BRANZ Appraised
Appraisal No.750 [2011]

BRANZ Appraisals

Technical Assessments of products for building and construction

BRANZ APPRAISAL No. 750 (2011)

Amended 6 October 2011.

EVG 3D BUILDING SYSTEM

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Product

1.1 The EVG 3D Building System is based on panels of expanded polystyrene (EPS) insulation and steel reinforcement which are site applied with concrete. The system is suitable for the walls and floors of housing and commercial buildings.

1.2 The EVG 3D panels consist of a layer of mesh on either side of an EPS core, welded together by steel diagonals (trusses) which penetrate through the EPS core. The panels are joined in the desired configuration on site and sprayed both sides with concrete to form a sandwich type construction. The exterior of the panels are finished with a weatherproof coating such as render while the interior surfaces (walls and ceilings) can either be plastered or lined with conventional lining materials such as plasterboard systems.

QUESTECH EVG-3D

Scope

2.1 The EVG 3D Building System has been appraised for use as a structural wall and floor system for specifically designed buildings within the following scope:

- with a maximum building height from the ground to eaves of 10.0 m; and,
- with a floor plan area limited only by seismic and structural control joints; and,
- situated in non-cyclonic wind zones up to, and including N6 or situated in cyclonic wind zones up to, and including C4.

2.2 The structural and weathertightness design for each specific structure is the responsibility of the building designer.

2.3 The system is appraised for use with framed window and door joinery that is installed with vertical jambs and horizontal heads and sills. *(The Appraisal of the EVG 3D Building System relies on the joinery meeting the requirements of AS 2047 for the relevant wind zone.)*

Building Regulations

National Construction Code Series (NCC 2011) Building Code of Australia (BCA)

3.1 In the opinion of BRANZ, the EVG 3D Building System, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the BCA:

BCA Volume One - Class 2 to Class 9 Buildings

Part B1 - Structural Provisions: Performance Requirement BP1.1. The EVG 3D Building System meets the requirements for actions arising from the following imposed actions: permanent actions (dead loads), imposed actions (live loads), wind action, earthquake action, differential movement, creep and shrinkage and thermal effects [i.e. BP1.1(b)(i), (ii), (iii), (iv), (x), (xi) and (xii)]. See Paragraphs 8.1 – 8.4.

Part C1 – Fire Resistance and Stability: Performance Requirements CP1 and CP2. The EVG 3D Building System can be used to meet these requirements. See Paragraphs 10.1-10.6.

Part F1 - Damp and Weatherproofing: Performance Requirement FP1.4. The EVG 3D Building System meets this requirement. See Paragraphs 11.1 – 11.6.
Part F5 – Sound Transmission and Insulation: Performance Requirement FP5.4 and FP5.5. The EVG 3D Building System can be used to meet this requirement. See Paragraph 12.1.
Part G5 – Construction in Bushfire Prone Areas: Performance Requirement GP5.1. The EVG 3D Building System can be used to meet this requirement. See Paragraph 10.8.
Part J1 – Building Fabric: Performance Requirement JP1. EVG 3D Building System contributes to meeting these requirements. See Paragraphs 13.1 – 13.5.

BCA Volume Two - Class 1 and Class 10 Buildings
Part 2.1 Structure: Performance Requirement P2.1(b) Structural Stability and Resistance to Actions. The EVG 3D Building System meets the requirements for actions arising from the following imposed actions: permanent actions (dead loads), imposed actions (live loads), wind action, earthquake action, differential movement, creep and shrinkage and thermal effects [i.e. BP1.1(b)(i), (ii), (iii), (iv), (x), (xi) and (xii)]. See Paragraphs 8.1 – 8.4.
Part 2.2 Damp and Weatherproofing: Performance Requirement P2.2.2 Weatherproofing. The EVG 3D Building System meets this requirement. See Paragraphs 11.1 – 11.6.
Part 2.3 Fire Safety: Performance Requirements P2.3.1 Protection from the Spread of Fire and P2.3.4 Bushfire Zones. The EVG 3D Building System can be used to meet these requirements. See Paragraphs 10.1 – 10.8.
Part 2.4 Health and Safety: Performance Requirements P2.4.6 Sound Insulation. The EVG 3D Building System can be used to meet this requirement. See Paragraph 12.1.
Part 2.6 Energy Efficiency: Performance Requirement P2.6.1 Building. The EVG 3D Building System contributes to meeting these requirements. See Paragraphs 13.1 – 13.5.

