



BEAL Appraisal Certificate



Certificate BS2318

EXPIRES 6 July 2024

The TAUCO Light Gauge Steel Building System



Product

1.1 The 'TAUCO Light Gauge Steel Building System' is based on the use of a range of floor, wall and roof products, using a proprietary light gauge steel design and manufacturing process, incorporating windows and exterior doors, an interior wet area system, for the construction of residential housing, up to three stories in height.

1.2 The TAUCO LGS BS is comprised of light gauge steel framing including insulation, thermal breaks & cavity system for walls, roof truss and suspended floor. The foundations, framing, insulation, linings and any applicable fire rating are to specific design.

1.3 The TAUCO LGS BS is to be constructed under the supervision of a suitably experienced person trained and approved by Forest Mountain Australia Limited or their authorised agents, in conformance with the Forest Mountain Australia Limited **Building Product Quality Plan** and **site checklists**.

Compliance with the NCC

2.1 In the opinion of BEAL, the TAUCO LGS BS' when designed, installed and maintained in accordance with the statements and conditions of this Appraisal Certificate, will meet the following provisions from NCC Volumes one and two:

Part H1 Structure

H1P1 Structural reliability and resistance (1), (2)(a), (b), (c), (d), (l), (n) and (o), (3)

Part H2 Damp and weatherproofing

H2P1 Rainwater management

H2P2 Weatherproofing

Part H3 Fire safety

H3P1 Spread of fire

Part H4 Health and amenity

H4P1 Wet areas

H4P2 Room heights

H4P7 Condensation and water vapour management

Part H6 Energy efficiency

H6P1 Thermal performance

H6P2 Energy usage

Part H7 Ancillary provisions and additional construction requirements

H7P5 Buildings in bushfire prone areas.

Part H8 Livable housing design

H8P1 Livable housing design

Applicant:



Forest Mountain Australia Limited

21 Myers Grove
Churton Park, Wellington, 6037

Tel: +64 9 889 1253

E-Mail info@forestmountain.tech

www.forestmountain.tech

Appraiser:



BEAL

6B Cedric Place
Plimmerton, Porirua, NZ

Tel: +64 233 6661

E-Mail: bts@beal.co.nz

www.beal.co.nz

The most up to date version of this BEAL Appraisal Certificate can be viewed at www.beal.co.nz

© Building Element Assessment Laboratory Ltd 2021 All rights reserved. Use of this document is subject to BEAL's Terms and Conditions

2.2 Other performances have been considered and are either to Specific Design or are not applicable for a particular project.

2.3 This product has been assessed as per A5G3 Evidence of suitability - Volumes One and Two (BCA)

Scope and Limitations

3.1 The 'TAUCO Light Gauge Steel Building System' (TAUCO LGS BS) is based on the use of a range of floor, wall and roof products, using a proprietary light gauge steel design and manufacturing process, incorporating the TAUCO suite of windows and exterior doors and proprietary interior wet area system, for the construction of residential housing, up to three stories in height, subject to:

- constructed within a temperate climate, within Wind Regions A and B (winds up to and including 52m/sec); other than Regions A and B, the system shall use specific designed steel framing ;
- the system shall incorporate either a SED concrete foundation to a specific design, or, a proprietary floor system to SED;
- the system is limited to use for residential housing as described in NCC Volume 2. i.e. stand-alone houses, multi-apartment dwellings and light commercial;
- the system shall be constructed in accordance with the technical and quality plan literature supervised by those trained and approved by Forest Mountain Australia Ltd;
- plumbing and other service fixtures and fittings will be sourced from Australian suppliers and site installed in accordance with the Building Code of Australia;
- the roofing system and wall cladding will be sourced from Australian suppliers and installed in accordance with NCC Volume 2 and AS 1562.1:2018 Design and Installation of Roof and Wall Cladding.
- the TAUCO LGS BS, when installed correctly on a Class 1 building 900mm away from an allotment boundary other than the boundary adjoining a road alignment or other public space or, 1.8 m from another building on the same allotment other than a Class 10 building associated with the Class 1 building or detached part of the same Class 1 building, meets the requirement of clause H3P1 Spread of fire. For situations not covered above, a fire engineer shall provide a site specific opinion.
- the TAUCO LGS BS system shall be installed only by Forest Mountain Australia Ltd. trained and approved constructors under the supervision of a suitably experienced person.

