BRANZ Appraised
Appraisal No. 385 [2021]

EVG-3D CONCRETE SYSTEM

Appraisal No. 385 (2021)

This Appraisal replaces BRANZ Appraisal No. 385 (2009)

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 The EVG-3D Concrete 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 plaster, while the interior surfaces (walls and ceilings) can either be plastered or lined with conventional lining materials such as plasterboard systems.

Scope

2.1 The EVG-3D Concrete System has been appraised for use as a specific design structural wall and floor system for buildings within the following scope:

- with a maximum building height from the ground to eaves of 10 m; and,
- with a floor plan area limited only by seismic and structural control joints; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

2.2 The EVG-3D Concrete System has been appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *(Note: The Appraisal of the EVG-3D Concrete System relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone.)*

Building Regulations

New Zealand Building Code (NZBC)

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

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. The EVG-3D Concrete System meets the requirements for loads arising from self-weight, imposed gravity loads, earthquake, wind, impact and creep and shrinkage [i.e. B1.3.3 (a), (b), (f), (h), (j) and (q)]. See Paragraphs 8.1–8.3.

Clause B2 DURABILITY: Performance B2.3.1 (a), not less than 50 years. The EVG-3D Concrete System meets this requirement. See Paragraphs 9.1-9.6.

Clause C3 FIRE AFFECTING AREAS BEYOND THE SOURCE: Performance C3.4 (a), C3.6 and C3.7 (a), (b) and (c). The EVG-3D Concrete System meets or contributes to meeting these requirements. See Paragraphs 11.1-11.10.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The EVG-3D Concrete System meets this requirement. See Paragraphs 13.1-13.6.

Clause E3 INTERNAL MOISTURE: Performance E3.3.1. The EVG-3D Concrete System can be used to meet this requirement. See Paragraphs 14.1–14.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The EVG-3D Concrete System meets this requirement.

Clause G6 AIRBORNE AND IMPACT SOUND: Performance G6.3.1. The EVG-3D Concrete System can be used to meet this requirement. See Paragraph 16.1.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 (a) and H1.3.2 E. The EVG-3D Concrete System contributes to meeting these requirements. See Paragraphs 16.1–16.6.

Technical Specification

The EVG-3D Concrete System

4.1 The EVG-3D Concrete System consists of panels manufactured to form a three-dimensional truss-type, welded-wire space frame integrated with an S grade fire retardant, EPS core. The panels are placed in position, and wythes of concrete from 45-80 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.

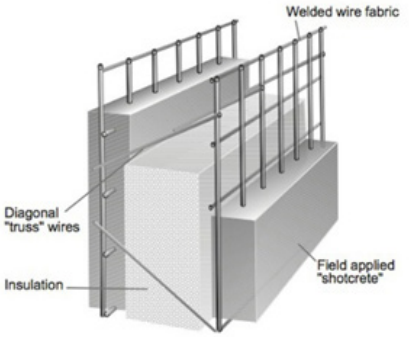
4.3 The panels are produced in a standard wide of 1,200 mm, with lengths supplied as required up to 6,000 mm. The panels weigh approximately 6 kg/m² and may be site-cut to size and shape. The standard EPS core thicknesses are 50, 80 and 100 mm.

4.4 The welded-wire sheets are 1,200 mm wide and up to 6,000 mm long and have a standard size of 50 x 50 mm mesh spacing x 2.5-3.0 mm wire diameter for the cover mesh, which is connected by steel diagonals (trusses) 3.5-3.8 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 60 (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 the EVG-3D Concrete 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 Concrete System is used in buildings that have been specifically designed in accordance with NZS 3101 using the design guidelines.

7.2 The EVG-3D Concrete System is used to provide the required bracing resistance for earthquake and wind loads.

7.3 Foundations are to a specific design in accordance with NZS 3101 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 NZS 3604 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 Clause 10.2.2 of NZS 3604. Roof coverings can be conventional and must meet the requirements of the NZBC.

7.5 The exterior concrete must be finished with a weatherproof coating system. This can be either paint, painted cement-based stucco or an external plaster finishing system suitable for concrete covered by a valid BRANZ Appraisal. Stucco must be accordance with NZS 4251. 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 plaster 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 Concrete 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 Concrete System follows the requirements of NZS 3101. Design guidelines and requirements are set out in the Technical Literature and must be followed. The design guidelines cover loading, design requirements, material type and material properties, durability, flexure, axial load, in-plane shear, and standard details.

