BEAL Appraisal Certificate v2

B2080

EXPIRES 31 Jan 2022

The QuicFab Structural Insulated Panel System

Product

1.1 **The QuicFab Structural Insulated Panel (SIP) System is a building system that includes structural insulated panels, specified fasteners, adhesives, sealants, membranes and exterior finishing systems that allow the rapid construction of walls, floors and roofs.**

1.2 The QuicFab Structural Insulated Panel (SIP) System is to be applied only by persons trained and approved by QuicFab NZ Ltd. or their authorised agents in conformance with the QuicFab **Building Product Quality Plan** and site checklists.

Compliance with the NZ Building Code

2.1 In the opinion of BEAL, the QuicFab SIP System, when designed, installed and maintained in accordance with the statements and conditions of this Appraisal Certificate, will meet the following provisions of the New Zealand Building Code:

Performance Clauses B1.3.1, B1.3.2, B1.3.3 (a), (b), (c), (f), (g), (h), (l), (m), (q) and B1.3.4; refer Para 6.7
Performance Clauses B2.3.1 (a) for the SIP, (b) for the cladding and render, & (c) for the coating system; refer Para 6.8
Performance Clause E2.3.2; refer Para 6.9
Performance Clause E3.3.1; Refer to Para 6.10
Performance Clause F2.3.1 refer Para 6.11
Performance Clause H1.3.2E; refer Para 6.12
Compliance with other clauses fall outside the scope of this certificate

2.2 The QuicFab SIP System has been appraised as an Alternative Solution in terms of the Building Act 2004.

Scope and Limitations

3.1 The QuicFab Structural Insulated Panel System is to be installed within seismic zones with a Z factor of Upper Hutt and a local wind zone of up to and including Extra High. Installation shall be supervised by a trained and approved installer.

Applicant:

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3.2 Design details shall comply with all requirements described in the QuicFab SIP System Technical Installation Manual and the site inspection requirements;
3.3 The owner of the building is responsible for the proper maintenance of the exterior finishing system as set out in an owner's maintenance schedule.

Technical Literature

4.1 The QuicFab SIP System Technical Installation Manual must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained within the technical literature and scope of this Appraisal Certificate must be followed.
4.2 For a copy of this manual and any subsequent updates please refer to www.quicfab.co.nz

Technical Details

5.1 Materials supplied by QuicFab are as follows:

- **QuicFab Wall SIPs**

Thickness	Composition	Thermal
165mm	12mm Board/141mmEPS/12mm Board	R3.8
215mm	12mm Board/191mmEPS/12mm Board	R5.4
265mm	12mm Board/241mmEPS/12mm Board	R6.7
315mm	12mm Board/191mmEPS/12mm Board	R8.0

Table 1

- **QuicFab External Walls**

QuicFab internal walls are typically 165mm thick. This allows use of standard timber framing, which is used for plates, and if needed, point load bearing.
Standard sheet sizes are the same as QuicFab SIP's.

- **QuicFab Floor Panel & Joist System**

A structural joist, whether I-beam, LVL joist, structural timber, or formed steel joist with attached timber flanges for fixing, are installed in the edge of the appropriate sized panel, leaving half of it exposed for the connection of the next panel. The next panel slides over the exposed section of joist and the top and bottom edges of each panel are butted together then screw fixed to the joist. The result is a flush finish on both the top and bottom. It is recommended that the minimum thickness of the jointing member is 63mm to provide adequate fixing of both sheet edges.

- **QuicFab WarmFloor100**

This is commonly a 115mm thick panel screw fixed over standard floor framing. 115mm thickness allows standard 90 x 45 framing to be used for opening trimmers and boundary boards. The benefit of these floors is, superior strength, thermal insulation, and the waterproof nature of the board that allows for use in wet areas. Where falls are required, eg bathrooms, the panel can be reduced in thickness to allow for a plaster screed.

- **QuicFab Roof SIPs**

Same detail as 'QuicFab Floor & Joist System', but installed to the required fall. Any compliant roof cladding system is suitable for fixing over SIP roof panels, including torch on membrane, tile and batten, or long run iron on purlin. Roofing underlay shall be installed over the SIP roof panels where required.
Note that QuicFab SIPs must be kept dry, out of the weather, when stored on site.

