beads specifically designed for Greenboard™ cladding .use only UV stabilized beads for external application.

N.B. External and internal 'rail edges' must be precise to ensure a uniform complete 'fit and finish' in readiness for sealing as well as rendering.

NRG UV Stabilized PVC Beads Range	Application Guide (for 6mm Build Beads)
External Corner Bead	<ul style="list-style-type: none"> External Corners Window Heads, Sills and Jamb's 50mm & 75mm Refer to DWG o4 and o6
Render Starter Bead 40/60/75mm <small>Capping base of Greenboard™ Sheet</small>	<ul style="list-style-type: none"> Rebated Slab Edge. Refer to DWG o1 High Set (above roof – exposed subfloor areas – elevated projections) Refer to DWG o2, 11 and 12
Reveal Bead 40mm 60mm 75mm	<ul style="list-style-type: none"> Window and Door Jamb's. 40mm - (60mm, 75mm and 100mm Should not be used Render sill recommended). Refer to DWG o3 Eave Line (optional) Refer to DWG 14 Vertical, Horizontal (Gable) Expansion Joints Refer to DWG o9 and DWR 10
Sill Bead (15° incline) 50mm	<ul style="list-style-type: none"> Window Sill 50mm Refer to DWG 5 60mm, 75mm and 100mm is not recommended.
Expansion Joint Bead	<ul style="list-style-type: none"> Flexible control joint for vertical/horizontal and gable applications. Substitute for Reveal Bead as referred to in DWG 9 and DWG 10.



IMPORTANT INFORMATION

17.1.16 NRG Greenboard™ Bead and Sealant Procedure

Installing, Priming and Sealing of Bead – Procedure. N.B. Use only UV stabilized beads for external application.

At this point particular care needs to be exercised to ensure that the installation of all beading around window, door openings etc.; it is imperative that this procedure is performed correctly. This is not just a gap filling exercise but an integral part of the total NRG Greenboard™ Walling System.

- External and internal 'rail edges' must be precise to ensure a uniform complete 'fit and finish' in readiness for sealing as well as rendering.
- Extra care needs to be taken to make sure all 'beads' are both 'plumb/level'.
- Priming (to prevent 'roll-back' of sealant) and sealing procedure stage requires extreme attention to detail to ensure water tightness of all windows, doors and openings.
- Using Bostik™ Primer 5077, and a clean rag, dampen cloth with primer and quickly clean the internal joinery to NRG line that is to be sealed.
- Using masking tape, accurately adhere to frame of joinery, 4mm form edge creating a neat parallel margin, ready for sealant application.
- Cut a medium size end off nozzle of 'Seal'n Flex.' Proceed in applying sealant. Using a coving tool, neatly create an internal cove finish.
- Remove masking tape from joinery leaving a 100% water proof joint seal.

I. External Corner Angles Beads - External Points of the building, columns etc. (Refer DWR 07)

- a) Install external corner angle bead to external corner edges by applying a 'liberal' bead of Bostik™ 'No More Nails' to both sides of internal corner rails of the external corner angle bead, then press bead firmly into position. Make sure it is plumb, scraping of excess glue protruding through bead perforations (priming of beads in this case is not required).

II. External Corner Beads - Render return to windows and doors - head, jamb and sills. This is particularly recommended for 50mm, 75mm and 100mm Greenboard™.

- a) Allow 3mm gap between Greenboard™ panel and openings (this will provide a 'key' for the sealant). Tape around window and door perimeters.
- b) Prime and tape around aluminum surfaces of window and door component edges prior to rendering, apply a bead of sealant into the 'gap' between the Greenboard™ and the component edge. This sealing process is repeated after rendering and prior to the texture painting system. (Refer DWR 04-06)
- c) Install external corner angle bead to external corner edges. Refer I. a) above.

III. Reveal Beads/Render Reveal Trims (sill) return to head, jamb and sills of windows and doors.

- a) Allow 3mm gap between Greenboard™ panel and openings (this will provide a 'key' for the sealant). Tape around window and door perimeters, priming both surfaces.
- b) Prime (using Bostik™ Primer 5077) beads and tape around surfaces of windows and doors in readiness for application of the texture painting system. (Refer DWR 04-06)

IV. Render Reveal Trim (Sill) – 50mm

- a) Allow 3mm gap, prime beads and tape around surfaces of window and door edges prior to sealing readiness for application of the texture paint system. (Refer DWR 05)

V. Expansion Joint - there are two options available - Either by using Reveal Beads or Render Expansion Joint.

1) Reveal Beads as referred to in DWR's 09 -10

- a) Install 'reveal bead' to both edges of Greenboard™ by applying a 'liberal' bead of Bostik™ 'No More Nail', allowing a 6mm gap between both sheets, then insert a 10mm foam backing rod as shown.
- b) Prime (using Bostik™ Primer 5077) both top and bottom outside exposed edges before applying sealant thus creating an 'expressed' joint as shown.

2) Expansion Joint Bead (illustration shown in Accessories)

- a) Install 'render expansion joint' between both Greenboard™ surfaces (leaving required gap). Applying two beads of Bostik™ 'No More Nail' to either side of the internal corner rails (i.e. top and bottom sections), with sufficient glue to allow the glue to penetrate perforated rail edges. Scrape off excess.
- b) Prime (using Bostik™ Primer 5077) within the 'flexible' joint, before applying the sealant thus creating an 'expressed' joint.

Example of adhesive applied to bead.



Installation Procedures of NRG Greenboard™ Walling System over Concrete and Masonry Wall Surfaces

18.1.1 Preparation

All walls must be clean and dust free from dirt, oil, vegetation, and crumbling or loose materials.

18.1.2 Installation of Greenboard™ using Power's Foam Adhesive System

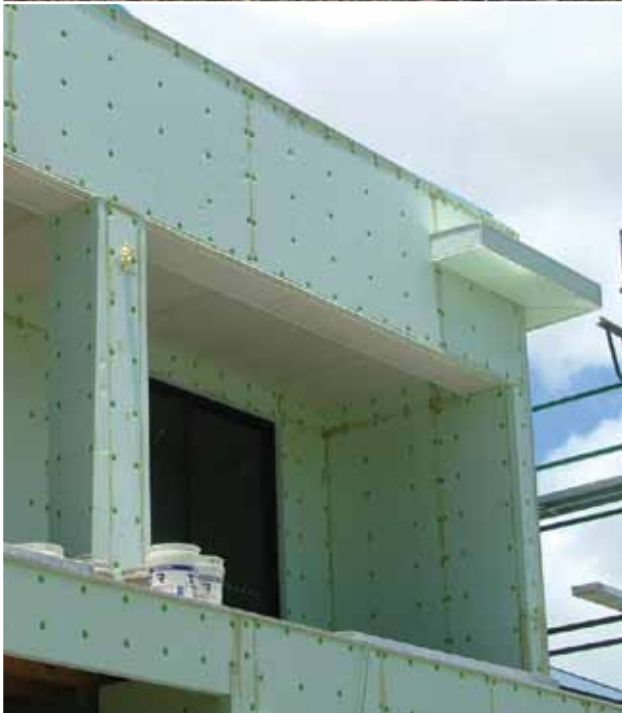
- i. When installing via the Foam adhesive system, apply a large "dob" of foam adhesive to the middle of each and every masonry block.
- ii. Position the board and drill 8mm hole through the masonry at each corner offset in by approx 100mm.
- iii. Hammer the Hilti IDP anchors in.
- iv. Use a minimum of 8 IDP anchors for each 2500 x 1200 board with at least 2 x IDP anchors staggered in the mid section of the board.

Hilti™ IDP Polypropylene Anchors (Table M)

NRG Greenboard™	Hilti™ IDP Polypropylene Anchors	Hilti™ IDP Anchors Maximum Fixing Centres
50mm	70mm	Refer:- iv) above for spacing details
60mm	90mm	
75mm	110mm	
100mm	130mm	

18.1.3 Final Checking of Greenboard™ installation on Concrete and Masonry Walls - Before rendering, any irregularities in the surface of the sheet or joints are sanded back using a coarse rasp.

18.1.4 Expansion Joints within The Greenboard™ installation on Concrete and Masonry Walls - All expansion joints in the substrate must be carried through the complete cladding system. (Refer to DWG 9 and 10)



Render Specifications

19.1.1 3.5mm Render

Option 1

1 coat polymer modified render (3.0mm)
Reinforced Alkali Resistent Fibreglass Mesh (160g/mm)
1 coat Acrylic Render (1.0mm)
2 coats of Acrylic Membrane Paint

Option 2

1 coat polymer modified render (3.0mm)
Reinforced Alkali Resistent Fibreglass Mesh (160g/mm)
1 coat Primer
1 coat Timted texture (1.0mm)
(Clearcote optional)

6mm Render

1 coat polymer modified render (4mm)
Reinforced Alkali Resistent Fibreglass Mesh (160g/mm)
1 coat polymer modified render (2mm)
2 coats of Acrylic Membrane Paint

NOTE: To be used only as a guide. Refer to Render/ Paint manufactureres specifications (example Rockcote RRR) for exact details and procedures.

