

CERTIFICATE OF STRUCTURAL ADEQUACY

Project: 50mm & 25mm Aluminium Batten Fixings & 'Clip in' Connection Check Project No: 19470
Date: 8th Nov. 2019
Engineer: N. Fournakis

For: Knotwood Pty Ltd

SCOPE

Magryn & Associates have been engaged to undertake structural calculations and specify fixings to install the Knotwood Aluminium Clip-Batten system to various wall materials in various regions of Australia. This is to specify and certify the structural adequacy of 'clip in' element of the battens and their fixings and comply with the current relevant Australian Standards.

GENERAL

Magryn & Associate calculations were based on the following drawings provided by Knotwood.

- 40730 - KWBA5050 - 50x50 base batten
- 33078 - KWB50200B - 200x50 batten
- 33076 - KWB50150B - 150x50 batten
- 33077 - KWB50100B - 100x50 batten
- 33079 - KWB5050B - 50x50 batten
- 37844 - KW2PA2550 - 50x25 base batten
- 37848 - KW2P25150B - 150x25 batten
- 37847 - KW2P25100B - 100x25 batten
- 37846 - KW2P2575B - 75x25 batten
- 37845 - KW2P2550B - 50x25 batten

The maximum overall batten width considered in this certification is 200mm installed at a 90° angle to the wall.

This certification is for the wall fixings and the 'Clip-in' connections of the components only; the structural adequacy of the wall studs and the building structure has not been checked by Magryn & Associates.

Design loads considered are self-weight and wind loads for Regions A, B and C in Australia. The fixings have been designed to be installed to steel stud, timber stud, concrete, and masonry walls.

ASSUMPTIONS

- 6063 Alloy & T6 temper
- Battens installed as a 'wall' application. Not used as a structural member.
- Wind average recurrence interval of 500 years
- Terrain Category 2
- Building height $\leq 20\text{m}$
- Shielding and Topographic Multiplier M_s and M_t taken as 1.0
- Aspect ratio correction and angle of inclination factors K_{ar} and K_i taken as 1.0

DESIGN STANDARDS

The battens were checked in accordance with the latest versions of the following standards:

AS/NZS 1170.0	Structural design actions: Part 0: General principles
AS/NZS 1170.1	Structural design actions: Part 1: Permanent, Imposed and other actions
AS/NZS 1170.2	Structural design actions: Part 2: Wind actions
AS/NZS 1664.1:1997	Aluminium structures: Part 1: Limit state design

RESULT

All fixing anchors to the wall are to be stainless steel. Alternatively, hot dipped galvanised steel fixings can be used in combination with a neoprene washer to isolate the fixing anchor from the aluminium.

For the 50mm base batten, fixing screws are to be installed in pairs of two at 25mm centres to the perforated groove in the Wall Bracket at maximum centres detailed below, and with one pair of screws at each end of each Wall Bracket component.

For the 25mm base batten, fixing screws are to be installed at the centre to the perforated groove in the Wall Bracket at maximum centres detailed below, and with one screw at each end of each Wall Bracket component.

Fixing bolts are to be installed as single bolts to the centre of the Wall Bracket at maximum centres detailed below, and with one bolt at each end of each Wall Bracket component. If required, the screw flutes are to be removed locally to allow for installation of the bolts centrally in the Wall Bracket.

All fixings are to be installed in accordance with manufacturer's specifications.

Fixing Notes:**Timber:**

- Nominal embedment depth to timber to be 35mm.
- Fixing to be central in timber stud.

Concrete:

- Nominal embedment depth to be 70mm for Hilti HUS-HR Screw Anchors.
- Minimum thickness of concrete to be 100mm for Hilti HUS-HR Screw Anchors.
- Minimum distance from the concrete edge to be 140mm.

Masonry:

- Nominal embedment depth to be 75mm.
- Minimum anchor spacing to be 80mm.
- Minimum edge distances to be 200mm from the masonry wall edge, 40mm from vertical masonry mortar joints, and 20mm from horizontal masonry mortar joints.
- One anchor per brick.

