

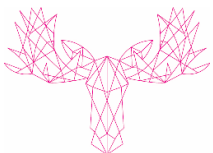
ROCKWOOL Stone Wool



Outright ROCKWOOL - ThermalRock S Compliance Path

Contents

1. PURPOSE	1
2. CLIENT STATEMENT	1
3. COMPLIANCE STATEMENT	1
4. PERFORMANCE IN RELATION TO THE NEW ZEALAND BUILDING CODE.....	4



1. PURPOSE

This compliance statement, produced by Oculus Architectural Engineering Limited, is an evaluation of the following product's ability to fulfil the following requirements of the New Zealand Building Code (NZBC) based on the available international performance documentation referenced below:

- B1 Structure
- B2 Durability
- C3 Fire affecting areas beyond the source
- E2 Exterior Moisture
- E3 Internal Moisture
- H1 Energy Efficiency

This compliance statement has been produced assuming the product will be utilised in accordance with the manufacturer's details in the application described below.

2. CLIENT STATEMENT

ROCKWOOL Stone Wool products are made of basalt, a volcanic stone, which is a very abundant natural resource. ROCKWOOL Stone Wool products are non-combustible with a melting point more than 1000°C. They are particularly suitable for thermal insulation, fire protection and sound reduction or absorption. ROCKWOOL Stone Wool is inorganic and contains no nutritious substance. Therefore it will not be attacked by microorganisms. Stone Wool will not rot and does not attract vermin. No CFCs, HFCs, HCFCs, or asbestos are used in the manufacture of ROCKWOOL Stone Wool products.

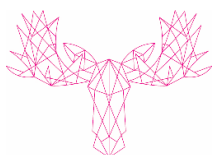
ROCKWOOL Stone Wool is ideal for commercial façade insulation. Combining exceptional fire performance, durability and high acoustic and insulation performance, it is excellent as continuous, external Outsulation. ROCKWOOL Stone Wool products are high-density, which makes them extremely excellent at noise reduction and sound absorption. The product is also vapour permeable, and dimensionally stable, meaning its performance is unchanged and keeps its shape and toughness in all conditions.

3. COMPLIANCE STATEMENT

Outright Insulation ROCKWOOL Stone Wool insulation is a durable product for use in external insulation applications. The following documents and statements describe the performance, composition, and applications for ROCKWOOL Stone Wool insulation. When considered within the framework of the New Zealand Building Code, ROCKWOOL Stone Wool insulation is a suitable product for New Zealand's building industry.

Compliance documentation provided by Outright Insulation:

- Rockwool Asia – Thermal Rock S – Data Sheet
- Rockwool Asia – Environmental Product Declaration (EPD)

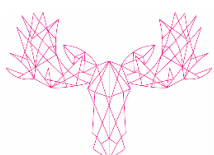
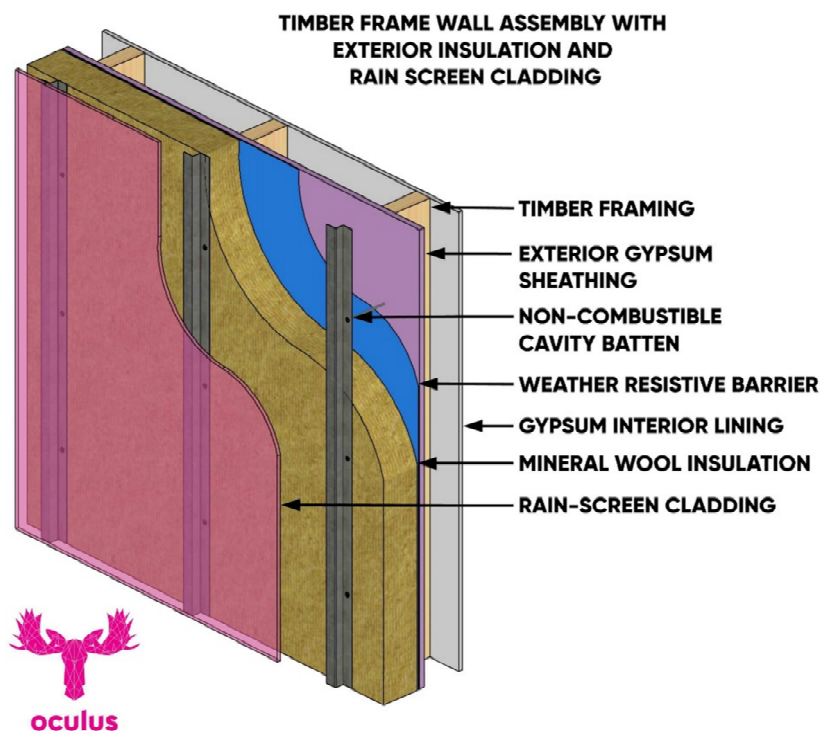