19.1.2 Handling and Storage

- i. NRG Greenboard™ should be laid flat with edges and corners protected from damage.
- ii. NRG Greenboard™ should not be stored in the open or fixed to a building for prolonged periods. NRG Greenboard™ should to be protected from exposure to direct sunlight and kept away from extreme heat and organic solvents.

19.1.3 Health and Safety

- i. NRG Greenboard™ Insulative Walling System and is non-hazardous.
- ii. However, as with all composite materials basic safety clothing and gloves are to be worn when handling or cutting the NRG Greenboard™
- iii. When cutting NRG Greenboard™ Insulative Walling System with a power saw it is recommended that a face mask and protective glasses be worn.

NRG Estimating Hints

Measure m² of NRG Greenboard™ required + 10% waste

Bostik™ No More Nail: Calculate e.g. 150m₂ x 0.22 = 33 tubes x 300ml)

Bostik™ Seal'n Flex: Calculate total window perimeter. e.g. 150mtrs. = 19 x 300ml tube (150mtrs x 0.1266 = 19 x 300ml tube) Coverage is an approximation.

NRG PVC Beads: Calculate window perimeter ÷ 3.65mtrs + 3 lengths (waste cutting). e.g. 75.00mtrs ÷ 3 = 25 + 3 lengths (28 lengths)

NRG Washers and Screws – e.g. 150m² x 12 = 1800

NRG Fiberglass Mesh (Effective coverage /50mtr. Roll = 45m²) e.g. 150m² x 45 = 3.33 rolls (round up) 4 x 50mtr. Rolls

Render x 20kg Bag (1.5m² per bag)

Suggestion, place NRG Greenboard™ off-cut (waste) into western wall cavity, this will add additional insulation.



IMPORTANT INFORMATION

Principal Contractor / Builder / Installer

Essential Related Trade Practices

- General Construction and Flashing Principles must be adhered to in maintaining water tightness. NRG Building Systems cannot be held liable for inferior flashing and installation practices.
- It is essential that all external surfaces of the framing structure are parallel, i.e. ground floor framing, mid floor framing and upper floor framing with no protrusions or setbacks. It is also a recommendation that where ply bracing is fixed externally, counter battens be fixed perpendicular to adjoining studs to level the wall surface prior to fixing Greenboard™.
- It is imperative that all exterior window/door and joinery are fixed into position prior to the installation of the NRG Greenboard™ to maintain water tightness and those components are fixed off plumb and level.
- Consideration should be given to the installation of wall mounted accessories i.e. taps, electrical fittings, etc. It is important to allow for adequate back-blocking for these items prior to the installation of the NRG Greenboard™.
- Termite Barriers: It is the builder's responsibility to arrange the installation of a suitable termite barrier system by a qualified professional installer, prior to the installation NRG Greenboard™.
- Internal Lining Fixing: If render application has been completed prior to plasterboard/wet area linings installation, it must be screw fixed to the internal side of all external wall surfaces. Failure to do so can result in defects to exterior render surface finish.

Product Advisory Line – Ph: 1800 674 001

NRG Building Systems provides a full comprehensive construction advisory service, from pre plan to onsite construction advice. Product information and CD-Rom 'how to', assistance is available on request.

Alternately go to: www.nrggreenboard.com

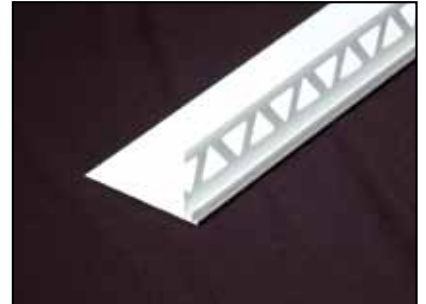


Accessories

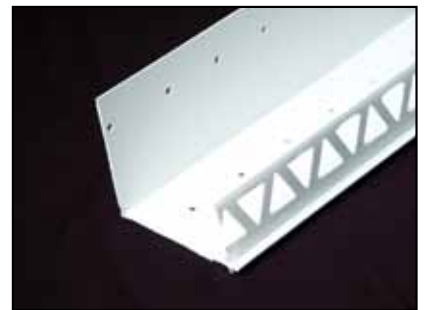
**6mm External
Corner Bead**



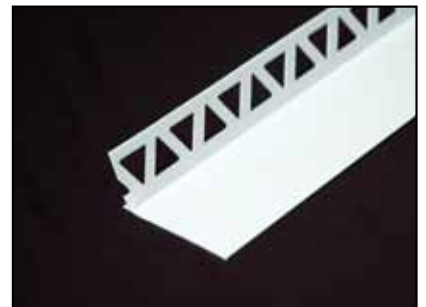
**Reveal Bead
40mm - 60mm - 75mm**



**Render Starter
Bead 40mm - 60mm
- 75mm - 100mm**



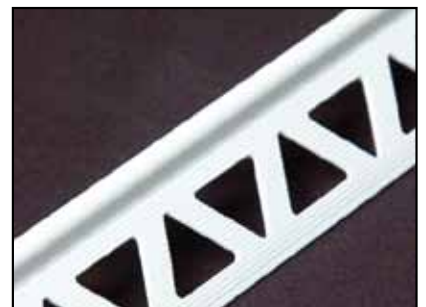
**Render Reveal Trim
Sill (15° incline)**



Expansion Joint Bead



3mm Render Bead



PVC Bead Profiles 100% uv Stabilised

**NRG Greenboard™
Mesh and Render**



**NRG Greenboard™
Textures and Paints**



Metal Fixings



Timber Fixings



Masonry Fixings



**Sunhood Bracket
and Fixings**



DWR 01

50mm - 60mm - 75mm - 100mm NRG panel Slab Rebate Detail

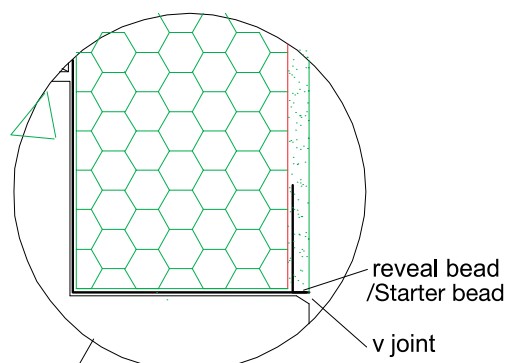
NRG Greenboard™ Set Out (Measurement Shown - Indication Only)	Step Down	Set Back (Rebate)
Rebated Slab Edge – 40mm	50mm min	45mm max
Rebated Slab Edge – 60mm	50mm min	65mm max
Rebated Slab Edge – 75mm	50mm min	80mm max
Rebated Slab Edge - 100mm	50mm	105mm max

10mm plasterboard lining
over stud frame

window reveal and architrave

wall frame

DAMPCOURSE AND TERMITE BARRIER REQ'D



NRG panel

render and reinforcing

Starter bead fixed to frame

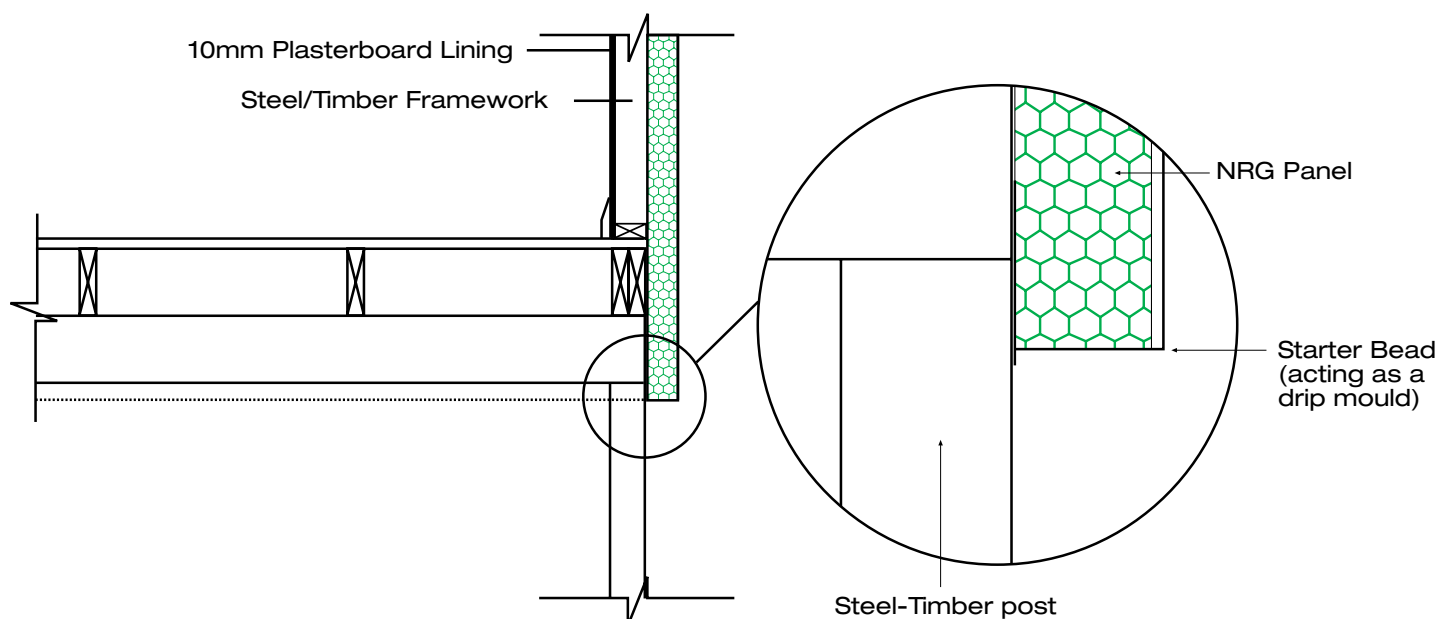
50mm rebate min

NOTE: NRG GREENBOARD IS NOT TO BE USED FOR DAMPCOURSE OR TERMITE BARRIERS. STANDARD BUILDING PRACTICES APPLY IN THESE SITUATIONS.