1. 50x50 Batten Fixing Requirements:**Table 1.1 Fixing into steel stud wall:**

50x50	Wind Region A	Wind Region B	Wind Region C
Steel stud 0.55BMT	2 No. Buildex #12-11 BattenZips at 4200mm centres*	2 No. Buildex #12-11 BattenZips at 4200mm centres*	2 No. Buildex #14-12 CyclonicfZips at 4200mm centres*
Steel stud 0.75BMT	2 No. Buildex #14-12 CyclonicfZips at 4200mm centres*	2 No. Buildex #14-12 CyclonicfZips at 4200mm centres*	2 No. Buildex #14-12 CyclonicfZips at 4200mm centres*
Steel stud 1.20BMT	2 No. Buildex #14-12 CyclonicfZips at 4200mm centres*	2 No. Buildex #14-12 CyclonicfZips at 4200mm centres*	2 No. Buildex #14-12 CyclonicfZips at 4200mm centres*

* - Spacing dictated by maximum span of section allowed.

Table 1.2 Fixing into timber stud wall:

50x50	Wind Region A	Wind Region B	Wind Region C
F7 Timber stud Pine	2 No. Buildex #12-11 BattenZips at 4200mm centres*	2 No. Buildex #12-11 BattenZips at 4200mm centres*	2 No. Buildex #12-11 BattenZips at 4200mm centres*
F17 Timber stud Hardwood	2 No. Buildex #12-11 BattenZips at 4200mm centres*	2 No. Buildex #12-11 BattenZips at 4200mm centres*	2 No. Buildex #12-11 BattenZips at 4200mm centres*

* - Spacing dictated by maximum span of section allowed.

Table 1.3 Fixing into concrete wall:

50x50	Wind Region A	Wind Region B	Wind Region C
Concrete ≥ Grade N25	Hilti HUS-HR 8 Anchors at 4200mm centres*	Hilti HUS-HR 8 Anchors at 4200mm centres*	Hilti HUS-HR 8 Anchors at 4200mm centres*

* - Spacing dictated by maximum span of section allowed.

Table 1.4 Fixing into masonry wall:

50x50	Wind Region A	Wind Region B	Wind Region C
Solid clay brick	Hilti HUS-HR 8 Screw Anchors at 4200mm centres*	Hilti HUS-HR 8 Screw Anchors at 3900mm centres	Hilti HUS-HR 8 Screw Anchors at 2700mm centres
Solid Sand Lime Brick	Hilti HUS-HR 6 Screw Anchors at 3800mm centres	Hilti HUS-HR 6 Screw Anchors at 2350mm centres	Hilti HUS-HR 6 Screw Anchors at 750mm centres
Aerated Concrete Block	Hilti HUS-HR 6 Screw Anchors at 1600mm centres	Hilti HUS-HR 6 Screw Anchors at 700mm centres	Hilti HUS-HR 6 Screw Anchors at 500mm centres

* - Spacing dictated by maximum span of section allowed.

2. 100x50 Batten Fixing Requirements

Table 2.1 Fixing into steel stud wall:

100x50	Wind Region A	Wind Region B	Wind Region C
Steel stud 0.55BMT	2 No. Buildex #14-12 CyclonicZips at 2050mm centres	2 No. Buildex #14-12 CyclonicZips at 1250mm centres	2 No. Buildex #14-12 CyclonicZips at 800mm centres
Steel stud 0.75BMT	2 No. Buildex #14-12 CyclonicZips at 2750mm centres	2 No. Buildex #14-12 CyclonicZips at 1700mm centres	2 No. Buildex #14-12 CyclonicZips at 1100mm centres
Steel stud 1.20BMT	2 No. Buildex #14-12 CyclonicZips at 2750mm centres	2 No. Buildex #14-12 CyclonicZips at 1700mm centres	2 No. Buildex #14-12 CyclonicZips at 1100mm centres

Table 2.2 Fixing into timber stud wall:

100x50	Wind Region A	Wind Region B	Wind Region C
F7 Timber stud Pine	2 No. Buildex #14-10 Type 17 Screws at 2750mm centres	2 No. Buildex #14-10 Type 17 Screws at 1700mm centres	2 No. Buildex #14-10 Type 17 Screws at 1100mm centres
F17 Timber stud Hardwood	2 No. Buildex #14-10 Type 17 Screws at 2750mm centres	2 No. Buildex #14-10 Type 17 Screws at 1700mm centres	2 No. Buildex #14-10 Type 17 Screws at 1100mm centres