- Rockwool Asia – Classification for Non-Combustibility
- Outright Continuous Insulation – Rockwool Product Overview
- Rockwool LTD – BBA 93/2884 – Rockwool Cavity Wall Insulation
- Rockwool LTD – BBA 94/3079 Rockwool Built in Cavity Wall Insulation Batts
- Rockwool LTD – BBA 17/5402 Rockwool Insulation Systems – For use in Rainscreen Cladding Systems
- Rockwool LTD – BBA 17/5402 Rockwool Insulation Systems – For use in Timber or Steel Frame Constructions
- A Designer's Guide: Outsulation for High-Performance Walls

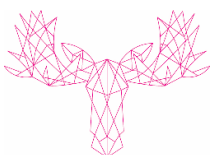
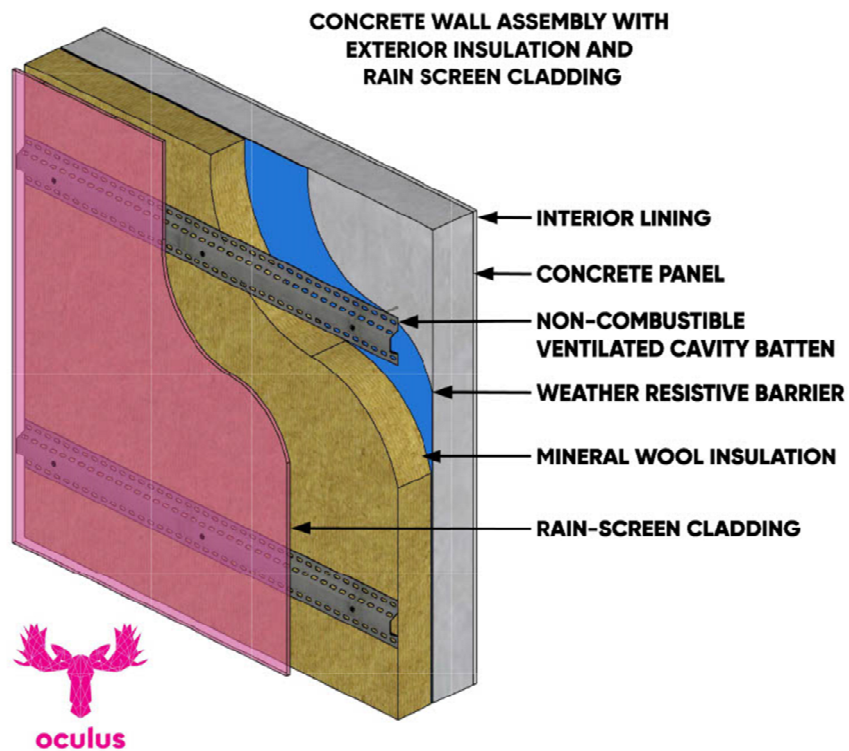
Typical Product Installation:

The ROCKWOOL Stone Wool can be installed in many different enclosure assemblies as an insulation material. There are further installation procedure requirements set out in the UK BBA 93-2884. For the purpose of this compliance statement, ROCKWOOL Stone Wool is specific to externally insulated rainscreen cavity installations, examples of which are shown below:

- Rainscreen cladding cavity installation – In this assembly, the insulation is installed over a timber or steel framing structure over either a rigid air barrier or flexible weatherproof membrane. The insulation is then installed outside of the buildings weathertightness line. A rainscreen water-shedding layer installed outside of the insulation separated by a cavity typically framed out with vertical cavity battens.



