

1. Purpose

The purpose of this practice note is to provide guidance for building consent applicants wanting to install wet installed or water repellent dry fibre insulation into either internal or external wall cavities of existing buildings. This practice note excludes the use of non-repellent organic fibres such as wool and paper.

2. Legislative requirements

A building consent is required when insulation is injected into the external wall of a building (refer Schedule 1 exemption 13; under the BA04 this building work is considered an alteration to an existing building (s.112).

Insulation is injected via a series of holes drilled through either internal or external wall cavities. Insulation is usually only inserted into external walls but internal walls may also be insulated. In the case of external walls, if the hole exceeds 300mm in diameter, it is considered restricted building work (RBW) and licensed building practitioners (LBP) must undertake the design and carry out the work.

3. Background information

The installation of insulation into wall cavities in existing buildings is an alternative solution; examples of this product include foam, mineral fibre and other such products.

Retrofitting insulation fundamentally changes the way in which the un-insulated wall performs, particularly in respect to external moisture.

If moisture enters a building which is not insulated it will usually dry through ventilation, with minimal damage. However, once insulated, moisture added with wet installed products during installation, may delay the drying process of structural timber and could lead to decay.

This means that any defects in the existing building may result in the building failing to meet the performance requirements of s.112.

Defects include but are not limited to:-

- Damage to the external wall cladding or wall framing
- Poor maintenance of the external cladding
- Incompatibility of materials, e.g. electrical cabling

When processing the application, we must first identify which code clauses affect the building work.

- B1 Structure
- B2 Durability
- C1-7 Fire safety
- E2 External moisture
- F2 Hazardous
- F7 Warning systems
- G9 Electrical
- H1 Energy efficiency

Then because it is an alteration to an existing building, we must consider both the new building work and its impact on the performance of the existing building.

4. Processing the application

The following items must be considered when processing an application for building consent:-

1. What is the new building work and how will it comply with the relevant clauses of the NZ Building Code; and

Code clause	New work (considerations)	Compliance
B1 Structure	Holes drilled in cladding / lining	Size of hole <300mm
B2 Durability	Holes drilled in cladding / lining	Building remains weather tight for no less than 15 years
C1-7 Fire safety	Heat transfer from fixed appliances	Appliance not affected by installation of injected material
	Proximity of other buildings (FRR)	No increase to fire load
E2 External moisture	Holes drilled in cladding / lining Cavity filled with insulation	Moisture levels have returned to equilibrium (wet installed products) Building is weathertight / holes sealed
F2 Hazardous	Fumes such as urea formaldehyde released by injected material	Occupants not harmed by inhaling harmful solids, liquids or gases
F7 Warning systems	Appropriate means of detection and warning of fire	Smoke alarms installed
G9 Electrical	Compatibility of electrical cables with polystyrene insulation materials	Electrical wiring not compromised
H1 Energy efficiency	Type (wet or dry) and method (injected or sprayed) of insulation	Thermal performance of building not reduced

2. The performance of the existing building and compliance with the relevant clauses of the NZ Building Code (to the extent required by s.112)
 - the current and future performance of the structural integrity of the building; and
 - the current and future performance of the building envelope

Note: Predicting the future performance of the building is complicated and requires a thorough visual inspection of the existing building. A base building report (refer definition below) on the current and future performance of the building must accompany the application for building consent.

5. Consent fees

- All applications must be accompanied by the fixed fee, this fee covers the processing and issuing of the Code Compliance Certificate.

6. Consent documentation

The following documentation is required to accompany an application for building consent:-

- Building consent application form
- Lodgement checklist-residential
- Floor plan and elevations detailing
 - which external walls are to be insulated
 - which external walls moisture readings were taken from (location, number and moisture content readings to be provided)

- location of windows and doors
- location of smoke alarms
- location of heating appliances
- Installation methodology, including:-
 - building risk assessment including risk profile of highest risk elevation
 - schedule of moisture readings
 - base building assessment report including any pre existing defects and remediation
 - how installation process is to be undertaken, penetrations of external cladding remediated, and repainting or partial repainting of external walls (injection holes)
 - how compliance with identified code clauses is demonstrated
- Signed form “Agreement to provide Producer Statement Construction (PS3)” - Form AC2326.

Application form these can be downloaded from Councils website; all sections must be completed including the Means of Compliance section. AC2103 – Residential application for a project information memorandum and/or building consent

Lodgement checklist – Residential (AC1011) must accompany the application form. Relevant responses are required to indicate what documentation is being submitted with the application.

Moisture readings to identify equilibrium; invasive moisture readings must be taken from external walls around the building. Plans submitted for building consent must identify the recorded moisture level and location for each reading taken. *It is preferable that moisture readings are recorded on elevations as this allows us to identify where the readings have been taken from i.e. bottom plate, beside window, etc.*

Note

- *Checking the moisture content of framing **before** work commences ensures that any damage to the building is identified and remediated before work commences (required for both wet and dry installations).*
- *Checking the moisture content **after** the work is completed confirms that framing has returned to equilibrium (only required for wet installations)*

Elevations showing the location of doors and windows and the type of cladding; to identify where moisture readings / invasive testing have and will be conducted from *(to demonstrate moisture levels prior to installation) and (to demonstrate moisture levels have dissipated after installation)*. Black and white photos printed onto A4 / A3 paper maybe be used in lieu of plans; black and white copies are required because colour photos do not scan clearly.

