Thermal Expansion & Wall Requirements

SGA Architects. ©Simon Devitt

Designed to move with New Zealand

Nu-Wall aluminium cladding is designed to perform across seismic zones and shifting temperatures. This guide outlines the key requirements for framing, board alignment, and movement — ensuring a clean finish and long-term performance.

Understanding Thermal Movement in Aluminium Cladding

Aluminium reacts quickly to temperature changes, expanding and contracting in a process known as thermal expansion. This movement is consistent and expected — but it must be carefully managed in cladding design.

Compared to materials like timber or fibre cement, aluminium has a higher thermal expansion coefficient which is generally accepted as 1mm per 1m. Over a 6–8 metre board, this can mean movement of up to 6–8mm, depending on the environment and installation orientation. Allowing for this ensures the system performs as

Why it matters?

If thermal movement is restrained through rigid fixings or improper detailing — it can result in:

- Visual distortion such as bowing
- Stress concentration at fixings
- Unwanted expansion noise
- Long-term fatigue or fastening failure

Nu-Wall System Design

The Nu-Wall cladding system is engineered to manage this thermal movement through a freeboard allowance built into the profile design and fixing methodology. Key components include:

1. **CLIP-FIXED SYSTEM**
   All boards are installed using proprietary Nu-Wall fixing clips (e.g. NC203, NC232F) which allow boards to expand and contract within the clip's restraint zone.

2. **BASE-SEATED INSTALLATION**
   Boards are seated in a base channel (NC134P), enabling unidirectional movement — upward for vertical cladding, longitudinal for horizontal cladding.

3. **CONTROLLED CLEARANCE ZONES**
   Critical clearances (e.g. 10mm to flashing) and movement indicators (e.g. 0.5mm nibs) ensure that movement occurs as intended, without visual compromise.

Together, these details maintain alignment, prevent stress loading, and ensure the finished cladding maintains its form and function over the lifetime of the structure — regardless of daily or seasonal temperature variation.

nu-wall CLADDING

1. Framing Straightness

Nu-Wall cladding is only as straight as the framing and cavity battens behind it. A well-aligned frame is critical to achieving the crisp finish Nu-Wall is known for.

- **General straightness** must meet NZS3604 — no more than 5mm deviation over 10m.
- **Board-end tolerance** is tighter: no more than 2mm deviation in the final 500mm (whether installed horizontally or vertically).
- **Overbuilt corners or flashing tape buildup** can throw things out of alignment. Reduce the cavity batten thickness to bring it back in line.
- If this isn't corrected, boards may flare or visually bow — especially noticeable in raking light.

Frame Straightness Tolerances

ITEM	TOLERANCES
Deviation from the position shown on the plan for a building	15mm
Deviation from vertical	15mm per 2 storey height (5mm per 2.4m)
Deviation from vertical for buildings in excess of 2 full storeys	20mm
Relative displacement between load bearing walls in adjacent storeys intended to be in vertical alignment	5mm
Deviation from line in plan A. In any length up to 10m B. In any length over 10m	 5mm 10mm total
Deviation from horizontal A. In any length up to 10m B. In any length over 10m	 5mm 10mm total
Straightness of corners (where 2 walls meet at right angles) Other studs (gradual bow)	2mm in 2.4m in both studs 6mm in 2.4m
Wall framing: A. At mid-height under 3m long horizontal straight edge B. At mid-heigh under 1.3m long horizontal straight edge	 6mm gradual bow 1.5mm out of line

Reworked table from NZS3604.

MEASUREMENT SPAN	PERMISSIBLE DEVIATION	RELEVANT STANDARD
10 metres (NZS3604 guidance)	±5mm	NZS3604 Table 2.1
Final 500mm of board (Nu-Wall)	≤2mm deviation	Nu-Wall requirement

Critical Tolerances & Installation Information

- The final 500mm of board alignment is visually critical.
- Deviations beyond 2mm will result in visible board flaring.
- Typically, misalignment is caused by a build-up of back flashings and tapes around corners and windows. If this build-up causes the cladding face to deviate more than 2mm over the final m of board length, then the cavity batten at the offending misalignment will need to have its thickness reduced to compensate.
- Where back flashings or tape build-up causes a misalignment, cavity battens should be planed or packed to maintain a true face line.
- If the batten is not thicknessed to alignment, flaring of the board will be visible.
- Nu-Wall have 18/20mm single castellated battens available for ordering to support the best quality outcome for your project. These can be ordered directly from Nu-Wall.

2. Corners

Nu-Wall's two-piece corner system (NC107/NC109) allows for minor variation — up to 3° either side of square (87–93°). Outside this range you'll need a custom-folded 'W' corner flashing (see detail NW-VOC-042-02).

CORNER TYPE	ACCEPTABLE RANGE	NOTES
Nu-Wall NC107 / NC109	87° – 93°	2-piece internal/external corner system
Custom Folded 'W' Flashing	Required outside range	Use for corners outside the 87–93° range

3. Thermal Movement Consideration

Like all metal cladding, aluminium expands and contracts with temperature. Nu-Wall's clip system is engineered to allow for this — absorbing movement so your cladding stays intact and aligned.

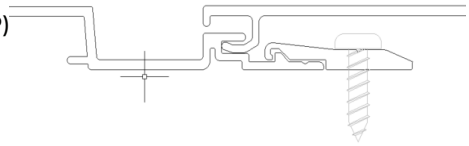
Installation Instructions
Don't fix boards directly to framing (except where noted below).
Let them float. That's what keeps the system stress-free.