Width of rebate depends on finish
6mm less if rendered finish required
and alternative termite protection required

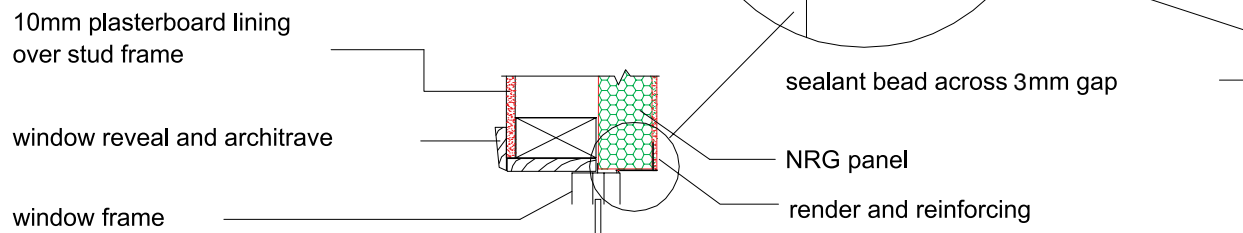
DWR 02

50mm - 60mm - 75mm - 100mm NRG panel Timber Floor Detail



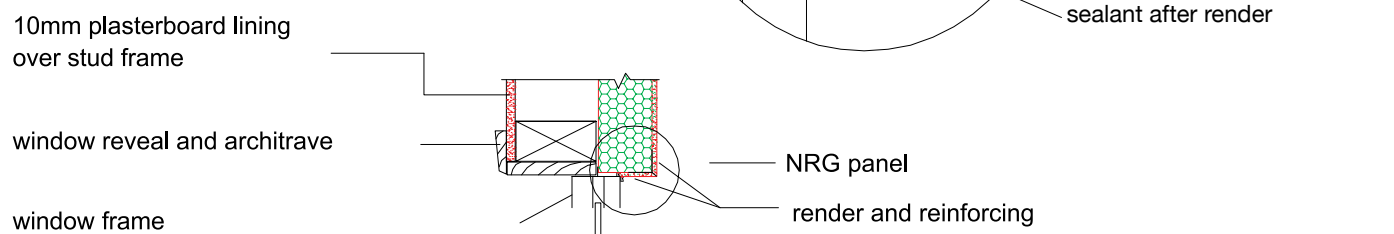
DWR 03

50mm NRG panel Head and Jamb Detail



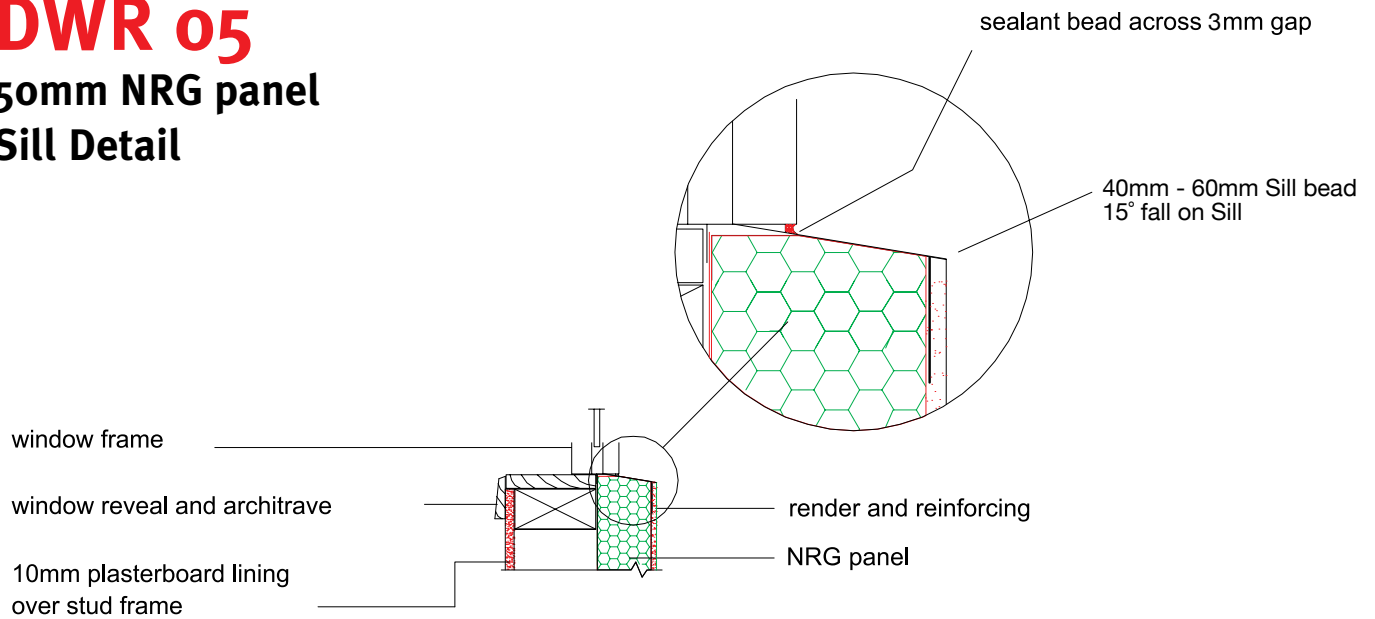
DWR 04

50mm - 75mm - 100mm NRG panel Head and Jamb Detail



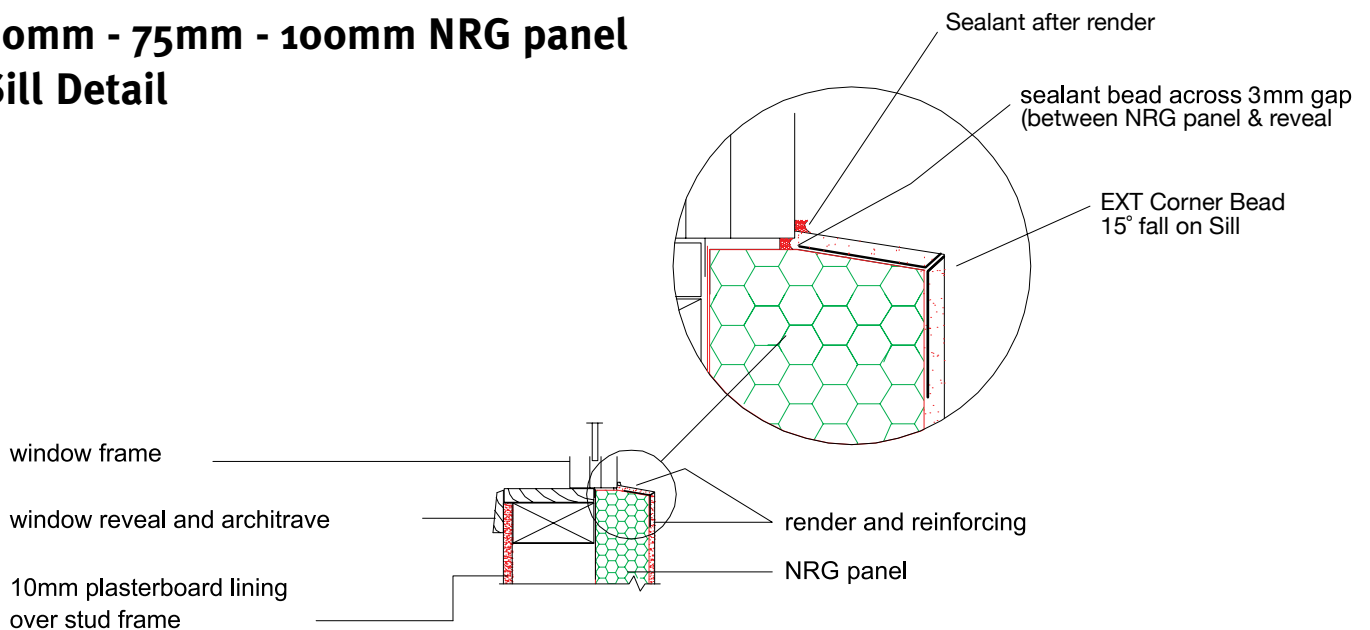
DWR 05

50mm NRG panel Sill Detail



DWR 06

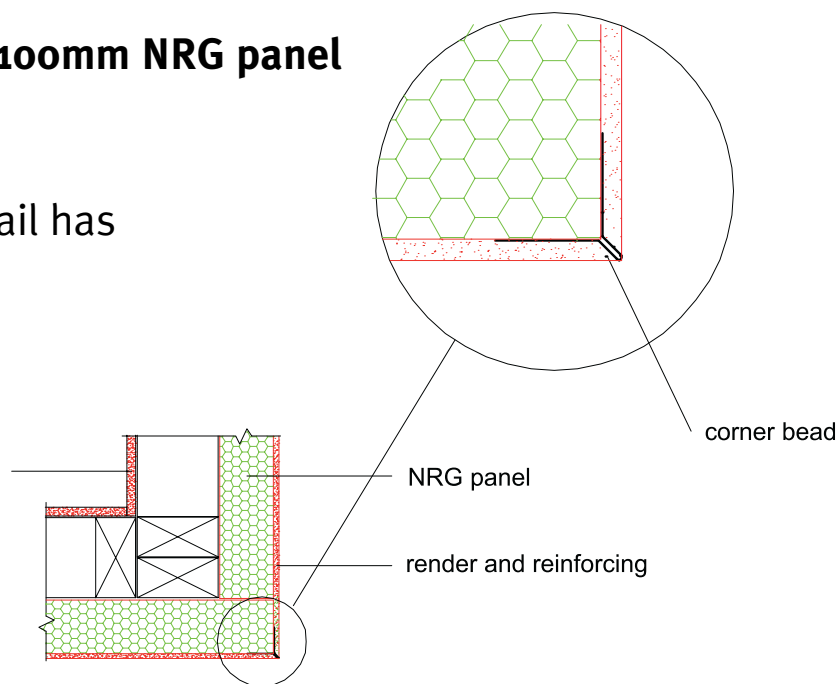
50mm - 75mm - 100mm NRG panel Sill Detail



DWR 07

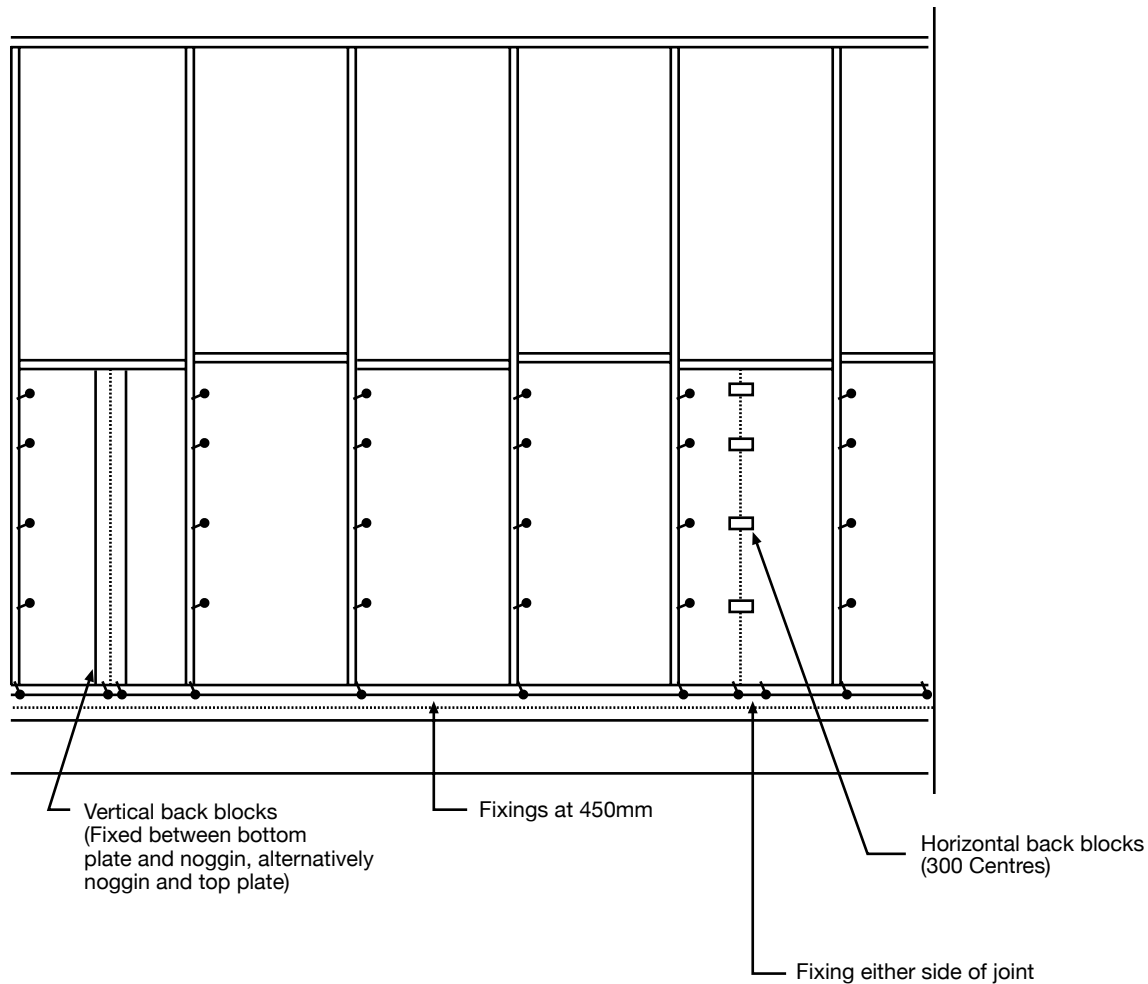
50mm - 60mm - 75mm - 100mm NRG panel External Corner Detail

Note: Internal corner detail has
no beading



DWR 08