Advice for designers

6.1 The QuicFab SIP comprises a composite panel of expanded polystyrene (EPS) insulation and skins of Magnesium oxide board. When connected, these SIPs compare favourably in strength with conventional, timber framed walls or floors of comparable thickness.
6.2 An installed QuicFab SIP also provides a first layer of protection of the interior from the weather, similar to that of a rigid air barrier.
Once erected, the exterior SIP walls are themselves protected from the weather using either a conventional rainscreen / cladding over cavity battens or, by way of an approved plaster system.
6.3 Energy efficiency for a whole house is achieved using the QuicFab SIP connection design which minimises any thermal bridging.
6.4 Compliance with performance clauses E3, G4 and H1 are easily achieved though incorporation of a heat recovery ventilation unit.
6.5 Electrical and other Services can be run thru the preformed vertical wiring chases in the SIP.
6.6 Designers are directed to the QuicFab SIP System Technical Installation Manual which contains comprehensive details and drawings, available from the QuicFab web site www.quicfab.co.nz

Clause B1 - Structure

6.7 The QuicFab Structural Insulated Panel (SIP) System, when designed and constructed in accordance with the QuicFab SIP System Technical Installation Manual, will meet the performance requirement of Clause B1

Clause B2 - Durability

6.8 The QuicFab SIPs, when subjected to normal conditions of environment and use, are expected to have a serviceable life of at least 50 years. The selected external rainscreen or plaster system is expected to have a serviceable life of 15 years with any decorative elements having an expected life of 5 years.

Clause E2 - External Moisture

6.9 Compliance with clause E2 relies on either the installation of a NZBC compliant rainscreen on cavity battens, or use of a QuicFab-specified plaster finishing system.

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Clause E3 - Internal Moisture

6.10 Compliance with clause E3 covering the management of internal moisture, relies on either the installation of a NZBC compliant mechanical ventilation system or a heat recovery ventilation system.

Clause F2 - Hazardous Materials

6.11 No materials are used that are hazardous to ocupants or users of buildings constructed from QuicFab SIPs

Clause H1 - Energy Efficiency

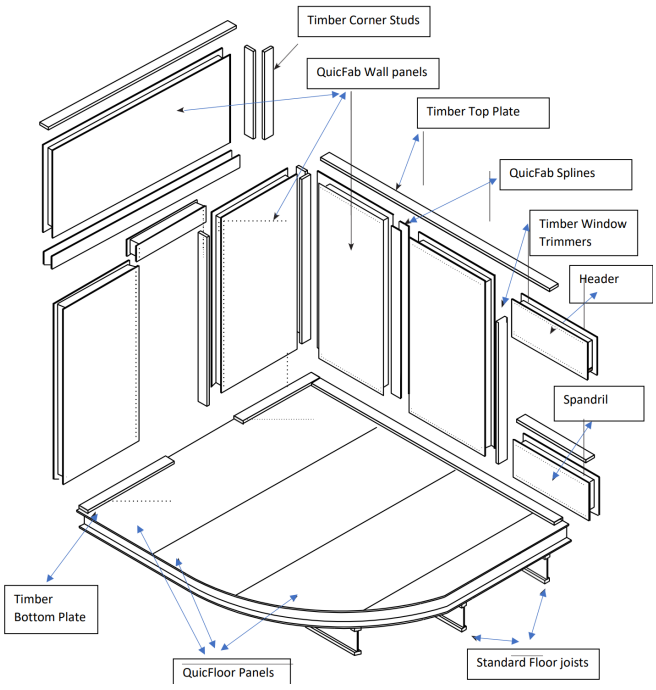
6.12 Compliance of the completed building with clause H1 relies on use of the relevant R values for calculating the 'building performance index'. Refer Table 1.

Installation Requirements

7.1 Construction using the QuicFab SIP System must be completed by persons who have been trained and approved by either QuicFab NZ Ltd. or their authorised agents.

7.2 Use of the QuicFab SIP System shall be in accordance with the QuicFab SIP System Technical Installation Manual. Any variation shall be subject to specific design and outside the scope of the this Appraisal Certificate.

7.3 All construction work on site shall be subject to the requirements set out in the QuicFab Building Product Quality Plan and accompanying Site Checklists, which shall be completed as work progresses, as required.



Basis of this Appraisal

BEAL use the *compliance verification procedure* to demonstrate compliance with the relevant performance clauses of the NZBC based on a risk assessment procedure. The following is a summary of the technical investigations carried out by BEAL:

8.1 Tests to verify compliance

The following testing of the QuicFab SIP System has been undertaken by BEAL to verify compliance:

⇒ P21 Bracing capacity testing at SCION
⇒ Fastener pull-out testing by BTS
⇒ Adhesion and bond strength testing by BTS
⇒ Durability testing by way of accelerated ageing testing by BTS in accordance with ASTM C297, ASTM D905 and ASTM D2294
⇒ Resistance to moisture ingress of the QuicFab SIP System with specified plaster system, by way of a purpose designed test procedure using elements of AS/NZS 4284 by BTS
⇒ Thermal performance measurements using a Guarded Hotplate in accordance with AS/NZS4859.1 by BTS

Other assessment work

9.1 Assessments

⇒ Wind loadings, self weight, seismic loadings, shear force, panel capacity, fastener pull through testing and calculations for the system were determined by an independent Chartered Engineer in respect to the requirements of compliance document B1 Structure. Structural and durability opinions were provided.
⇒ Opinion of the durability of SIP panel components
⇒ Opinion on the compliance with clause E2 based on an analysis of the details and designs described in the technical literature
⇒ Opinion on the potential for the product to become a hazard to health.