BOARD LENGTH	EXPECTED THERMAL MOVEMENT
1 metre	±1mm
6 metres	±6mm
8 metres	±8mm

Important
This movement is absorbed by the Nu-Wall Clip System. Direct fixing is not permitted except in clearly specified instances (e.g. ripped end boards or window notches).

4. Vertical Cladding Installation

- **Boards sit in the base channel (NC134P)** and move **upwards** with temperature.
- **Movement rate** is around **1mm per metre of board** — so expect up to 8mm shift on an 8m board.
- **Start fixing** with the first clip at the **nog above the base channel (NC134P)** (about 600mm up). The base doesn't need a clip — it's already secured.
- Leave **10mm clearance** to the underside of the top of wall termination flashing (NC247T/NC248). There's a **0.5mm guide nib** on the flashing to help position the board end precisely.
- Once clipped in, boards should still move vertically (with some effort) — this is intentional.
- Use only Nu-Wall clips: **NC232F Starter Clip or NC203F Fixing Clips and Nu-Wall supplied CSK screws.**
  Align them with the edge of the boards centred over the movement nib.



INSTALLATION ELEMENT	REQUIREMENT
Base of board	Seated in base channel (NZ134P) (no clip required)
First fixing clip location	At first nog above base channel (NC134P) (~600mm up)
Clearance to cap flashing	10mm from board top to underside of flashing
Movement indicator (visual guide)	0.5mm nib on cap back flashing face
Clip alignment	Fixing Clip (NC203F) must be centred over movement nib and square to board
Horizontal Boards	Must be screwed to the centre of each horizontal board

5. Fixing and Attachments

Never screw boards directly to the structure — except:

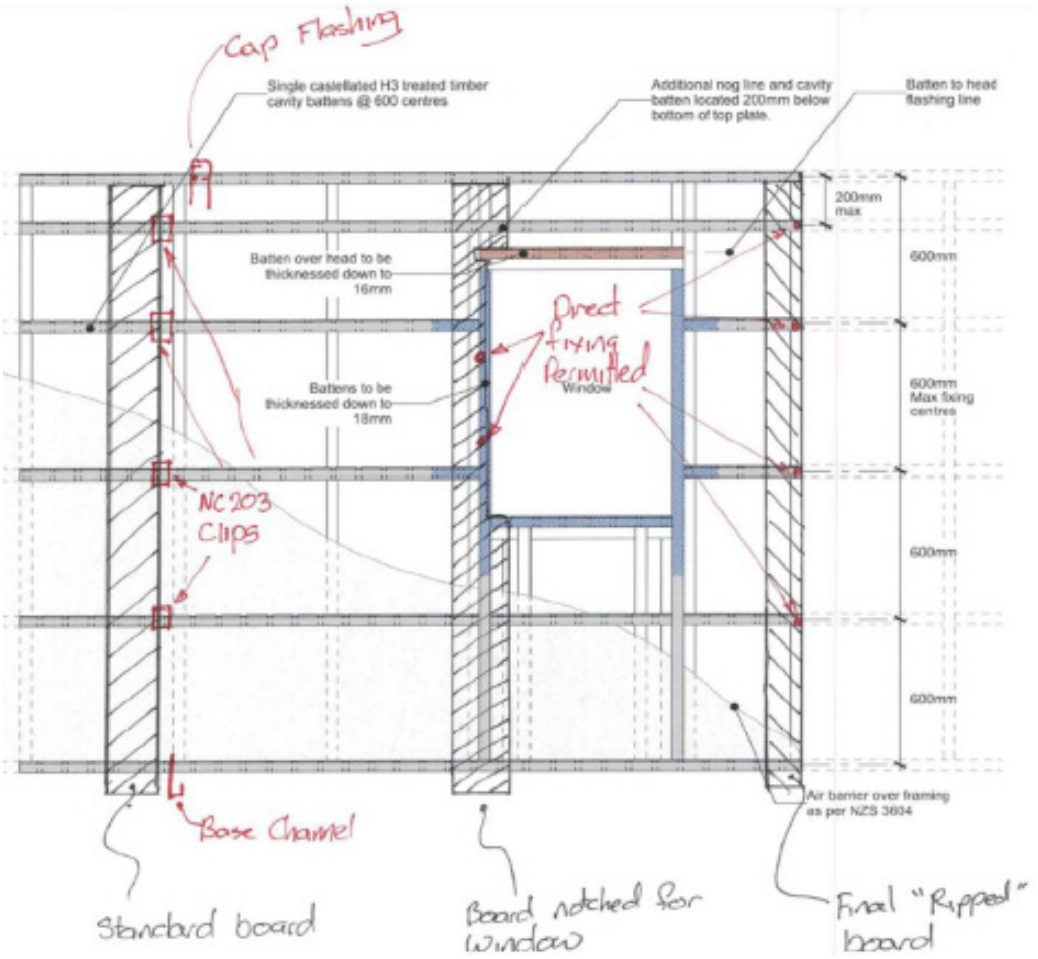
- Final ripped board
- Large window jamb notches

For fittings (fascia, gutters, etc.):

- Lightweight - Fix to the board only, not the structure.
- Heavyweight - Use grommeted oversize holes so boards can still move freely.

For screens, decorative battens or bolt-ons:

- Don't clamp the boards. Use lag screws through oversize holes if needed.
- Always allow for movement. When in doubt, give our team a bell.



Need support? We're here.

From concept to completion, our technical team are here to support your project and help you through the project ensuring all items are addressed appropriately

- Onsite builder training
- 3D install videos
- CAD details and documentation
- Design and detail peer reviews

For more information visit www.nuwall.co.nz or call our technical support team on 0800 689 255.