3.2 The design and construction of any new replacement substructure, including control joints, or termination points or the like, are to be specific design and therefore the responsibility of the owner/building designer and are outside the scope of this Appraisal Certificate;

Technical Literature

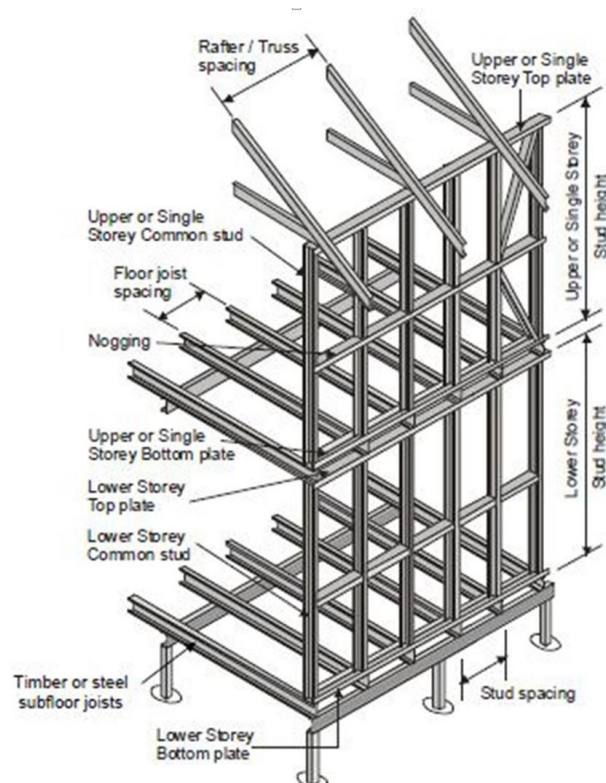
4.1 The TAUCO LGS BS Technical Literature Ver 3.3 Feb 2023 must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained within the Technical Literature and scope of this Appraisal Certificate must be followed. For a copy of this Technical Literature and subsequent updates please contact Forest Mountain Australia Ltd.

Technical Details

5.1 The TAUCO Light Gauge Steel Building System (TAUCO LGS BS), as a system, consists of prefabricated, ready to be assembled building components, for residential buildings up to three storeys high.

5.2 The TAUCO LGS BS complies with the NASH requirements for non-specific Design solutions for cold-formed steel-framing used in low-rise residential buildings including houses and low-rise light commercial buildings. TAUCO LGS BS consists of the following cold formed 'light gauge steel' (LGS) assembled components:

- Sub-floor;
- First-Floor, Mid-floor, Upper-Floor;
- Wall framing - (including prefabricated LGS wall panels with/without pre-installed windows, doors and wall insulation);



5.3 Structural and framing elements are designed using advanced roll-forming manufacturing equipment and software both meeting the NASH Standards with support for training and engineering processes. This will gain efficient design and faster construction with the TAUCO LGS Building System.

Steel coils must meet the requirements of AS 4100 or AS/NZS 4600 in accordance with the NASH Standards. The corresponding light gauge steel (LGS) designs, connection solutions and site jobs must be checked and signed off by a suitably qualified structural engineer.

5.4 The TAUCO LGS BS consists of:

The foundation is either an acceptable solution or SED (Specific Engineered Design) concrete slab and footing, or masonry perimeter, or pole/post footings, or proprietary ground screws.

Flooring material options include 20mm HD enhanced Fibre-cement sheet, or plywood sheet, or particle board/ OSB flooring material laid and screwed to LGS floor joists according to the manufacturer's instructions.

Wall Frames are typically a web of 70 - 100mm, based on wind zone and design specification.

Wall lining panels are constructed with exterior 10mm or 20mm thick XPS board, attached to one or both sides of the LGS framing, with interior plasterboard or enhanced fibre-cement sheet fixed to the interior of the framing.

Insulation material can be either one of, or a mix of the following materials:

- ◆ XPS sheets or XPS Batten Strip / Thermal Break
- ◆ Rock Wool or Glass Wool or Natural Wool blend
- ◆ Sprayed Polyurethane (PU) foam.

Note: XPS sheeting is used on exterior or both sides of the LGS, while Rock Wool, glass/natural wool or PU foam are used only inside the frame cavity.

Roof Truss Framing is typically designed and manufactured the same as for the wall framing.