3.2 This is an **Alternative Solution** in terms of Building Code of Australia compliance.

Technical Specification

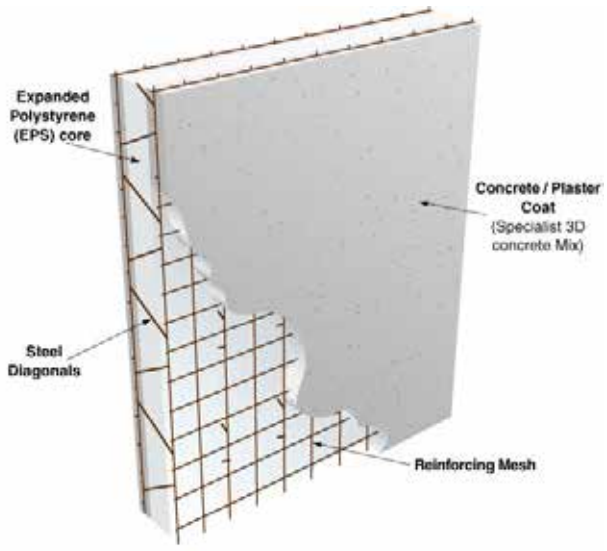
The EVG 3D Building System

4.1 The EVG 3D Building System consists of panels manufactured to form a three-dimensional truss-type welded-wire space frame integrated with an S grade fire retardant, EPS (expanded polystyrene) core. The panels are placed in position, and wythes of concrete from 40 - 80 mm thickness are applied to both sides (see Figure 1).
4.2 Panels are butt-jointed, with extra layers of welded-wire fabric spliced over the joints, around openings and at internal and external corners. Reinforcing ties and bars are used at building element junctions to add strength to joints.
4.3 The panels are produced in a standard width of 1200 mm, with lengths supplied as required up to 6000 mm. The panels weigh approximately 6 kg/m^2, and may be site cut to size and shape. The standard EPS core thicknesses are 50, 80, 100 and 150 mm. The welded-wire fabric has a standard size of 50 x 50 mm mesh x 2.5 to 3.0 mm wire diameter, which is connected by steel diagonals (trusses) 3.5 to 3.8 mm in diameter. The wires may be either galvanised steel or stainless steel. The panels are available with three truss spacings for different applications. The trusses are spaced with either 67 (D60), 100 (D100) or 200 (D200) truss wires per square metre.

Handling and Storage

5.1 If it is necessary to store panels on site by stacking, care must be taken to ensure they are stacked flat, and that they are kept clean and undamaged. The panels may need to be weighted or tied down during storage in windy conditions.

Figure 1



5.2 Long-term storage of the panels must be carried out in a covered, protected, dry environment, so that corrosion of the reinforcing does not occur and the panels do not get damaged.
5.3 The panels must not be left exposed to sunlight for longer than 3 months, either in storage or during construction, to protect the EPS from degradation.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for EVG 3D Building System. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 The EVG 3D Building System is used in buildings that have been specifically designed in accordance with AS 3600 and AS 4100 using the design guidelines.
7.2 The EVG 3D Building System must be designed to provide the required building bracing resistance for earthquake and wind loads.
7.3 Foundations are to a specific design in accordance with AS 3600 using the design guidelines. Ground floors are typically concrete slab-on-ground.
7.4 Roof framing and interior partitions may be constructed using conventional details as set out in AS 1684, or may be to a specific engineering design. Steel framing, or pre-cast concrete units such as beams or panels may also be used, but must be to a specific engineering design. Roof trusses, if used, must comply with AS 1684. Roof coverings can be conventional and must meet the requirements of the BCA.
7.5 The exterior concrete must be finished with a weatherproof coating system. This can be either paint, painted cement-based render or an external render finishing system suitable for concrete covered by a valid BRANZ Appraisal.