Table 2.3 Fixing into concrete wall:

100x50	Wind Region A	Wind Region B	Wind Region C
Concrete ≥ Grade N25	Hilti HUS-HR 8 Anchors at 3100mm centres	Hilti HUS-HR 8 Anchors at 1950mm centres	Hilti HUS-HR 8 Anchors at 1300mm centres

Table 2.4 Fixing into masonry wall:

100x50	Wind Region A	Wind Region B	Wind Region C
Solid clay brick	Hilti HUS-HR 8 Screw Anchors at 1250mm centres	Hilti HUS-HR 8 Screw Anchors at 750mm centres	Hilti HUS-HR 8 Screw Anchors at 500mm centres
Solid Sand Lime Brick	Hilti HUS-HR 6 Screw Anchors at 750mm centres	Hilti HUS-HR 6 Screw Anchors at 450mm centres	Hilti HUS-HR 6 Screw Anchors at 300mm centres
Aerated Concrete Block	Hilti HUS-HR 6 Screw Anchors at 250mm centres	Hilti HUS-HR 6 Screw Anchors at 150mm centres	Hilti HUS-HR 6 Screw Anchors at 100mm centres

3. 150x50 Batten Fixing Requirements

Table 3.1 Fixing into steel stud wall:

150x50	Wind Region A	Wind Region B	Wind Region C
Steel stud 0.55BMT	2 No. Buildex #14-12 CyclonicfZips at 1000mm centres	2 No. Buildex #14-12 CyclonicfZips at 620mm centres	2 No. Buildex #14-12 CyclonicfZips at 430mm centres
Steel stud 0.75BMT	2 No. Buildex #14-12 CyclonicfZips at 1350mm centres	2 No. Buildex #14-12 CyclonicfZips at 840mm centres	2 No. Buildex #14-12 CyclonicfZips at 570mm centres
Steel stud 1.20BMT	2 No. Buildex #14-12 CyclonicfZips at 1350mm centres	2 No. Buildex #14-12 CyclonicfZips at 840mm centres	2 No. Buildex #14-12 CyclonicfZips at 570mm centres

Table 3.2 Fixing into timber stud wall:

150x50	Wind Region A	Wind Region B	Wind Region C
F7 Timber stud Pine	2 No. Buildex #14-10 Type 17 Screws at 1350mm centres	2 No. Buildex #14-10 Type 17 Screws at 1700mm centres	2 No. Buildex #14-10 Type 17 Screws at 840mm centres
F17 Timber stud Hardwood	2 No. Buildex #14-10 Type 17 Screws at 1350mm centres	2 No. Buildex #14-10 Type 17 Screws at 1700mm centres	2 No. Buildex #14-10 Type 17 Screws at 840mm centres

Table 3.3 Fixing into concrete wall:

150x50	Wind Region A	Wind Region B	Wind Region C
Concrete ≥ Grade N25	Hilti HUS-HR 8 Anchors at 1500mm centres	Hilti HUS-HR 8 Anchors at 950mm centres	Hilti HUS-HR 8 Anchors at 650mm centres

Table 3.4 Fixing into masonry wall:

150x50	Wind Region A	Wind Region B	Wind Region C
Solid clay brick	Hilti HUS-HR 8 Screw Anchors at 600mm centres	Hilti HUS-HR 8 Screw Anchors at 380mm centres	Hilti HUS-HR 8 Screw Anchors at 260mm centres
Solid Sand Lime Brick	Hilti HUS-HR 6 Screw Anchors at 350mm centres	Hilti HUS-HR 6 Screw Anchors at 230mm centres	Hilti HUS-HR 6 Screw Anchors at 150mm centres
Aerated Concrete Block	Hilti HUS-HR 6 Screw Anchors at 120mm centres	<i>Not Recommended</i>	<i>Not Recommended</i>

4. 200x50 Batten Fixing Requirements

Table 4.1 Fixing into steel stud wall:

200x50	Wind Region A	Wind Region B	Wind Region C
Steel stud 0.55BMT	2 No. Buildex #14-12 CyclonicZips at 880mm centres	2 No. Buildex #14-12 CyclonicZips at 550mm centres	2 No. Buildex #14-12 CyclonicZips at 370mm centres
Steel stud 0.75BMT	2 No. Buildex #14-12 CyclonicZips at 1150mm centres	2 No. Buildex #14-12 CyclonicZips at 740mm centres	2 No. Buildex #14-12 CyclonicZips at 500mm centres
Steel stud 1.20BMT	2 No. Buildex #14-12 CyclonicZips at 1150mm centres	2 No. Buildex #14-12 CyclonicZips at 740mm centres	2 No. Buildex #14-12 CyclonicZips at 500mm centres

Table 4.2 Fixing into timber stud wall:

200x50	Wind Region A	Wind Region B	Wind Region C
F7 Timber stud Pine	2 No. Buildex #14-10 Type 17 Screws at 1150mm centres	2 No. Buildex #14-10 Type 17 Screws at 740mm centres	2 No. Buildex #14-10 Type 17 Screws at 500mm centres
F17 Timber stud Hardwood	2 No. Buildex #14-10 Type 17 Screws at 1150mm centres	2 No. Buildex #14-10 Type 17 Screws at 740mm centres	2 No. Buildex #14-10 Type 17 Screws at 500mm centres

Table 4.3 Fixing into concrete wall:

200x50	Wind Region A	Wind Region B	Wind Region C
Concrete ≥ Grade N25	Hilti HUS-HR 8 Anchors at 900mm centres	Hilti HUS-HR 8 Anchors at 560mm centres	Hilti HUS-HR 8 Anchors at 380mm centres

Table 4.4 Fixing into masonry wall:

200x50	Wind Region A	Wind Region B	Wind Region C
Solid clay brick	Hilti HUS-HR 8 Screw Anchors at 360mm centres	Hilti HUS-HR 8 Screw Anchors at 220mm centres	Hilti HUS-HR 8 Screw Anchors at 150mm centres
Solid Sand Lime Brick	Hilti HUS-HR 6 Screw Anchors at 210mm centres	Hilti HUS-HR 6 Screw Anchors at 130mm centres	Hilti HUS-HR 6 Screw Anchors at 150mm centres
Aerated Concrete Block	<i>Not Recommended</i>	<i>Not Recommended</i>	<i>Not Recommended</i>

5. 50x25 Batten Fixing Requirements:**Table 5.1 Fixing into steel stud wall:**

50x25	Wind Region A	Wind Region B	Wind Region C
Steel stud 0.55BMT	Buildex #14-12 CyclonicfZips at 1850mm centres	Buildex #14-12 CyclonicfZips at 1150mm centres	Buildex #14-12 CyclonicfZips at 780mm centres
Steel stud 0.75BMT	Buildex #14-12 CyclonicfZips at 1850mm centres	Buildex #14-12 CyclonicfZips at 1150mm centres	Buildex #14-12 CyclonicfZips at 780mm centres
Steel stud 1.20BMT	Buildex #14-12 CyclonicfZips at 1850mm centres	Buildex #14-12 CyclonicfZips at 1150mm centres	Buildex #14-12 CyclonicfZips at 780mm centres

Table 5.2 Fixing into timber stud wall:

50x25	Wind Region A	Wind Region B	Wind Region C
F7 Timber stud Pine	Buildex #14-10 Type 17 Screw at 1850mm centres	Buildex #14-10 Type 17 Screw at 1150mm centres	Buildex #14-10 Type 17 Screw at 780mm centres
F17 Timber stud Hardwood	Buildex #14-10 Type 17 Screw at 1850mm centres	Buildex #14-10 Type 17 Screw at 1150mm centres	Buildex #14-10 Type 17 Screw at 780mm centres

Table 5.3 Fixing into concrete wall:

50x25	Wind Region A	Wind Region B	Wind Region C
Concrete ≥ Grade N25	Hilti HUS-HR 8 Anchors at 2600mm centres*	Hilti HUS-HR 8 Anchors at 1950mm centres	Hilti HUS-HR 8 Anchors at 1300mm centres

* - Spacing dictated by maximum span of section allowed.