Exterior wall cladding can be any cladding solution installed over a frame protection system** that is compliant with the NASH Australian Standards. Cladding systems other than TAUCO eFibre-cement sheets and the TAUCO insulated weatherboard cladding system shall be to a specific design.

Roofing can be any roofing compliant roofing solution that is compliant with the NASH Standards of construction. Roofing other than the TAUCO Al-Mg Roof system shall be to a specific design.

Wet Area Linings will be a BCA compliant membrane or acrylic liner applied over the selected wall panel with tiles over all waterproofed areas.

All building work shall be in accordance with the TAUCO Light Gauge Steel Building System Design Manual V3.3.

Handling and Storage

5.4 Before arrival of components, a flat, solid dry area shall be made ready. On arrival, components must be stored on the flat, solid dry area, out of the weather and ensure no damage prior to construction.

****NOTE:** A frame protection system is comprised of either a proprietary rigid air barrier or a flexible air barrier system, incorporating sealing tapes and gaskets that prevents air and moisture penetrating the framing.

Advice for designers

6.1 General

As mentioned, the TAUCO Light Gauge Steel Building System (TAUCO LGS BS), as a system, consists of pre-fabricated, ready to be assembled building components, for buildings up to three storeys high in accordance with the site-specific conditions and specifications.

Information about the design and manufacture of the TAUCO LGS BS is described in summary under the heading Technical Details. Before any design work can be carried out, it is essential that the designer has a good understanding of the system, described in detail in the TAUCO LGS BS Technical Literature. Below is information to assist with the application of a building consent:

Installation Requirements

7.1 Installation Skill Requirement

The TAUCO LGS BS must be carried out by suitably experienced applicators under the supervision of a suitably experienced person who has been trained and approved by Forest Mountain Australia Ltd.

7.2 Health and Safety

The safe use and handling of the many components of the TAUCO LGS BS must be used in conjunction with the relevant materials safety data sheet from suppliers and manufacturers.



Basis of this Appraisal

BEAL use the compliance verification procedure to demonstrate compliance with the relevant clauses of the NCC based on a risk analysis procedure. The following is a summary of the technical investigations carried out:

Assessments

8.1 The following assessments of the TAUCO LGS BS have been undertaken by BEAL:

A review of testing, safety and technical literature supplied by Forest Mountain Australia Ltd.

In-Service History

8.2 The light gauge steel constructions have extensive in-service history as being in conformance with the NASH Standards and demonstrating compliance with the relevant performance clauses of the BCA.

The proprietary design, manufacturing software solutions used by Forest Mountain Australia Ltd must be checked and signed off by a suitably qualified structural engineer. This has been reviewed and considered acceptable by BEAL.

Testing

8.3 Testing of the TAUCO LGS BS has been undertaken by BEAL to verify compliance of the use of the foam rubber DPC, 20mm thick XPS sheet and the TAUCO Structural Cavity Batten to verify the material as a thermal break and fixing point for the TAUCO Insulating Weatherboard System, together with testing of the fluted Polypropylene board material used for flooring. Testing of the TAUCO weatherboard cladding on cavity battens in a horizontal and vertical configuration was undertaken by Façade Lab in Auckland – an IANZ accredited laboratory.

Testing of the TAUCO Al-Mg Roof System (with secret thermal fixing clips) has been in accordance with AS 4040.1 Methods of testing sheet roof and wall cladding Method 1: Resistance to concentrated loads and AS 1562:1 Design and Installation of sheet roof and wall cladding Part 1: Metal, has been undertaken by Inspection and Certification Co. Ltd. (a CNAS accredited laboratory) to verify conformance with the Standard.

Testing of the TAUCO Al-Mg Roof System (with secret thermal fixing clips) in accordance with AS 4040.2 Methods of testing sheet roof and wall cladding Method 2: Resistance to wind pressures for non-cyclonic regions, has been undertaken by Inspection and Certification Co. Ltd. (a CNAS accredited laboratory) to verify conformance with the Standard.

Other investigations

8.4 BEAL have carried out an extensive review of the performance of 'light gauge steel framing systems used throughout the world. Though there has been little use in Australia compared with timber framing, overseas and local research indicates excellent long-term performance, especially in seismic prone environments.

8.5 The installation of the TAUCO LGS BS was also evaluated through an assessment of 'constructability', potential risks of non-performance when being installed, any external factors that could affect the quality of the installed product.