Render must be in accordance with HB 161 Guide to Plastering. At least two coats of an exterior grade latex acrylic paint complying with any of Parts 7, 8, 9 or 10 of AS 3730 must be applied. Paint colours must have a light reflectance value of 40% minimum regardless of gloss value.

7.6 Other render finishing systems recognized for use over concrete may be used but are outside the scope of this Appraisal.

7.7 Interior finishing is carried out by either applying a coat of interior plaster or fixing a lining system to the concrete.

Structure

8.1 The EVG 3D Building System panel receives its out-of-plane strength and rigidity by truss action where the concrete wythes are the chord members and the diagonal cross-wires are the web members.

8.2 The design of the EVG 3D Building System follows the requirements of AS 3600. Design guidelines and requirements are set out in the Technical Literature, and must be followed. The design guidelines cover loading, design requirements and material properties, durability, flexure, axial load, in-plane shear, and standard details.

Impact Resistance

8.3 The EVG 3D Building System provides a robust system that has a high resistance to hard and soft body impacts likely to be associated with normal residential use situations.

Wind Uplift

8.4 The design of roof to wall connections must be to a specific engineering design to ensure the roof structure is properly restrained against wind uplift. AS 1684 provides uplift capacity of various tie-down connections for timber framed roofs, which may be used in conjunction with details provided in Technical Literature.

Durability

9.1 AS 3600 Section 4 specifies exposure zones, concrete strengths and cover requirements for the Australian environment. As the EVG 3D Building System is intended for use throughout Australia, a number of situations will apply.

9.2 The design guidelines set out the durability requirements that must be met for the EVG 3D Building System, and summarises the requirements of Tables 4.3 and 4.10.3.2 of AS 3600 for exposure zones, minimum cover and concrete strengths that apply to this system (see Table 1 of this Appraisal).

9.3 External applied coatings must be applied to provide additional protection to the reinforcing against corrosion. See Paragraph 7.5.

Serviceable Life

9.4 The EVG 3D Building System will remain durable and serviceable for at least 50 years.

Maintenance

9.5 Annual checks of the building exterior must be made to ensure the entire building envelope remains weatherproof in accordance with the performance provisions of BCA. Moisture must not penetrate the structure which would cause corrosion of the reinforcement.

9.6 Recoating of the finishing system will be necessary. The interval between recoats depends on the finish colour, orientation and quality of the application, and will be at approximately 5-10 yearly intervals in accordance with the paint manufacturer's instructions.

Fire Resistance and Fire Safety

BCA Volume One – Class 2 to Class 9 Buildings

Structural Stability Required During Fire

10.1 BCA Specification C1.1 provides details for the required FRL and Type of Construction required for various building elements and Building Classes. The specification provides details on the required FRL of elements supporting loads and other building elements.

Table 1: Minimum Concrete Cover Requirements

Exposure Classification		Minimum Required Cover (mm) for Various Concrete Strengths, f'c		
		25 MPa	30 MPa	40 MPa
A1	Above ground exterior surfaces in inland areas (non-industrial and arid climatic zones). Interior surfaces (residential). Surfaces in ground contact protected by a damp proof membrane or residential footings in non-aggressive soils.	20	20	20
A2	Above ground exterior surfaces in inland areas (non-industrial and temperate climatic zones). Surfaces (except residential footings) in ground contact in non-aggressive soils. Interior surfaces (non-residential).	30	25	20
B1	Above ground exterior surfaces in inland areas (non-industrial and tropical climatic zones, or industrial in any climatic zone). Interior surfaces subjected to repeated wetting and drying. Exterior surfaces in near-coastal areas.	(60)	40	30
B2	Exterior surfaces in coastal areas	n/a	(65)	45

Notes to Table 1:

1. *Inland environments are defined in AS 3600 as being more than 50 km from the coastline.*
2. *Near-coastal environments are defined in AS 3600 as being from 1 km to 50 km from the coastline, in any Climatic Zone.*
3. *Figure 4.3 of AS 3600 shows the Climatic Zones.*
4. *The Coastal zone (B2) is defined typically as within 1km of the shoreline of large expanses of saltwater. Where there are strong prevailing winds or vigorous surf, the distance should be increased beyond 1 km and higher levels of protection should be considered.*
5. *For bracketed figures, refer to concession in AS 3600 Clause 4.3.2.*