Table 5.4 Fixing into masonry wall:

50x25	Wind Region A	Wind Region B	Wind Region C
Solid clay brick	Hilti HUS-HR 8 Screw Anchors at 2500mm centres	Hilti HUS-HR 8 Screw Anchors at 1500mm centres	Hilti HUS-HR 8 Screw Anchors at 1000mm centres
Solid Sand Lime Brick	Hilti HUS-HR 6 Screw Anchors at 1500mm centres	Hilti HUS-HR 6 Screw Anchors at 940mm centres	Hilti HUS-HR 6 Screw Anchors at 640mm centres
Aerated Concrete Block	Hilti HUS-HR 6 Screw Anchors at 500mm centres	Hilti HUS-HR 6 Screw Anchors at 310mm centres	Hilti HUS-HR 6 Screw Anchors at 200mm centres

6. 75x25 Batten Fixing Requirements

Table 6.1 Fixing into steel stud wall:

75x25	Wind Region A	Wind Region B	Wind Region C
Steel stud 0.55BMT	Buildex #14-12 CyclonicZips at 900mm centres	Buildex #14-12 CyclonicZips at 560mm centres	Buildex #14-12 CyclonicZips at 380mm centres
Steel stud 0.75BMT	Buildex #14-12 CyclonicZips at 900mm centres	Buildex #14-12 CyclonicZips at 560mm centres	Buildex #14-12 CyclonicZips at 380mm centres
Steel stud 1.20BMT	Buildex #14-12 CyclonicZips at 900mm centres	Buildex #14-12 CyclonicZips at 560mm centres	Buildex #14-12 CyclonicZips at 380mm centres

Table 6.2 Fixing into timber stud wall:

75x25	Wind Region A	Wind Region B	Wind Region C
F7 Timber stud Pine	Buildex #14-10 Type 17 Screw at 900mm centres	Buildex #14-10 Type 17 Screw at 560mm centres	Buildex #14-10 Type 17 Screw at 380mm centres
F17 Timber stud Hardwood	Buildex #14-10 Type 17 Screw at 900mm centres	Buildex #14-10 Type 17 Screw at 560mm centres	Buildex #14-10 Type 17 Screw at 380mm centres

Table 6.3 Fixing into concrete wall:

75x25	Wind Region A	Wind Region B	Wind Region C
Concrete ≥ Grade N25	Hilti HUS-HR 8 Anchors at 1500mm centres	Hilti HUS-HR 8 Anchors at 950mm centres	Hilti HUS-HR 8 Anchors at 650mm centres

Table 6.4 Fixing into masonry wall:

75x25	Wind Region A	Wind Region B	Wind Region C
Solid clay brick	Hilti HUS-HR 8 Screw Anchors at 1200mm centres	Hilti HUS-HR 8 Screw Anchors at 750mm centres	Hilti HUS-HR 8 Screw Anchors at 500mm centres
Solid Sand Lime Brick	Hilti HUS-HR 6 Screw Anchors at 700mm centres	Hilti HUS-HR 6 Screw Anchors at 450mm centres	Hilti HUS-HR 6 Screw Anchors at 300mm centres
Aerated Concrete Block	Hilti HUS-HR 6 Screw Anchors at 200mm centres	Hilti HUS-HR 6 Screw Anchors at 150mm centres	Hilti HUS-HR 6 Screw Anchors at 100mm centres

7. 100x25 Batten Fixing Requirements

Table 7.1 Fixing into steel stud wall:

100x25	Wind Region A	Wind Region B	Wind Region C
Steel stud 0.55BMT	Buildex #14-12 CyclonicfZips at 530mm centres	Buildex #14-12 CyclonicfZips at 330mm centres	Buildex #14-12 CyclonicfZips at 220mm centres
Steel stud 0.75BMT	Buildex #14-12 CyclonicfZips at 530mm centres	Buildex #14-12 CyclonicfZips at 330mm centres	Buildex #14-12 CyclonicfZips at 220mm centres
Steel stud 1.20BMT	Buildex #14-12 CyclonicfZips at 530mm centres	Buildex #14-12 CyclonicfZips at 330mm centres	Buildex #14-12 CyclonicfZips at 220mm centres