50mm - 60mm - 75mm - 100mm NRG panel Back Blocking Detail

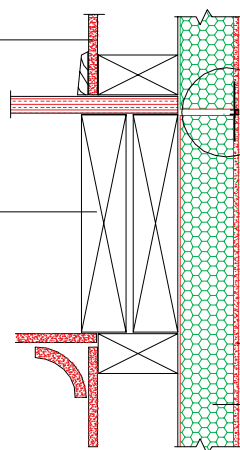


DWR 09

50mm - 60mm - 75mm NRG panel Horizontal Expansion Joint Detail

10mm plasterboard lining
over stud frame

floor joists



render and reinforcing

NRG panel

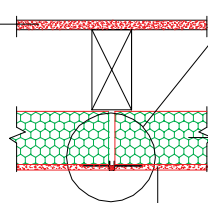
sealant bead across 6mm gap

expansion joint bead

DWR 10

50mm - 60mm - 75mm NRG panel Vertical Expansion Joint Detail

10mm plasterboard lining
over stud frame



NRG panel

render and reinforcing

expansion joint bead

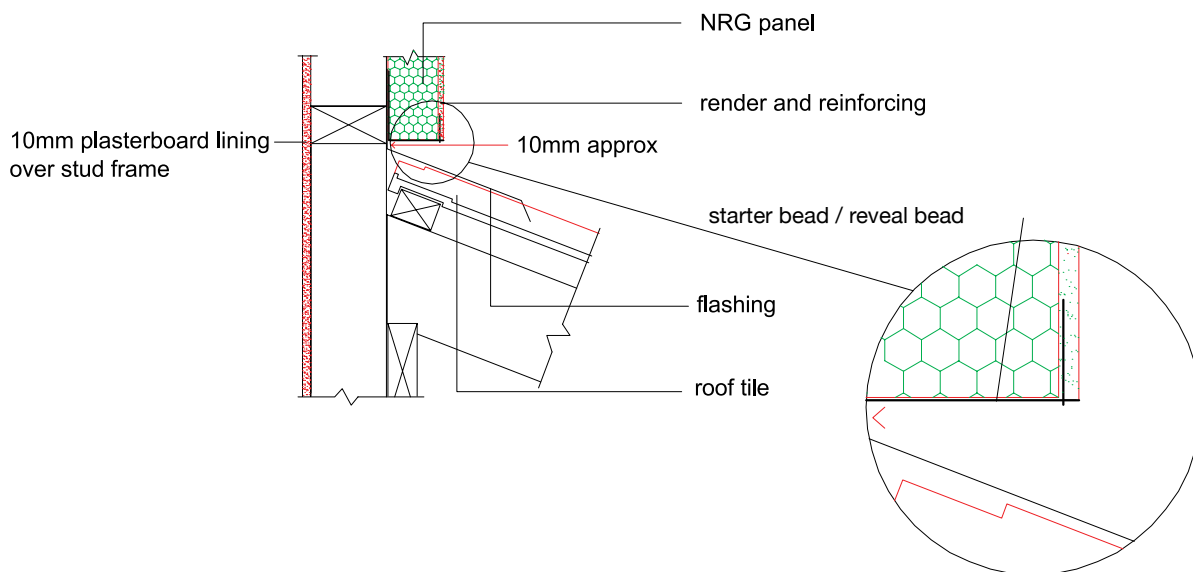
sealant bead across 6mm gap

Option 2 Expansion Joint Detail

- Chalk line after render/texture
- 20mm Cut through render and into panel using diamond tip blade
- Tape either side of joint
- Seal with sealant
- Remove tape and paint