Fire Resistance Levels (FRLs)

10.2 The EVG 3D Building System can be used for load-bearing and non-load bearing walls to provide passive fire and smoke protection. Fire Resistance Levels (FRLs) of up to 120/120/120 can be achieved with the system. Construction details are contained in the Technical Literature and must be strictly followed to obtain the required Fire Resistance Level. See Table 2 for Fire Resistance Levels. These FRL's can be used to contribute to meeting the Performance Requirement CP2 Spread of Fire.

Table 2: Fire Resistance Ratings as Tested to BS 476:1987

EVG 3D Panel Thickness (mm): concrete/EPS/ concrete	Partition Type	Period partition satisfied performance criteria (minutes)		
		Load Bearing Capacity (minutes)	Integrity (minutes)	Insulation (minutes)
38/50/38	Non-load bearing	N/A	90	90
75/80/75	Load bearing	125	125	125

Fire Hazard Properties of Materials

10.3 Deemed to Satisfy Performance Provision C1.10 does not apply to the EVG 3D System as the facings are made of concrete which is excluded by C1.10 (c)(i). Similarly the EVG 3D system finished with paint is excluded by Clause C1.10 (c)(viii).

10.4 However, other finish systems may require assessment of their fire hazard properties in accordance with Specification C1.10. These have not been assessed and are outside the scope of this Appraisal.

BCA Volume Two – Class 1 and Class 10 Buildings

Protection from the Spread of Fire

10.5 The EVG 3D Building System can be used to construct walls of fire rated construction. The FRL's are given in Table 2. Reference should be made to BCA Part 3.7.1 Fire separation for specific requirements.

Heating Appliances

10.6 Separation distances from flues to the external concrete faces of the EVG 3D Building System are not required in accordance with the requirements of BCA Volume Two Part 3.7.3 Heating Appliances for the protection of the material. However, care must be taken to protect heat sensitive lining and finishing materials where they are used.

10.7 Where penetrations are made in the panels for flues and the like to pass reference must be made to Part 3.7.3 of BCA for the installation of flues. The EPS core material must be separated in accordance with these requirements.

Bushfire Prone Areas

10.8 The EVG 3D Building System is suitable for use in all Bushfire Prone Areas up to and including BAL – FZ, when designed, constructed and installed in accordance with the Technical Literature and the BCA.

Damp and Weatherproofing

11.1 A roof cladding system complying with the BCA must be installed and maintained. The exterior walls must be protected with a weatherproof coating system.

11.2 Concrete slab-on-ground floors must be protected by a damp-proof membrane.

11.3 Exterior joinery complying with the BCA must be installed to openings in exterior walls. Exterior moisture must be excluded by detailing joinery and wall joint interfaces as shown in the Technical Literature, or designers may produce their own details, for which they alone must accept responsibility for compliance with the Damp and Weatherproofing requirements of the BCA. Weathertightness details that are developed by the designer are outside the scope of the Appraisal.

11.4 When using detailing as set out in the Technical Literature, designers must still check that the detail will meet their own design requirements and the Damp and Weatherproofing requirements of the BCA when these details are incorporated into their particular design. Compliance with the Damp and Weatherproofing requirements of the BCA is dependent on the correct incorporation of these details into the building design.

11.5 Roof cladding systems, exterior joinery, and exterior and interior finishes have not been assessed for compliance with the BCA and are outside the scope of this Appraisal, unless they have been BRANZ appraised as suitable for this particular use.

11.6 The EVG 3D Building System, when installed in accordance with this Appraisal and the Technical Literature, prevents the penetration of moisture that could cause undue dampness or damage to building elements.

Sound Transmission and Insulation

12.1 The EVG 3D Building System can be used for walls and floors that are common between occupancies. The BCA outlines the requirements for various elements. To meet this requirement, the walls must be constructed in accordance with the sound insulation details contained in the Technical Literature. See Table 3 for Sound Insulation Ratings.