Impact Resistance

8.3 The EVG-3D Concrete 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.

Durability

9.1 NZS 3101 Section 3 specifies exposure zones, concrete strengths and cover requirements for the New Zealand environment. As the EVG-3D Concrete System is intended for use throughout New Zealand, a number of situations will apply.

9.2 The Technical Literature sets out the durability requirements that must be met for the EVG-3D Concrete System, and summarises the requirements of Tables 3.1 and 3.6 of NZS 3101 for exposure zones, minimum cover and concrete strengths that apply to this system (see Table 1 of this Appraisal).

Table 1: Minimum Concrete Cover Requirements

Exposure Environment Classification		Minimum Required Cover (mm) for Various Concrete Strengths (f'_c)	
		25 MPa	30 MPa
A1	Interior surfaces, or surfaces in ground contact protected by a damp-proof membrane	25	20
A2	Above ground exterior surfaces in inland areas, or surfaces in ground contact in non-aggressive soils	35	30
B1	Interior surfaces subjected to repeated wetting and drying, or exterior surfaces in coastal areas	40	35
B2	Exterior surfaces in coastal frontage areas	-	45

Notes to Table 1:

1. The extent of Inland (A2) and Coastal Perimeter (B1) zones are shown in Figures 3.1 (a) to (f) in NZS 3101.

2. The Coastal Frontage zone (B2) is defined typically as within 100 m of the high tide mark, or 500 m of the high tide mark to the direction of a prevailing or other common wind. Specific assistance for New Zealand's main regions is given in Table 3.2 (a) of NZS 3101.

3. The "-" for classification B2 at 25 MPa indicates that this is not permitted by NZS 3101.

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 Concrete System will remain durable and serviceable for at least 50 years.

Maintenance

10.1 Annual checks of the building exterior must be made to ensure the entire building envelope remains weatherproof in accordance with the performance provisions of NZBC Clause E2. Moisture must not penetrate the structure which would cause corrosion of the reinforcement.

10.2 Re-coating of the finishing system will be necessary throughout the life of the cladding system. The interval between re-coats 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.

Prevention of Fire Occurring

11.1 Separation or protection must be provided to the EPS core of the EVG-3D Concrete System from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

Control of Internal Fire and Smoke Spread

12.1 The EVG-3D Concrete System includes an EPS (combustible insulant) core, therefore the interior surface finish must achieve a Group Number of not more than 3, as per NZBC Acceptable Solution C/AS1 Section 4.3 and C/AS2 Paragraph 4.17.2.

12.2 The EVG-3D Concrete System incorporates an interior wythe of concrete >15mm thick enclosing the EPS, when coated with a waterborne or solvent borne paint coating ≤0.4 mm this achieves a Group Number of 1-S, as per NZBC Verification Method C/VM2 Table A1.

12.3 If areas of the EPS are not enclosed by >15mm of concrete it will need to be enclosed by an interior surface lining so that the completed system achieves a Group Number of not more than 3, as per NZBC Acceptable Solution C/AS1 Section 4.3 and C/AS2 Paragraph 4.17.2.

12.4 The EPS used in the EVG-3D Concrete System has been tested and complies with the flame propagation criteria of AS 1366 as required by NZBC Acceptable Solution C/AS1 Section 4.3 and C/AS2 Paragraph 4.17.6.

Fire Resistance Ratings

12.5 The EVG-3D Concrete System can be used for loadbearing and non-loadbearing walls to form Fire Resistance Rated (FRR) separations. Load bearing walls will achieve an FRR of 120/120/120 and the non-loadbearing wall configuration will achieve an FRR of -/90/90 when constructed in accordance with the Technical Literature. See Table 2.

Table 2: Fire Resistance Ratings

Minimum Concrete/EPS/Concrete Thicknesses (mm)	Wall Type	FRR
40/50/40	Non-Loadbearing	-/90/90
75/80/75	Loadbearing	120/120/120

Vertical Fire Spread

12.6 This Appraisal only covers buildings 10 m or less in height. NZBC Functional Requirement C3.2 identifies that external vertical fire spread to upper floors only needs be considered for buildings with a building height greater than 10 m. Control of external vertical fire spread is therefore outside the scope of this Appraisal.

Horizontal Fire Spread

12.7 The exterior wythe are composed entirely of concrete and reinforcing steel and are therefore defined as non-combustible, as per NZBC Acceptable Solution C/AS2 Definitions. When the concrete exterior surface is left uncoated or has a directly applied surface finish of ≤1 mm in thickness, they can be used within 1 m of the relevant boundary. This meets the requirements of Paragraph 5.4 of NZBC Acceptable Solution C/AS1 and Paragraph 5.8.2 a) of NZBC Acceptable Solution C/AS2.