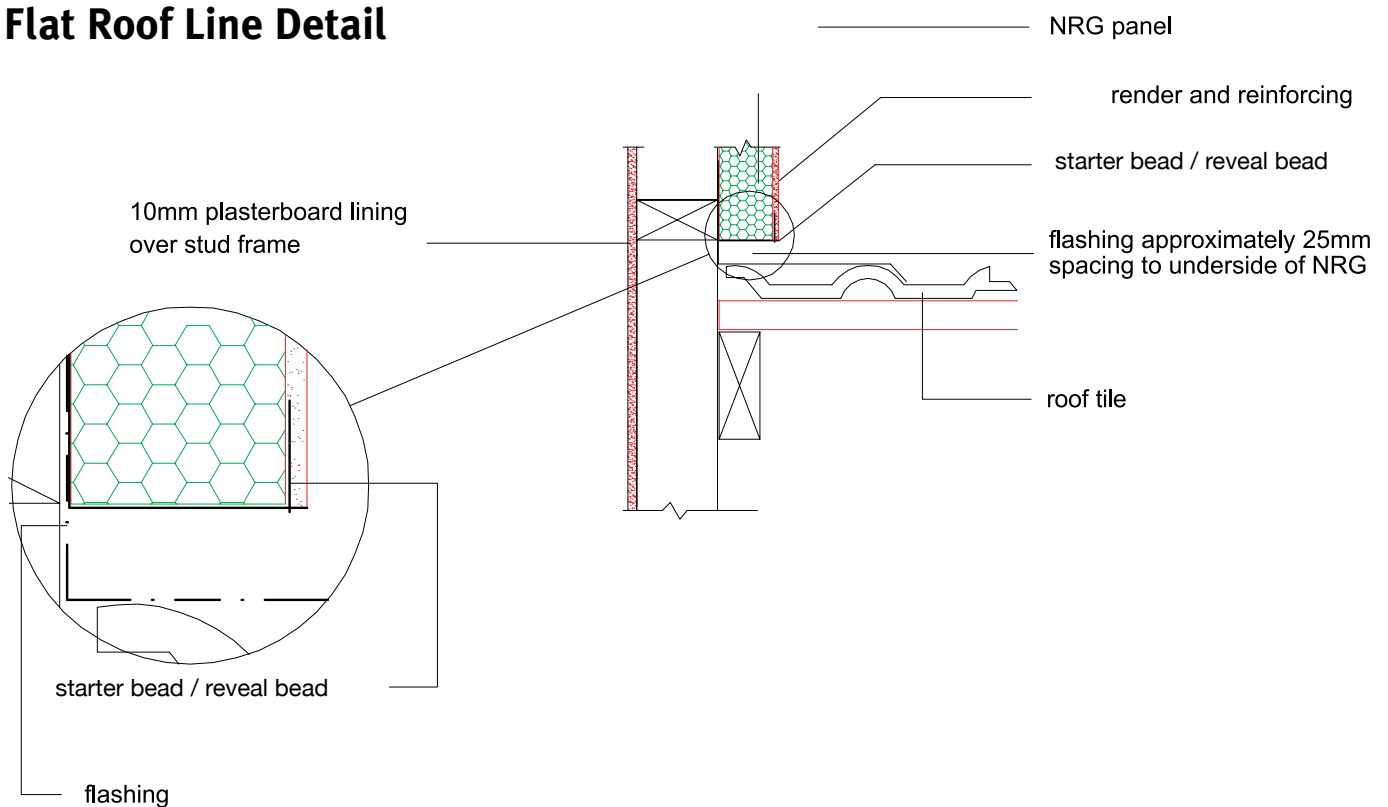
DWR 11

50mm - 60mm - 75mm - 100mm NRG panel Roof Floor Detail



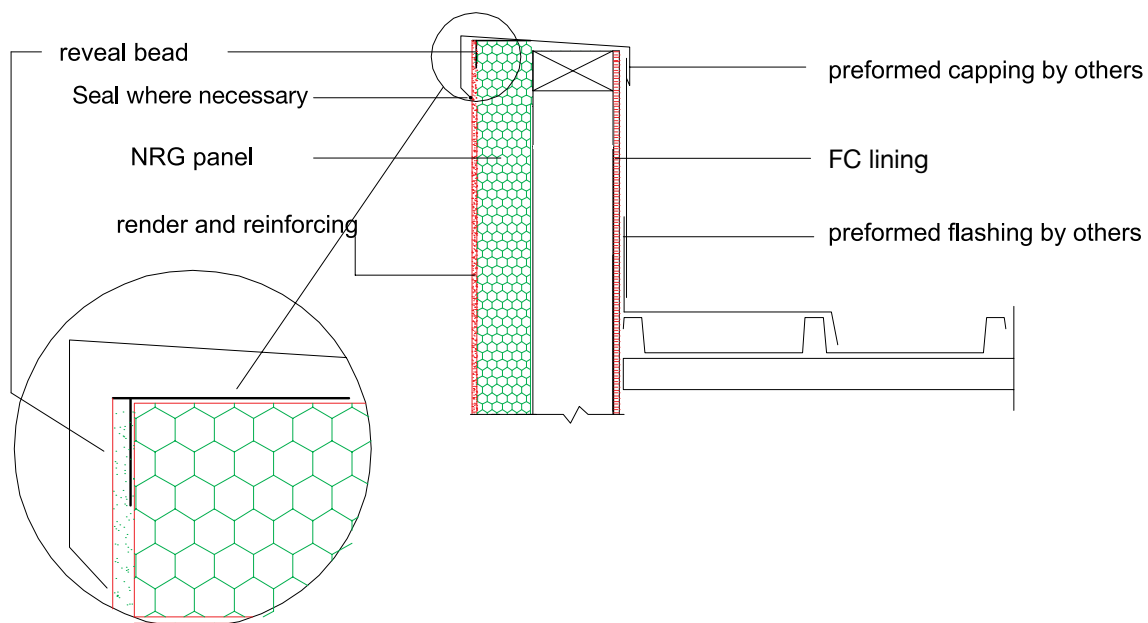
DWR 12

50mm - 60mm - 75mm - 100mm NRG panel Flat Roof Line Detail



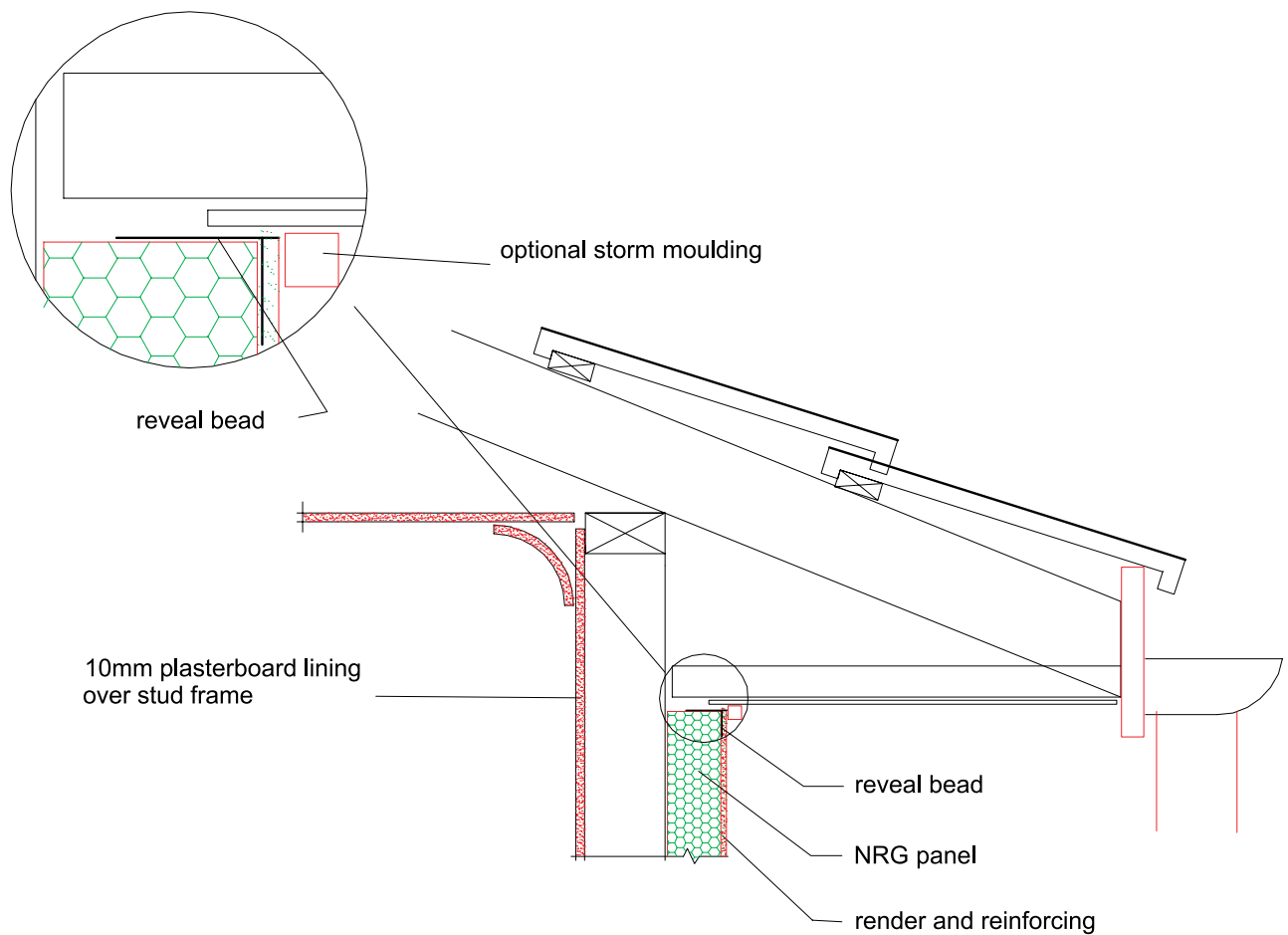
DWR 13

50mm - 60mm - 75mm - 100mm NRG panel Parapet Wall Detail



DWR 14

50mm - 60mm - 75mm - 100mm NRG panel Soffit Detail

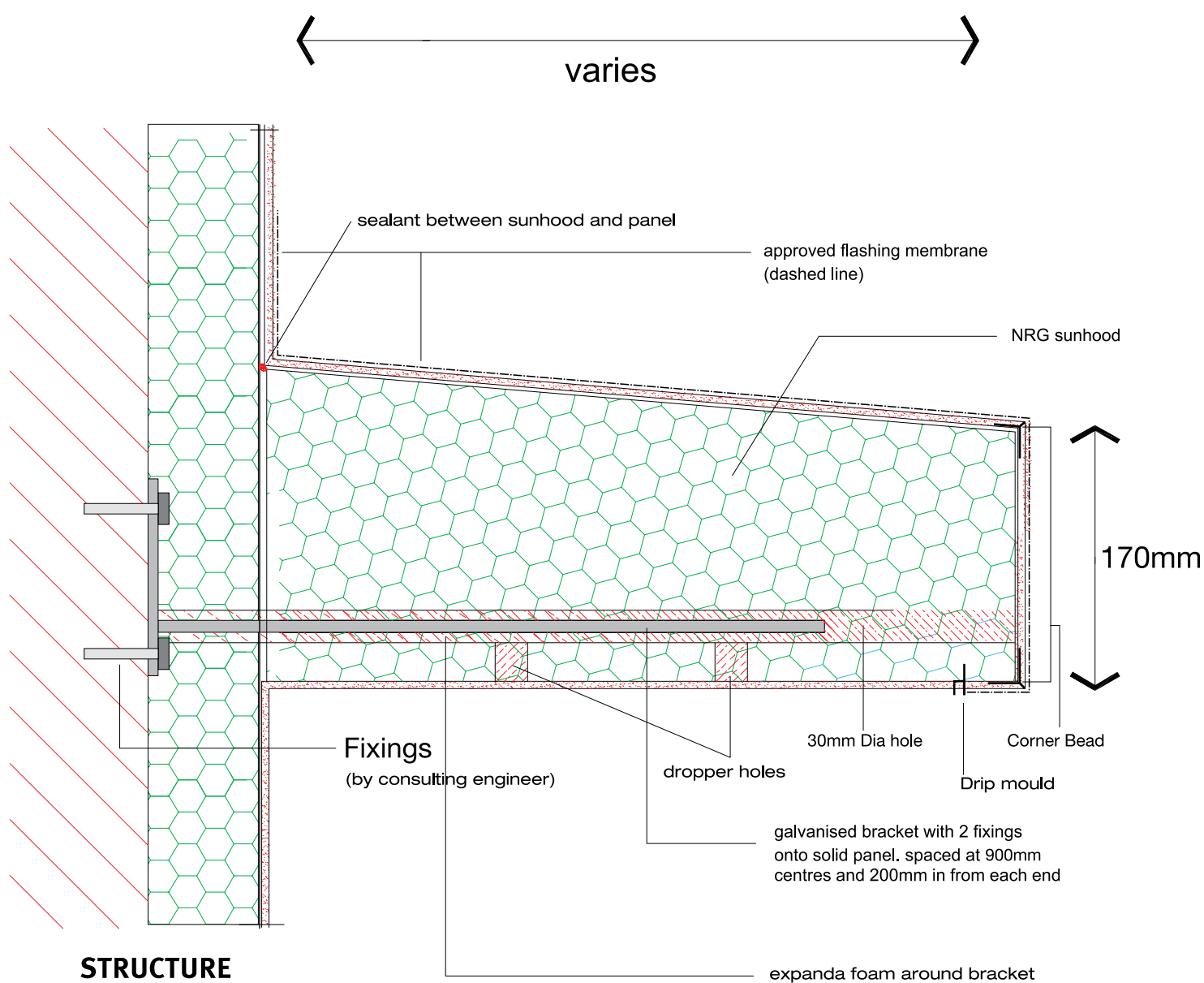


Square Set Soffit (Option 2)