Energy Efficiency

13.1 The EVG 3D Building System can be used to contribute to meeting the Energy Efficiency Provisions of the BCA. The R-values given in Table 4 can be used in the assessment of a particular building's compliance with the Energy Efficiency requirements of the BCA. The Technical Literature gives a calculation method to assess the R-value of varying EVG 3D wall constructions e.g. different EPS and concrete thicknesses.

BCA Volume One – Class 2 to Class 9 Buildings

13.2 The Annual Energy Consumption of a building design can be determined by using energy analysis software that complies with the ABCB Protocols.

BCA Volume Two – Class 1 and Class 10 Buildings

13.3 Contribution to the overall thermal performance and energy rating of houses needs to be considered. The individual thermal conductivity of the wall insulation contributes to the overall thermal energy rating but its thermal conductivity on its own cannot be used to determine the contribution to the overall energy rating and thermal efficiency of the house. The complete building needs to be considered when assessing the Energy Efficiency requirements of the BCA. Energy analysis software that complies with the ABCB Protocols can be used to assess the Energy Efficiency of a particular design.

Surface Density (High Mass Walls)

13.4 Where the combined concrete wythe thickness is at least 100 mm, and the concrete has a minimum density of 2300 kg/m^3, then EVG 3D walls will meet the minimum surface density requirement of 220 kg/m^2 for Table 3.12.1.3b of BCA Volume Two, and are considered to be high mass walls.

Table 3: Predicted Sound Insulation Ratings

EVG 3D Panel Thickness (mm): (concrete/EPS/ concrete)	Additional Requirements	Typical Application	Predicted R_w Rating	Predicted R_w+C_{tr}
40/100/40	None.	Basic wall/floor	42	39
40/100/40	*To each side of the wall:* - 13 mm plasterboard - 28 mm metal furring channel with cavity infill of 25 mm insulation[1].	Corridor wall	60	48
40/100/40	*To one side of the wall:* - 2 x 13 mm plasterboard - 28 mm metal furring channel with cavity infill of 25 mm insulation[1]. *To the other side of the wall:* - 13 mm plasterboard - 28 mm metal furring channel with cavity infill of 25 mm insulation[1].	Inter-tenancy wall: Continuous construction	62	51
40/100/40	*To one side of the wall:* - 13 mm plasterboard - 28 mm metal furring channel with cavity infill of 25 mm insulation[1]. *To the other side of the wall, with a clear gap of 20 mm with no connections:* - Minimum 64 mm stud with cavity infill of 50 mm insulation[1] - 13 mm plasterboard.	Inter-tenancy wall: Discontinuous construction	63	51
40/100/40	*To under side of the floor:* - Minimum 100 mm wire ceiling suspension system - 50 mm insulation - 13 mm plasterboard.	Inter-tenancy floor	59	53

Note:
1. Glasswool or polyester insulation, density 9 kg/m³.

State and Territory Variations

13.5 Some States and Territories have different Energy Efficiency requirements. Designers should make reference to the BCA for details of these variations.

Table 4: EVG 3D Building System R-values

EVG 3D Panel Thickness (mm): (concrete/EPS/ concrete)	Truss spacing	Approximate R-value with mild steel diagonals ($m^2{}^oC/W$)	Approximate R-value with stainless steel diagonals ($m^2{}^oC/W$)
40/50/40	D200	0.6	1.0
	D100	0.9	1.1
	D60	1.0	1.2
40/80/40	D200	0.9	1.4
	D100	1.2	1.7
	D60	1.4	1.8
40/100/40	D200	1.0	1.7
	D100	1.4	2.0
	D60	1.7	2.2
40/150/40	D200	1.4	2.4
	D100	2.0	2.9
	D60	2.3	3.2

Termites

14.1 Although EPS is not considered a food source for termites, appropriate protection measures in accordance with the BCA must be undertaken to protect the building from termite attack.

Installation Information

Installation Skill Level Requirements

15.1 The EVG 3D Building System must be completed by a tradesperson with an understanding of the EVG 3D Building System, in accordance with the instructions given within the Technical Literature and this Appraisal.

General

16.1 Installation must be carried out in accordance with the Technical Literature. It contains, in particular, details on the correct sequence for the erection of the panels.