12.8 The exterior wythe are composed entirely of concrete and reinforcing steel and are therefore defined as non-combustible, as per NZBC Acceptable Solution C/AS2 Definitions. When the concrete exterior surface is coated with a BRANZ Appraised external plaster finishing system that achieved a Type A classification when tested to the relevant standard test in Appendix C C7.1 of NZBC Acceptable Solution C/AS2, they can be used within 1 m of the relevant boundary. This meets the requirements of Paragraph 5.4 of NZBC Acceptable Solution C/AS1 and Paragraph 5.8.2 a) of NZBC Acceptable Solution C/AS2.

12.9 Refer to NZBC Acceptable Solutions C/AS1 and C/AS2, and Verification Method C/VM2 for fire resistance rating and control of external fire spread requirements for external walls.

Structural Stability During Fire

13.1 In order to satisfy the requirements of NZBC C6 Structural Stability, designers must ensure that elements with a Fire Resistance Rating (FRR) are structurally supported by elements with at least the equivalent FRR.

External Moisture

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

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

14.3 Exterior joinery complying with the NZBC 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 detail their own details, for which they alone must accept responsibility for compliance with NZBC Clause E2 and B2.

14.4 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 requirements of NZBC Clause E2 when these details are incorporated into their particular design. Compliance with NZBC Clause E2 is dependent on the correct incorporation of these details into the building design.

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

14.6 The EVG-3D Concrete 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.

Internal Moisture

15.1 The EVG-3D Concrete System alone may not meet NZBC Acceptable Solution E2/AS1, Paragraph 1.1.1 (a). Buildings must be constructed with an adequate combination of thermal resistance and ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

15.2 The EVG-3D Concrete System is not a barrier to the passage of water vapour, and when correctly installed will not create or increase the risk of moisture damage resulting from condensation.

Airborne Sound

16.1 The EVG-3D Concrete System can be used for walls that are common between occupancies, and therefore required to meet a minimum Sound Transmission Class (STC) of 55. 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 STC Ratings.

Table 3: STC Ratings

EVG-3D Panel Thickness: [concrete/ EPS/concrete]	Additional Insulation	Typical Application	STC Rating
40/100/40	10 mm plasterboard on resilient channels on timber battens, with 50 mm sound absorbing blanket, to one side.	Suspended floor, internal or external wall.	55
40/100/40	13 mm plasterboard on resilient channels on timber battens with 50 mm sound absorbing blanket to one side.	Suspended floor, or external wall.	57
70/50/45	Nil	External Wall	45
45/50/45	Nil	Internal or External Wall	44
45/50/45	10 mm plasterboard on resilient channels on timber battens, with 50 mm sound absorbing blanket, to both sides.	Internal or Party Wall	59
45/50/45	13 mm plasterboard on resilient channels on timber battens, with 50 mm sound absorbing blanket, to both sides.	Internal or Party Wall	61

Notes to Table 3:

1. Sound absorbing fibreglass or mineral fibre blanket bulk density in the range 12-60 kg/m³.

2. Battens at 600 mm centres and no less than 45 mm thickness.

3. Channels of 5 mm metal thickness and 13 mm deep fixed horizontally.

4. Gypsum plasterboard of no less than 680 kg/m³ bulk density.

5. Concrete density to be no less than 2,000 kg/m³.

Energy Efficiency

Building Thermal Envelope

17.1 The EVG-3D Concrete System can be used in Housing applications to meet the thermal insulation requirements of NZBC Clause H1.3.1(a) and H1.3.2E. For Housing (with a net lettable area of 300 m^2 or less) NZBC performance provision H1.3.1(a) can be met by using the Section 3 and Section 4.1 or 4.2 of NZS 4218 (as modified by NZBC Acceptable Solution H1/AS1 section 2). Performance provision H1.3.2E can be met by calculating the building performance index (BPI) in accordance with NZBC Verification Method H1/VM1 Section 1.2.

17.2 For buildings other than Housing (and Housing with a net lettable area greater than 300 m^2), the calculation and modelling methods of NZBC Verification Method H1/VM1 Section 1.3 (NZS 4243.1) and NZBC Acceptable Solution H1/AS1 Section 2.2 can be used to determine the building's thermal performance.

17.3 The approximate thermal resistance rating (R-value) of the EVG-3D Concrete System panels, including minimum concrete thickness required, but excluding exterior or interior coatings or linings, are as set out in Table 4 of this Appraisal.