- No bead required
- No moulding required
- V cut in render between Soffit and Render
- Seal and paint

NRG Greenboard™ Sunhoods

NRG Greenboard™ Sunhood Sizes			
Width	Front Height	Rear Height	Bracket Size
300mm	170mm	210mm	200mm
450mm	170mm	210mm	300mm
600mm	170mm	210mm	450mm
750mm	170mm	210mm	600mm
900mm	170mm	210mm	750mm
1200mm	170mm	210mm	1050mm



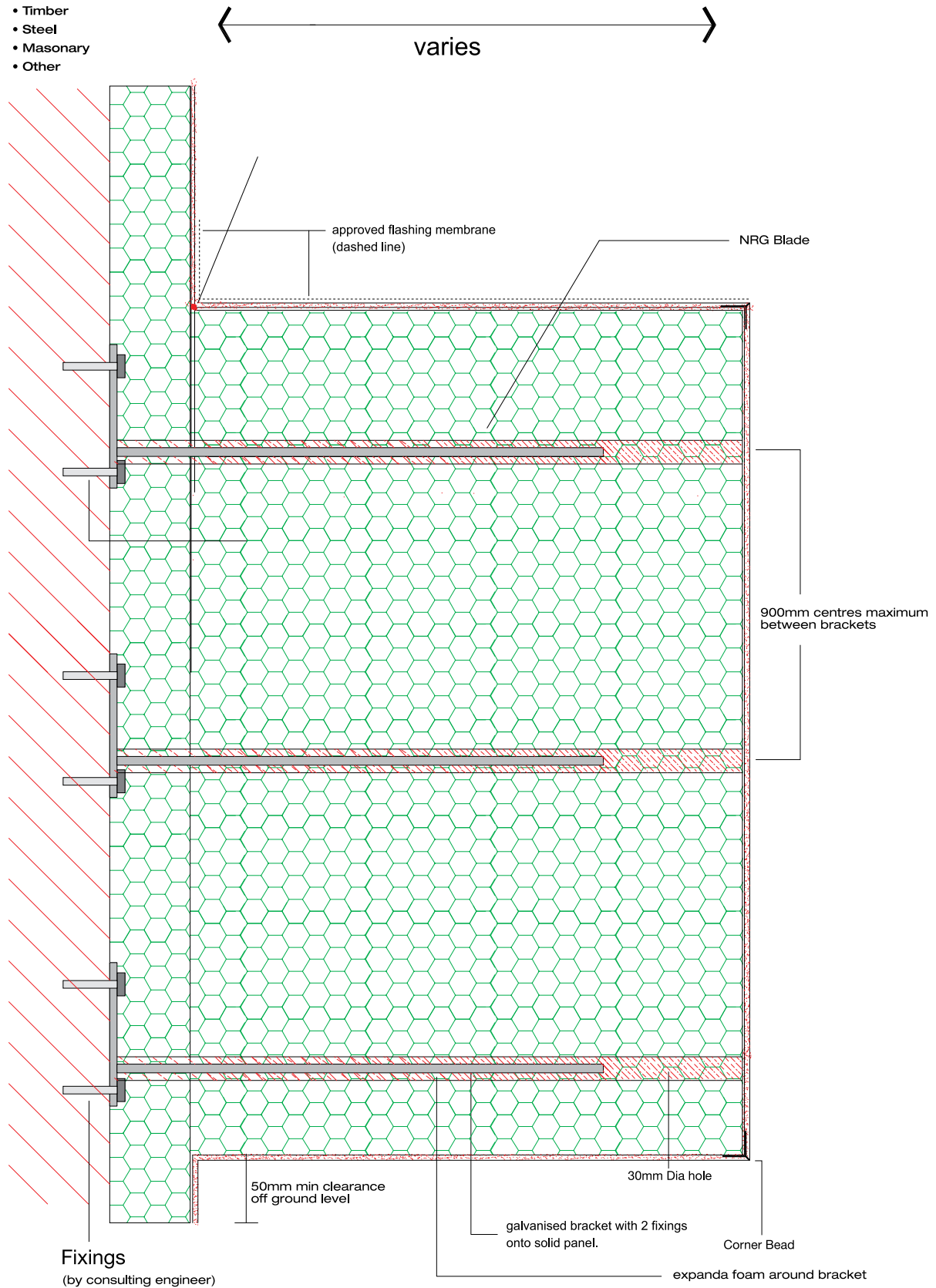
NOTE: Critical to waterproof sunhoods before painting.