Installation Information

8.6 The Technical and Installation literature has been examined by BEAL and found to be satisfactory.

Quality Management

8.7 The design and supply of the framing is the responsibility of the designer and manufacturer of the Light Gauge Steel Framing.

8.8 The supply and construction of other components of the TAUCO LGS BS is managed through the use of a Building Product Quality Plan.

8.9 Forest Mountain Australia Ltd.'s Building Product Quality Plan is reviewed and audited at least annually by BEAL or their appointed agent.

8.10 Building owners are responsible for the maintenance of those elements of the TAUCO LGS BS which require periodic maintenance in accordance with the product manufacturer's instructions and this Appraisal Certificate.

Sources of Information

- The NCC Volumes One and Two 2022
- AS 3604:2011 Timber framed Buildings
- AS 1684 Residential timber-framed construction, Part 2: Non-cyclonic areas
- AS 3600:2018 Concrete structures
- NASH Australia Standards
- The TAUCO Light Gauge Steel Building System Technical Manual version 3.3
- AS/NZS2269 Plywood - Structural
- NASH (Australia) Standards
- The Forest Mountain Australia Ltd. Product Quality Plan dated May 2021
- Summary of testing carried out by BEAL Testing Services:
 - ⇒ Testing of bottom plate foam rubber DPC
 - ⇒ Thermal testing of the XPS sheet used as a thermal break
 - ⇒ Fixing pullout from the LGS framing
 - ⇒ Mechanical and structural testing of the TAUCO Cavity Batten (fluted PP sheet)
 - ⇒ Testing of tape adhesion and durability onto the XPS sheet
 - ⇒ Testing of a special wet area sealant/glue for use with TAUCO PP Board substrates
 - ⇒ Testing of TAUCO enhanced fibre-cement sheet used as a rigid air barrier and flooring substrate
 - ⇒ Buildability assessment of a scaled-down example of a floor, wall and roof truss including specified cladding system with window system.
 - ⇒ Structural report covering use of the TAUCO Cavity Batten material from engineers King & Dawson, dated 21 November 2019
 - ⇒ Weathertightness test report of the TAUCO Weatherboard cladding from Façade lab dated 18 August 2022
 - ⇒ Roofing resistance to concentrated loads test report from CMC dated 10th November 2022
 - ⇒ Roofing resistance to wind pressures loads for non-cyclonic regions test report from CMC dated 10th November 2022.
 - ⇒ Test Reports covering the performance of the eFibre-cement range of sheets, including:
 - Intertek Test Report No: 140122001SHJ-BP-3 to AS 2908.2:2000 dated 18.4.2014
 - CES Report No:182688:- Identification of Asbestos in bulk sample No Asbestos Found. BEAL Test Reports for the TAUCO eFibre-cement sheets -
 - TR-100617-1 Thermal Conductivity.
 - TR-171129-1 MOE/MOR Test.
 - TR-171012-1 Water Resistance Test.
 - TR-171114-1 Soak/Dry Test.
 - TR-171130-1 Dimension and Geometric Test.
 - TR-151217-1 Screw Pull out Test.
 - TR-170714-1 Screw Pull through Test.
 - TR-171017-1 MOE/MOR Test.
 - TR-171017-2 Screw Pull through Test.
 - TR-171006-1 Adhesive Strength Test.

Concluding statement

9.1 In the opinion of BEAL, the TAUCO LGS BS is fit for purpose and will comply with NCC Volumes One and Two to the extent specified provided that it is used, designed, installed and maintained as set out in this Appraisal Certificate.

9.2 The Appraisal Certificate is issued only to Forest Mountain Australia Ltd., and is valid until further notification, subject to the conditions of this Appraisal.

Conditions of Appraisal

10.1 This appraisal Certificate :

a) This appraisal Certificate:

Relates only to the TAUCO Light Gauge Steel Framing System as described herein;

Must be read, considered and used in full, together with the current version of the Technical Literature;

Does not address any legislation, regulations, codes or standards, not specifically named herein;

Is copyright of BEAL.

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

10.3 Forest Mountain Australia 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.

10.4 BEAL makes no representation as to:

- The nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship.
- The presence or absence of any patent or similar rights subsisting in the product or any other product;
- Any guarantee or warranty offered by the Appraisal Certificate holder.

10.5 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 BCA 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.

10.6 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.

Authorised Signatory



C R Prouse - Director

BEAL (Building Element Assessment Laboratory Limited)