16.2 Wall panels must be erected vertically and plumb, starting at corners and working along. Connections between the panels and the foundation or floor must be made by means of starter bars that have been cast or set into the foundation or floor and wired to the welded-wire fabric. Panels must be plumbed and temporarily supported as erection takes place. Final adjustment of supports for correct alignment can be carried out when all panels are erected.

16.3 Panels can be cut to shape and size, or openings formed in them by cutting with a power saw, or using bolt cutters on the welded-wire fabric and a sharp blade, hand saw or hot wire on the EPS.
16.4 All joints in the panels must be connected by means of a splice mesh to create a continuous reinforcing mesh over the wall. Splice mesh must also be fitted at external and internal corners. Splice is not required around openings at windows and door reveals unless required by specific engineering design. A 'butterfly' of mesh should also be placed on a 45° angle across the corner of all openings.
16.5 Once all ground floor wall panels have been erected and braced, floor slab panels (where applicable) are placed over the top of the walls. Temporary support must be provided to floor panels by means of beams and props. Connections can then be made between the floor and wall panels when final alignment of the wall panels has been completed. Reinforcing bars required to the floor panels should be fixed in place before the panels are lifted. Reinforcing bars and splice mesh must be fitted at joints and connections when required by the specific structural engineering design.
16.6 The upper wall panels (if applicable) must be installed as for the ground floor wall panels. Any built-in hold-down or fixing devices required must be attached in the correct positions before concreting commences.

Services

17.1 Services may be run concealed within the panels by installing them behind the welded-wire fabric. If insufficient space exists between the welded-wire fabric and the polystyrene, the polystyrene may be cut away sufficiently to form a chase for the service.
17.2 PVC sheathed electrical cables must not come into contact with the EPS and must, therefore, be contained within a conduit or be laid without conduits away from the EPS.
17.3 Where services penetrate external panels, the penetration must be made weathertight on the outside. Clearance for services movement must be made in accordance with the service element providers' specifications.

Concrete Installation

18.1 All concreting work must be carried out in accordance with AS 3600 with regard to workmanship and materials.
18.2 Concrete is sprayed onto walls and ceilings using a shotcrete pump, and is pumped in place for floor topping slabs. Upper level floor topping slabs are usually placed before internal walls and ceilings to upper levels, and allowed to cure, to give a working platform for spraying the interior.
18.3 Some supports may be removed from under slabs after 3 days, but critical supports, such as those at mid-span, must be left in place until the slab is fully cured. The structural engineering design must provide the appropriate details for supports and sequence and timing of removal of them.
18.4 Concrete must be of the correct strength and mix design as required by the structural engineering design.
18.5 The normal procedure is to apply the concrete in two layers, although the application may be carried out in one single coat. The first layer is applied to a thickness to just cover the welded-wire fabric, and the second layer to give the final required thickness. The first layer is usually left to cure for a few days to provide initial load transfer to the panels. Any supports or stiffeners that have been attached to the panels are removed before the second layer is sprayed, and the gaps left by the supports are in-filled with sprayed concrete.
18.6 The first layer of concrete is left 'rough' to give adequate key to the second layer. Correct concrete thickness must be measured as work proceeds. Screed points of concrete are used as gauges to give correct concrete thickness and lines. Hand trowel finishing of the second layer is required to give the appropriate finish and surface tolerances. The ability to provide concrete finishes to the tolerances required by the designer or AS 3600, is entirely dependent on the skill and workmanship of the concrete finishers.
18.7 Curing of the concrete must be carried out as set out in AS 3600, and requires a minimum curing period of 7 days for external concrete and 3 days for internal concrete. Generally, this will require the concrete to be kept damp by applying water to the surface. This may be carried out by means of a fine spray hose or wet scrims placed over the surface.
18.8 Conventional roof construction (where applicable) can be installed once all walls and floors have been erected and concrete work completed.