DWR 16

NRG Greenboard™ Sunhoods

STRUCTURE

- Timber
- Steel
- Masonary
- Other



NOTE: Blades to match sunhood sizes

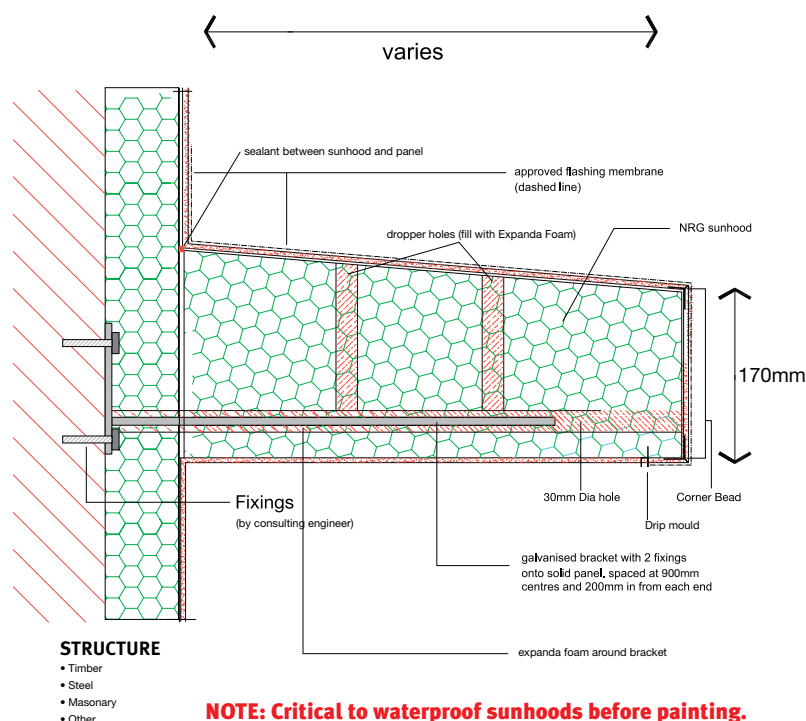


Sunhoods & Blades

Design Simplicity-Energy Efficient-Building Systems



Combining Sunhoods with NRG Greenboard™ Wall Cladding System



NRG Sunhoods and Blades are design for Aesthetic and Energy Efficiency Purposes and are engineered for wind loading, not as a trafficable area (i.e. platform/support area).

Description (Standard length 2500mm)	Width (mm)	Front Height (mm)	Rear Height (mm)	Bracket Size
Sunhood -Window Awning	300mm	170mm	210mm	200mm
Sunhood -Window Awning	450mm	170mm	210mm	300mm
Sunhood -Window Awning	600mm	170mm	210mm	450mm
Sunhood -Window Awning	750mm	170mm	210mm	600mm
Sunhood -Window Awning	900mm	170mm	210mm	750mm
Sunhood -Window Awning	1200mm	170mm	210mm	1050mm
Blades	As Above	170mm	170mm	As Above

Benefits

- Design Simplicity
- Lightweight Construction
- Speed of Installation
- No more costly fabrication or forming-up
- Suitable for Residential, Commercial, Industrial and Refurbishment
- Providing a 'polymer modified, fully reinforced render system'.
- Extensive choice of textures & colour finishes. (applied by licensed trades persons on site)
- Assist in Compliance* with BCA 2006 3.12.2.2 -Volume Two-Shading

Australian Building Codes Board -3.12.2.2 Shading -Page 542

Where shading is required to comply with 3.12.2.1, it must—

- be provided by an external permanent projection, such as a verandah, balcony, fixed canopy, eaves, shading hood which
 - extends horizontally on both sides of the glazing....
 - provide the equivalent shading to (i).....
- be provided by an external shading device, which
 - is capable of restricting at least 80% of the summer solar radiation; &
 - if adjustable, is readily operated.

Explanatory information:

- Shading devices can include fixed louvers, However, such devices need to be designed for the climate and latitude to ensure that summer sun penetration is restricted, while winter sun access is achieved.
- Gutters can only be considered as providing shading if attached.
- Shading devices can be either attached or located ... may be considered to provide shading to glazing if it complies with 3.12.2.2(b).

Extracts from the Building Code of Australia have been supplied with the permission of the Australian Building Codes Board -www.abcb.gov.au

* Subject to site orientation of structure by qualified design professional and engineers specifications, together with the limitations governed by physical dimensions due to manufacturing processes

** NRG Energy Building Systems reserves the right to alter dimensions of Sunhood and Blades. *** Special Sizes' within the limit of widths shown may be ordered —price on application.