Table 7.2 Fixing into timber stud wall:

100x25	Wind Region A	Wind Region B	Wind Region C
F7 Timber stud Pine	Buildex #14-10 Type 17 Screw at 530mm centres	Buildex #14-10 Type 17 Screw at 330mm centres	Buildex #14-10 Type 17 Screw at 220mm centres
F17 Timber stud Hardwood	Buildex #14-10 Type 17 Screw at 530mm centres	Buildex #14-10 Type 17 Screw at 330mm centres	Buildex #14-10 Type 17 Screw at 220mm centres

Table 7.3 Fixing into concrete wall:

100x25	Wind Region A	Wind Region B	Wind Region C
Concrete ≥ Grade N25	Hilti HUS-HR 8 Anchors at 900mm centres	Hilti HUS-HR 8 Anchors at 560mm centres	Hilti HUS-HR 8 Anchors at 380mm centres

Table 7.4 Fixing into masonry wall:

100x25	Wind Region A	Wind Region B	Wind Region C
Solid clay brick	Hilti HUS-HR 8 Screw Anchors at 720mm centres	Hilti HUS-HR 8 Screw Anchors at 450mm centres	Hilti HUS-HR 8 Screw Anchors at 300mm centres
Solid Sand Lime Brick	Hilti HUS-HR 6 Screw Anchors at 430mm centres	Hilti HUS-HR 6 Screw Anchors at 270mm centres	Hilti HUS-HR 6 Screw Anchors at 180mm centres
Aerated Concrete Block	Hilti HUS-HR 6 Screw Anchors at 140mm centres	<i>Not Recommended</i>	<i>Not Recommended</i>

8. 150x25 Batten Fixing Requirements

Table 8.1 Fixing into steel stud wall:

150x25	Wind Region A	Wind Region B	Wind Region C
Steel stud 0.55BMT	Buildex #14-12 CyclonicZips at 250mm centres	Buildex #14-12 CyclonicZips at 150mm centres	Buildex #14-12 CyclonicZips at 100mm centres
Steel stud 0.75BMT	Buildex #14-12 CyclonicZips at 250mm centres	Buildex #14-12 CyclonicZips at 150mm centres	Buildex #14-12 CyclonicZips at 100mm centres
Steel stud 1.20BMT	Buildex #14-12 CyclonicZips at 250mm centres	Buildex #14-12 CyclonicZips at 150mm centres	Buildex #14-12 CyclonicZips at 100mm centres

Table 8.2 Fixing into timber stud wall:

150x25	Wind Region A	Wind Region B	Wind Region C
F7 Timber stud Pine	Buildex #14-10 Type 17 Screw at 250mm centres	Buildex #14-10 Type 17 Screw at 150mm centres	Buildex #14-10 Type 17 Screw at 100mm centres
F17 Timber stud Hardwood	Buildex #14-10 Type 17 Screw at 250mm centres	Buildex #14-10 Type 17 Screw at 150mm centres	Buildex #14-10 Type 17 Screw at 100mm centres

Table 8.3 Fixing into concrete wall:

150x25	Wind Region A	Wind Region B	Wind Region C
Concrete ≥ Grade N25	Hilti HUS-HR 8 Anchors at 420mm centres	Hilti HUS-HR 8 Anchors at 260mm centres	Hilti HUS-HR 8 Anchors at 180mm centres

Table 8.4 Fixing into masonry wall:

150x25	Wind Region A	Wind Region B	Wind Region C
Solid clay brick	Hilti HUS-HR 8 Screw Anchors at 340mm centres	Hilti HUS-HR 8 Screw Anchors at 200mm centres	Hilti HUS-HR 8 Screw Anchors at 140mm centres
Solid Sand Lime Brick	Hilti HUS-HR 6 Screw Anchors at 200mm centres	Hilti HUS-HR 6 Screw Anchors at 120mm centres	<i>Not Recommended</i>
Aerated Concrete Block	<i>Not Recommended</i>	<i>Not Recommended</i>	<i>Not Recommended</i>

For Magryn & Associates Pty. Ltd.



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Attachments:
- SC19470