Determining Thermal Resistance

17.4 The thermal resistance (R-values) of building elements may be verified by using NZS 4214.

Table 4: R-Values

EVG-3D EPS Thickness: with nominal 50 mm concrete wythe each side	Truss Spacing	Approximate R-Value with mild steel diagonals [m² °C/W]	Approximate R-Value with stainless steel diagonals [m² °C/W]
50 mm	D100	1.0	1.2
	D60	1.1	1.3
80 mm	D100	1.3	1.8
	D60	1.6	2.0
100 mm	D100	1.6	2.2
	D60	1.9	2.4

Installation Information

Installation Skill Level Requirements

18.1 All design and building work must be carried out in accordance with the EVG-3D Concrete System's Technical Literature and this Appraisal by competent and experienced tradespersons conversant with the EVG-3D Concrete System. Where the work involves Restricted Building Work [RBW] this must be completed by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant License class.

General

19.1 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.

19.2 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.

19.3 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.

19.4 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 mesh 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.

19.5 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.

19.6 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

20.1 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.

20.2 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.

20.3 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

21.1 All concreting work must be carried out in accordance with NZS 3109 with regard to workmanship and materials.

21.2 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.

21.3 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.

21.4 Concrete must be of the correct strength and mix design as required by the structural engineering design.

21.5 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.

21.6 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 NZS 3109, is entirely dependent on the skill and workmanship of the concrete finishers.

21.7 Curing of the concrete must be carried out as set out in NZS 3109 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.

21.8 Conventional roof construction (where applicable) can be installed once all walls and floors have been erected and concrete work completed.

Finishing

22.1 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.

22.2 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.

22.3 Exterior finishes may be any weatherproof coating system recommended by the coating manufacturer as suitable for use on concrete or cement-based plaster, or other BRANZ Appraised systems suitable for this purpose. Plaster finish coats in accordance with NZS 4251 may also be used externally over the concrete, providing the weatherproof coating is also installed.

22.4 Exterior and interior finishing systems are not covered by this Appraisal, unless they have been BRANZ Appraised as suitable for this use.

Inspections

23.1 The Technical Literature must be referred to during inspection of the EVG-3D Concrete System.

Health and Safety

24.1 The EVG-3D Concrete 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

25.1 BRANZ has carried out thermal resistance testing of the EVG-3D Concrete System EPS in accordance with ASTM C518 as part of the material test evaluation to AS/NZS 4859.1.

25.2 Tests have been carried out to AS 1366.3 on the EVG-3D Concrete System EPS. The results have been reviewed by BRANZ.

25.3 Fire resistance tests have been carried out by in accordance with BS 476: Parts 21 and 22 on EVG-3D Concrete System panels. The results have been reviewed by BRANZ.

25.4 A sound insulation test has been carried out on EVG-3D Concrete System panels. The results have been reviewed by BRANZ.

Other Investigations

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

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

26.3 Assessments have been given by BRANZ technical experts covering structure, durability, outbreak of fire, spread of fire, structural stability during fire, external moisture, internal moisture and energy efficiency.

Quality

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

27.2 EVG (Entwicklungs und Verwertungs-Gesellschaft) are responsible for the quality of the product supplied.

27.3 Specific design using the EVG-3D Concrete System is the responsibility of the designer with the instruction, supervision and approval of EVG.

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

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

BRANZ

Sources of Information

- AS 1366: 1992 Rigid cellular plastics sheets for thermal insulation.
- AS 3720 Guide to the properties of paints for buildings.
- AS/NZS 2918: 2001 Domestic solid fuel burning appliances – Installation.
- AS/NZS 4859.1: 2018 Materials for the thermal insulation of buildings.
- 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.
- CCANZ CP 01:2014 Code of Practice for Weathertight Concrete and Concrete Masonry Construction.
- NZS 3101: 2006 Concrete structures standard.
- NZS 3109: 1997 Concrete construction.
- NZS 3404.1: 1997 Steel structures standard.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 4214: 2006 Method of determining the total thermal resistance of parts of buildings.
- NZS 4218: 2009 Thermal Insulation - Housing and Small Buildings.
- NZS 4243.1: 2007 Energy Efficiency – Large Buildings – Part 1: Building Thermal Envelope.
- NZS 4251: Part1: 1998 Solid plastering - Cement plasters for walls, ceilings and soffits.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

BRANZ

In the opinion of BRANZ, EVG-3D Concrete 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

Chelydra Percy
Chief Executive

Date of Issue:
16 April 2021