Unit 4, 32-38 Dover Dr. West Burleigh QLD 4220

Phone. 07. 3382 7742 Fax. 07. 3382 7741

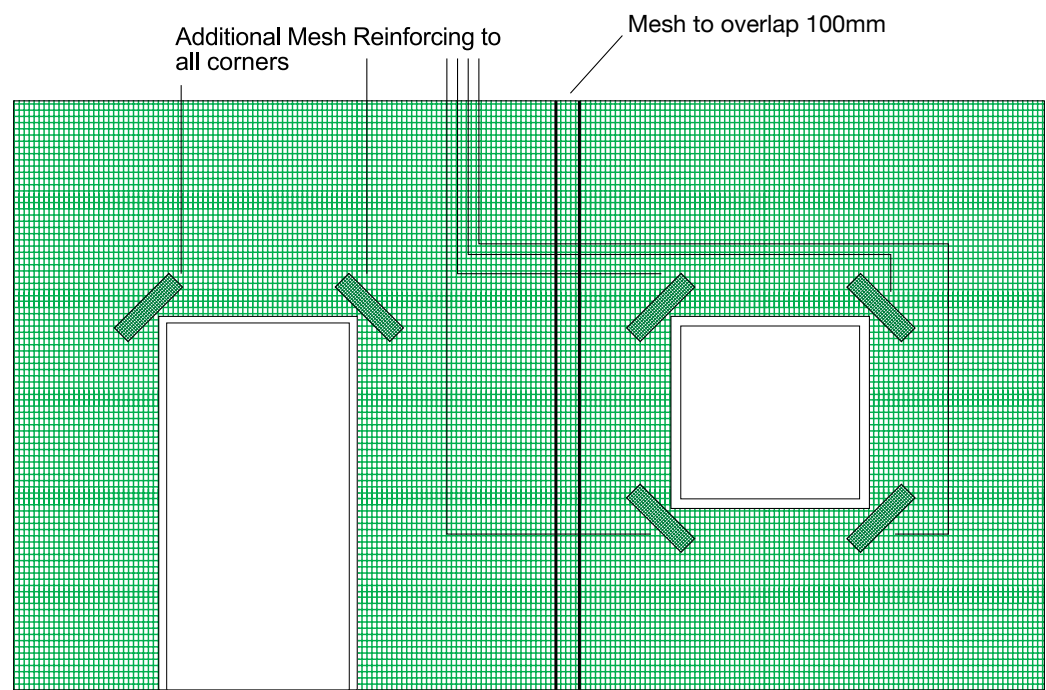
email. sales@nrggreenboard.com

www.nrggreenboard.com

Free Call 1800 674 001

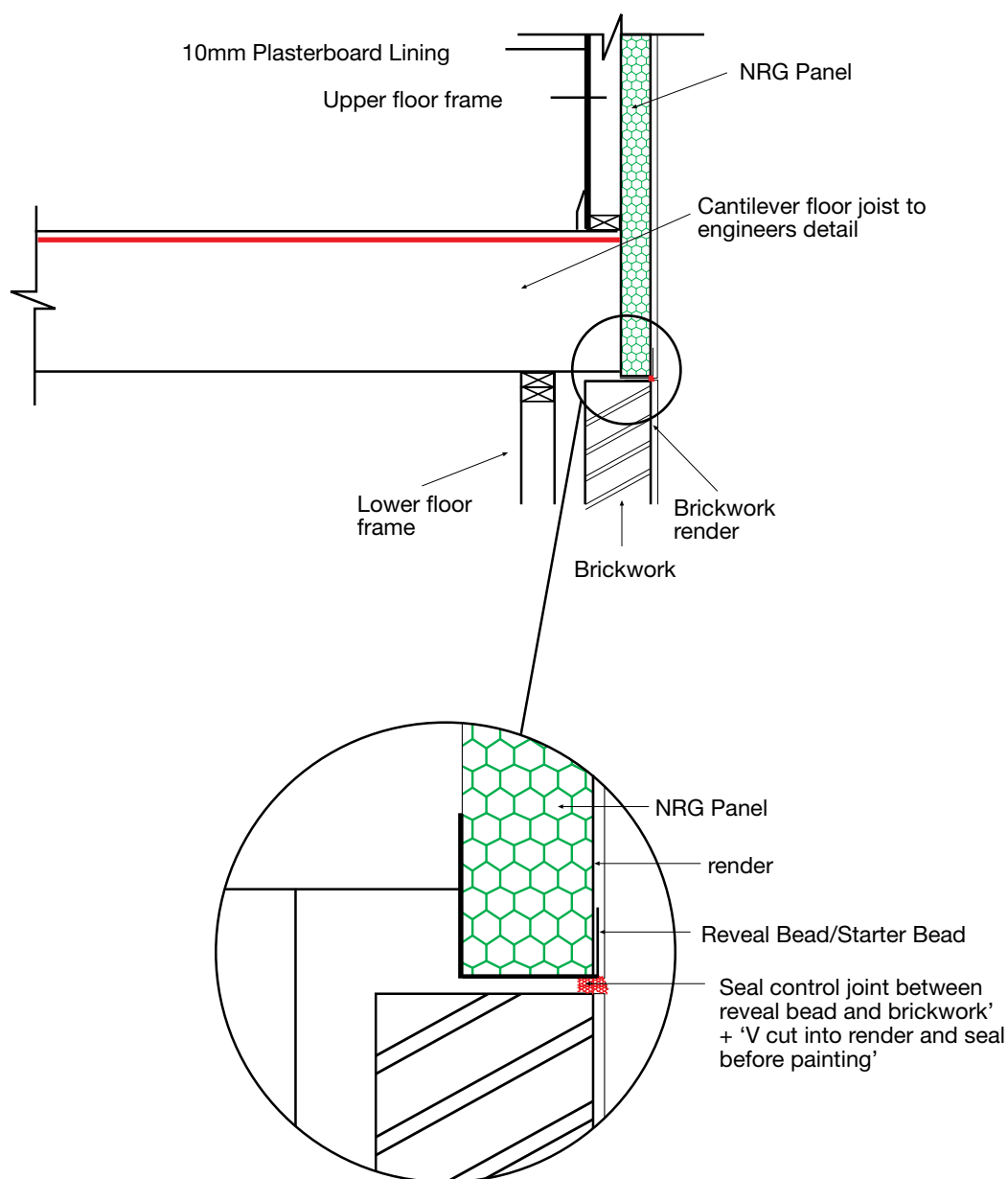
DWR 17

Corner Reinforcing Over 50mm, 60mm, 75mm and 100mm Greenboard™



DWR 18

50mm - 60mm - NRG Panel Cantilever Floor Detail



NOTE: Position of NRG panel may vary due to thickness of brickwork render

Builder: _____

Client: _____

Job Address: _____

NRG Greenboard™ Checklist

Stage 1- Installation of Greenboard™

A	Installation can be completed by either an accredited installer or by a qualified licensed builder/carpenter.	<input type="checkbox"/>	<input type="checkbox"/>
B	Installer to check frame/window jambs for any discrepancies. (wall must be rapped)	<input type="checkbox"/>	<input type="checkbox"/>
C	Measure and cut Greenboard™ Sheeting using a straight edge and masonry diamond blade in a standard power saw (use of handsaw not recommended).	<input type="checkbox"/>	<input type="checkbox"/>
D	Maximum fixings spacing's <ul style="list-style-type: none">• 300 centres vertically (See sheeting fixing DWR o8 - NRG Specifications for details)• 450/600mm centres horizontally	<input type="checkbox"/>	<input type="checkbox"/>
E	Glue both horizontal and vertical Greenboard™ sheet edges to each adjoining sheet using Bostik™ - No More Nails	<input type="checkbox"/>	<input type="checkbox"/>
F	All off stud joins must be back block and Greenboard™ sheet edges should be glued, then screwed individually (through each sheet into back blocking) while maintaining maximum fixing centres. 1) Small horizontal pieces (300mm) of stud material (300mm apart). 2) Alternatively use an off -cut of the framing material nailed to bottom plate and noggin, this procedure is then reversed on the second run, noggin and top plate. (17.1-4 Back Blocking - Off Stud Joints (I. + II.))	<input type="checkbox"/>	<input type="checkbox"/>
G	Allow 3mm expansion gap should be left between Greenboard™ sheet and door/window, vertical reveal, head and sill. 3mm expansion gap with 15 degrees fall on sill Greenboard™.	<input type="checkbox"/>	<input type="checkbox"/>
H	All beads fixed to Greenboard™ with adhesive (Bostik No More Nails) <ul style="list-style-type: none">• 50mm: head, sides & sills all 40mm reveal bead.• 60mm: head, sides & sills all external bead¹• 75mm: head, sides & sills all external bead¹• 100mm: head, sides & sills all external bead¹ ¹ When external beads used around window/door openings all reveals to be rendered.	<input type="checkbox"/>	<input type="checkbox"/>
I	Expansion gap between reveal bead & window/door reveal to be completely, primed, using Bostik™ Primer 5077 seal using an external VU type polyurethane sealant (e.g. Bostik Seal 'N' Flex) NB: When rendering reveals, seal between Greenboard™ & window reveal. (17.1.16 NRG Greenboard™ Bead & Sealant Procedure)	<input type="checkbox"/>	<input type="checkbox"/>
J	All base exposed edges of Greenboard™ need to be covered using the appropriate NRG Bead. (17.1.15 Beading (Table K))	<input type="checkbox"/>	<input type="checkbox"/>

Party 1 Signature Date / / Party 2 Signature Date / /



WARRANTY

NRG Building Systems Pty Ltd ("NRG") warrants to the purchaser of the Product and the last purchaser prior to the installation of the Product for a period of 10 years from the date of purchase that Greenboard™ sheets (the "Product") will be free from defects due to defective factory workmanship or materials and, subject to compliance with the conditions below, will be resistant to cracking, rotting, damage from termite attacks to the extent set out in NRG's relevant published Specifications current at the time of installation. Nothing in this document shall exclude or modify any legal rights a customer may have under the Trade Practices Act or otherwise which cannot be excluded or modified at law.

CONDITIONS OF WARRANTY

The warranty is strictly subject to the following conditions:

- i) NRG will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation;
- ii) this warranty is transferable;
- iii) the Product must be installed and maintained strictly in accordance with the relevant NRG Specifications current at the time of installation and must be installed in conjunction with the components or products specified in the specifications;
To obtain copies of such specifications, contact NRG Building Systems on 1800 674 001. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer's instructions and good trade practice;
- iv) the project must be designed and constructed in strict compliance with all relevant provisions of the current Building Code of Australia, regulations and standards;
- v) the claimant's sole remedy for breach of warranty is (at NRG's option) that NRG will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product;
- vi) NRG will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing, NRG will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces);
- vii) all warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law;
- i) if meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement products due to the effects of weathering and variations in materials over time.

DISCLAIMER

The recommendations in NRG's specifications manual are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (iii), (iv), (vi) and (vii) above. Further, as the successful performance of the relevant system depends on numerous factors outside the control of NRG (e.g. quality of workmanship and design), NRG shall not be liable for the recommendations in that literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the Building Code of Australia, regulations and standards.

Disclaimer: NRG Building Systems has endeavoured to produce this manual taking into account good building practices and experience gained over many years. NRG Building Systems will not be liable for omissions and or errors contained in this manual.'

THERMAL RATING FOR GREENBOARD WALL SYSTEM

Timber or Steel Frame

Greenboard™ Thickness	50mm	60mm	75mm	100mm
External Air Firm	0.03 R	0.03 R	0.03 R	0.03 R
Render System	0.02 R	0.02 R	0.02 R	0.02 R
Greenboard™ R-value	1.30 R	1.56 R	1.95 R	2.60 R
Breather Sisalation Wrap	0.48 R	0.48 R	0.48 R	0.48 R
Cavity, frame	0.17 R	0.17 R	0.17 R	0.17 R
10mm PlasterBoard	0.06 R	0.06 R	0.06 R	0.06 R
Internal Air Film	0.12 R	0.12 R	0.12 R	0.12 R
Total R-value	2.18 R	2.44 R	2.83 R	3.48 R

What is an R-value?

All insulation materials are rated for their performance in restricting heat transfer. This is expressed as an R-value which is the measure of material's resistance heat transfer (Thermal Resistance). The higher the R-value, the greater the insulating effects.

Total R-value ratings where checked by,



PO Box 1721
Springwood Qld, 4127
PH. 1300 304 313 or Email. info@qbears.com.au



NRG GREENBOARD™ and the ENVIRONMENT

- **NRG Greenboard™** Energy Efficient Insulative Walling System Product Information.
- **NRG Greenboard™** is comprised of 98% air and therefore only 2% polystyrene making it a highly efficient use of raw material.
- **NRG Greenboard™** remains inert, is non toxic, odour free and nonbiodegradable.
- No **CFC's** or **HCFC's** foam agents are used in its manufacture, so **NRG Greenboard™** causes no damage to the ozone layer.
- Effective installation of **NRG Greenboard™** can cut carbon dioxide emissions by up to **50%**.
- The R-value of **NRG Greenboard™** does not deteriorate during its life time; therefore the reduction in emissions lasts the full lifetime of the building.
- The energy used to manufacture **NRG Greenboard™** is recovered within six months by the energy saved in the building in which **NRG Greenboard™** is installed.
- Typically, for every kg of oil used in **NRG Greenboard™** manufacturing, about **200kg** will be saved in reduced heating demands.
- All **NRG Greenboard™** waste is recycled. Either through installation of off-cuts in the wall cavity or it can be granulated and mixed with virgin material to make new products.



ENVIRONMENTALLY RESPONSIBLE. ENERGY EFFICIENT. BUILDING SYSTEMS.



**NRG Provides you with seasonal
comfort all year round**