9.2 Other Investigations

⇒ Ease of installation has been assessed by BEAL.
⇒ The technical literature has been examined by BEAL and found to be satisfactory.
⇒ Ease of repair or maintenance

9.3 The Technical Literature has been examined by BEAL and found to be satisfactory.

Quality Control

10.1 The manufacture of the QuicFab SIPs and the construction of the SIP System is covered by the QuicFab NZ Ltd. Building Product Quality Plan, which has been assessed by BEAL and found to be satisfactory.

10.2 QuicFab NZ Ltd. Building Product Quality Plan is reviewed and audited at least annually by BEAL.

10.4 Building owners and designers are responsible for the suitability of the ground

10.5 Building owners are responsible for the maintenance of the exterior in accordance with the instructions of the cladding or plaster manufacturer and this Appraisal Certificate.

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Sources of Information

10.6 The following sources of information were referred to:

- ⇒ AS/NZS 1170:2011 Structural design actions
- ⇒ AS/NZS 4284:2008 Testing of building facades
- ⇒ AS 3566:1998 Self drilling screws for the building and construction industries.
- ⇒ ASTM C297: Standard test method for flatwise tensile strength of sandwich constructions.
- ⇒ ASTM D905: Standard Test Method for Strength Properties of Adhesive Bonds in Shear by Compression Loading
- ⇒ ASTM D2294: Standard Test Method for Creep Properties of Adhesives in Shear by Tension Loading
- ⇒ ASTM E72 -10 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
- ⇒ NZS 3604:2011 Timber framed Buildings
- ⇒ NZS 4211:1985 Specification for performance of windows
- ⇒ AS/NZS 4859.1:2002 Materials for the thermal insulation of buildings
- ⇒ The Building Regulations 1992, up to, and including October 2004 Amendment.
- ⇒ Intertek test certificates covering testing of structural insulated panels as follows -
  - Heat Release, Flame Spread
  - Fire Resistance Tests
  - Testing of the SIP to ICC-ES AC04
  - Air Leakage
  - Water Penetration
  - Salt Spray Resistance
  - Testing of the MgO Board to AC 386.
  - An ISOGRIP Laminating Guide – ISOGRIP SP 4020D.

Concluding statement

11.1 In the opinion of BEAL, based on in-service history of the QuicFab SIP System supplied by QuicFab NZ Ltd. is fit for purpose and will comply with the New Zealand Building Code to the extent described in the scope of use and limitation statement provided and that it is used, designed, installed and maintained as set out in this Appraisal Certificate.

11.2 The Appraisal Certificate is issued only to QuicFab NZ Ltd. and is valid until the expiry date, subject to the conditions of this Appraisal.

Conditions of Appraisal

12.1 This appraisal Certificate :

a) Relates only to the QuicFab SIP System as described herein;
b) Must be read, considered and used in full, together with the current version of the Technical Literature
c) Does not address any legislation, regulations, codes or standards, not specifically named herein;
d) Is copyright of BEAL and subject to BEAL's terms and conditions.

12.2 The Appraisal Certificate holder continues to meet the quality requirements of the QuicFab NZ Ltd. Building Product Quality Plan and has the plan audited and Appraisal certificate revalidated by BEAL on an annual basis.

12.3. QuicFab NZ Ltd. shall notify BEAL and obtain approval of any changes of the product specification or quality assurance prior to product being marketed including any trade literature, web site info or the like.

12.4. BEAL makes no representation 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 the Appraisal Certificate holder.

12.5. BEAL's verification of the building product or system complying with one or more of the above-mentioned criteria is given on the basis that the criteria used were those that were appropriate to demonstrate compliance with the Building Code of Australia at the date of this Appraisal Certificate. In the event that the criteria is withdrawn or amended at a later date, this Appraisal may no longer remain valid.

12.6. Any reference in this Appraisal Certificate to any other publication shall be read as a reference to the version of publication specified in this Appraisal Certificate.

C R Prouse - Director
BEAL (Building Element Assessment Laboratory Limited)
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