Finishing

19.1 After joinery installation has been completed using the detailing as set out in the Technical Literature, the exterior and interior finishes can be applied to the concrete surfaces.
19.2 Interior surfaces (walls and ceilings) are finished with a thin coat interior plaster applied in accordance with the Technical Literature. Alternatively, any other suitable lining system may be used, providing it is installed in accordance with the lining manufacturers' instructions.
19.3 Exterior finishes may be any weatherproof coating system recommended by the coating manufacturer as suitable for use on concrete or cement-based render, or other BRANZ Appraised systems suitable for this purpose. Render finish coats in accordance with HB 161 may also be used externally over the concrete, providing the weatherproof coating is also installed.
19.4 Exterior and interior finishing systems are not covered by this Appraisal, unless they have been BRANZ Appraised as suitable for this use.

Inspections

20.1 The Technical Literature must be referred to during the inspection of EVG 3D Building System.

Health and Safety

21.1 The EVG 3D Building System Technical Literature must be consulted for guidance for health and safety requirements such as personal protective clothing, protective glasses, hearing protection and installation hazard assessment.

Basis of Appraisal

The following is a summary of the technical investigations undertaken.

Tests

22.1 BRANZ has carried out thermal resistance testing of the EVG 3D Building System EPS in accordance with ASTM C518.
22.2 Fire resistance tests have been carried out in accordance with BS 476:Parts 21 and 22 on EVG 3D Building System panels. The results have been reviewed by BRANZ.
22.3 Sound insulation tests have been carried out on EVG 3D Building System panels. The results have been reviewed by an Acoustic Engineer.

Other Investigations

23.1 The manufacturer's Technical Literature has been reviewed by BRANZ and found to be satisfactory.

23.2 Site inspections were carried out by BRANZ to assess methods used for the installation of the EVG 3D Building System and to examine completed installations.

23.3 Assessments have been given by BRANZ technical experts covering structure, durability, fire resistance and fire safety, damp and weatherproofing, and thermal performance.

Quality

24.1 The manufacture of the EVG 3D Building System panels has been not been examined by BRANZ, but details of the methods adopted for quality control and the quality of the materials used, have been obtained.

24.2 Questech Pty Ltd and EVG (Entwicklungs-und Verwertungs-Gesellschaft) are responsible for the quality of the product supplied.

24.3 Specific design using the EVG 3D Building System is the responsibility of the designer with the instruction, supervision and approval of Questech Pty Ltd.

24.4 Quality of installation of the system on site is the responsibility of the tradesperson.

24.5 Quality of maintenance of the building is the responsibility of the building owner.

Sources of Information

- ABCB Protocol for Building Energy Analysis Software Version 2006, Australian Building Codes Board.
- AS/NZS 4859.1: 2002 Materials for the thermal insulation of buildings.
- AS 1684:2006 Residential timber-framed construction.
- AS 3600:2009 Concrete structures.
- AS 3730 Guide to the properties of paints for buildings.
- AS 4100:1998 Steel Structures.
- BS 476: Part 21: 1987 Methods for the determination of the fire resistance of loadbearing elements of construction.
- BS 476: Part 22: 1987 Methods for the determination of the fire resistance of non-loadbearing elements of construction.
- HB 161- 2005 Guide to Plastering, Standards Australia.
- National Construction Code Series, Building Code of Australia 2011, Australian Building Codes Board.

Amendment No. 1 dated, 6 October 2011.
This Appraisal has been amended to include the use of the product in non-cyclonic wind zones up to N6, cyclonic wind zones up to C4 and to include sound insulation ratings.

BRANZ

In the opinion of BRANZ, EVG 3D Building System is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.
The Appraisal is issued only to EVG - Entwicklungs - und Verwertungs-Gesellschaft m.b.H., and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
a) relates only to the product as described herein;
b) must be read, considered and used in full together with the technical literature;
c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
d) is copyright of BRANZ.
2. EVG - Entwicklungs - und Verwertungs-Gesellschaft m.b.H.:
a) continues to have the product reviewed by BRANZ;
b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
c) abides by the BRANZ Appraisals Services Terms and Conditions.
d) Warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
c) any guarantee or warranty offered by EVG - Entwicklungs - und Verwertungs-Gesellschaft m.b.H.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to EVG - Entwicklungs - und Verwertungs-Gesellschaft m.b.H. or any third party.

For BRANZ

P Burghout
Chief Executive

Date of issue: 9 June 2011