Floor plan must include details of the layout of the building including the location of doors and windows. The floor plan must also show which walls insulation will be inserted into, and the position of smoke alarms.

Note: Moisture meters must be used to determine moisture contents. Moisture detection unit (MDU) reports may be used where these are in existence.

Building risk assessment means an assessment briefly describing the risks associated with the building. (This risk analysis is similar to an E2 risk assessment and is attached to the base building report).

Risk elements include-

- wind zone
- number of stories
- roof / wall intersections
- eaves width
- envelope type and complexity
- deck / sub-floor design (i.e. airflow)

- presence of building paper
- permeability of cladding
- durability of framing timber (i.e. durable, native timber)
- insulation type (i.e. wet or dry)

Base building report means an assessment of the existing building following an inspection to determine if the existing building is suitable for insulation. These reports must be provided by the installer and must include information about any pre-existing defects and remediation proposed and report on the condition or otherwise of the following items:-

- electrical wiring (type and measures to protect fittings from filling with insulation; compatibility of insulation with wiring)
- fire rated walls
- fixed appliances (heating)
- smoke alarms
- structural stability
- internal moisture
- weathertightness (i.e. well maintained, free of cracks, needs painting, penetrations, reliance on sealants, etc)
- pre-existing defects and remediation proposed

The base building report must identify, which code clauses will be affected by the proposed building work; how the work will meet the mandatory provisions of those clauses (e.g. general information provided in support of achieving compliance) and any other specific information known about the building including moisture levels. The report should also detail the installation methodology.

Installation methodology

- How will electrical flush boxes be isolated to prevent insulation filling these spaces?
- Are electrical cables compatible with the insulating material? (*compatibility issues are generally only associated with foam or polystyrene materials*)
- How will the product be installed?
- How will the building be ventilated during and following installation? (*these issues are generally associated with products which include urea formaldehyde*)
- How will the holes be repaired?

Processing considerations:

Is the description of building work appropriate?
Does the base building report provide evidence of the current state of repair or maintenance of the building?
Have defects been identified and has a repair schedule been included as part of this application for building consent?
Do the floor or elevation plans identify which walls will be insulated?
Has a schedule of existing moisture levels been provided and do the plans identify where those readings were taken from?(To establish equilibrium)
Have fixed heating appliances been identified and fire and acoustic walls excluded as appropriate?
Has the location of smoke alarms been identified?
Has an agreement to provide a producer statement construction (PS3) – Form AC2326 been provided or will Council inspect the work?

7. Inspection

An inspection by the installer is required prior to the installation of any insulation; once the holes have been drilled, a second inspection (final) by the installer is required on completion of all work.

In lieu of inspections by Council, an agreement can be reached with Council for the installer to provide a producer statement construction (PS3) – Form AC2326. Note this agreement must be reached prior to the application for building consent being granted.

Producer statements will only be accepted in accordance with AC2301 Auckland Council Producer Statement Policy, which is available on our website.

In order for Council to accept a producer statement from an installer, the Installer must be able to demonstrate competency for the field of work proposed. If approved, details are recorded on Auckland Council's Producer Statement Register

On completion of the work, the following documentation is required to accompany the application for code compliance certificate (CCC)

- producer statement construction (PS3) Form AC2331 – Injected Wall Insulation Producer Statement (PS3) (where agreement is reached in lieu of an inspection); and
- compliance management report

Compliance management report means a report provided by the installer that confirms-

- invasive moisture testing has been carried out and moisture has returned to equilibrium (only required for wet installed insulation)
- holes have been properly repaired (plugged, sealed and painted)
- installation has not affected the ongoing compliance of the building

Note: Invasive moisture content readings must be recorded from the same location as those checked prior to submitting the application.

8. Post installation

When installing wet insulation, it is critical that the building is well-ventilated to ensure fumes and unpleasant odours released during the curing process, are removed.

9. Certification

Following receipt of the application for CCC and supporting documentation, a technical review of the information will be conducted. If the technical review is favourable, the CCC will be issued.

Technical review considerations:

Have all inspections been carried out and / or has a producer statement been supplied for all of the work by an approved author? (Council template must be used as it includes confirmation that smoke alarms have been installed – AC2331 – Injected Wall Insulation Producer Statement construction (PS3))

Has a completion report been provided in support of the work and does the report clearly identify walls, which have been insulated, and work that has been completed?

Does the completion report include a summary of moisture content level readings and have readings returned to equilibrium? (Only required for wet foam)

Equilibrium means moisture content levels pre-installation.

10. Reference material

Ministry of Building Innovation and Employment (MBIE) guidance on Building Code compliance for retrofitting insulation in external walls <http://www.building.govt.nz/building-code-compliance/h-energy-efficiency/h1-energy-efficiency/retrofitting-insulation-in-external-walls/>

New Zealand Building Code

Determinations published by MBIE including 2012/026; 2012/027; 2012/073; 2012/076 and 2012/077