- Precast/in situ concrete or masonry block – In this assembly the insulation is installed over the concrete or masonry substrate with a weather resistive barrier between. Mechanical fasteners are installed to secure the board to the substrate. A rainscreen cladding system installed over the top of this to improve weathertightness by creating a water shedding layer separated from the structural wall.



4. PERFORMANCE IN RELATION TO THE NEW ZEALAND BUILDING CODE

The NZBC Clauses and applicable Performance Requirements that are included within the scope of this review are listed in Table 1. Demonstration that a product or assembly can meet the Performance Requirements of the clause ensures that the Functional Requirement and the Objective of the clause will be met.

Table 1: NZBC Clauses and Applicable Performance Requirements

NZ Building Code Clause	Functional Requirement	Applicable Performance Requirements within scope of review
B1 Structure	B1.2 <i>Buildings, building elements and sitework</i> shall withstand the combination of loads that they are likely to experience during <i>construction or alteration</i> and throughout their lives.	B1.3.2 and B 1.3.3 a), b), f), h), m)
B2 Durability	B2.2 <i>Building materials, components and construction methods</i> shall be sufficiently durable to ensure that the <i>building</i> , without reconstruction or major renovation, satisfies the other functional requirements of this code throughout the life of the <i>building</i> .	B2.3.1 a), b), c) and B2.3.2 a), b)
C3 Fire	C3.2 <i>Buildings</i> with a <i>building height</i> greater than 10 m where upper floors contain sleeping uses or <i>other property</i> must be designed and constructed so that there is a low probability of external vertical fire spread to upper floors in the <i>building</i> .	C3.5 and C3.7
E2 External moisture	E2.2 <i>Buildings</i> must be constructed to provide <i>adequate</i> resistance to penetration by, and the accumulation of, moisture from the outside.	E2.3.1 – E2.3.7
E3 Internal moisture	E3.2 <i>Buildings must be constructed to avoid the likelihood of—</i> <i>a) fungal growth or the accumulation of contaminants on linings and other building elements; and</i> <i>b) free water overflow penetrating to an adjoining household unit; and</i> <i>c) damage to building elements caused by the presence of moisture.</i>	E3.3.1
H1 Energy efficiency	H1.2 <i>Buildings</i> must be <i>constructed</i> to achieve an <i>adequate</i> degree of energy efficiency when that energy is used for— <i>a) modifying temperature, modifying humidity, providing ventilation, or doing all or any of those things (does not apply to assembly service buildings, industrial buildings, outbuildings, or ancillary buildings); or</i> <i>b) providing hot water to and from sanitary fixtures or sanitary appliances, or both; or</i> <i>c) providing artificial lighting (applies only to commercial buildings and communal non-residential buildings whose floor area is greater than 300 m²)</i>	H1.3.1 and H1.3.3

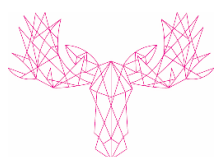
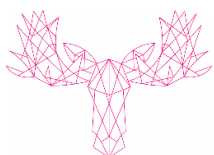
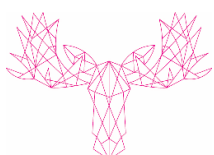


Table 2: Method of Compliance to NZBC Clauses with Applicable Performance Requirements

NZBC Clause	Method of Compliance with Applicable Performance Requirements
<p>B1 Structure</p>	<p>Product Certification and Alternative Solution:</p> <ul style="list-style-type: none"> • Structural design actions to AS/NZS 1170 are applied in conjunction with appropriate material standards to establish compliance with Clause B1. A summary of the structural design actions is included in Section 4 – Building Enclosure Performance Requirements. • The specific structural design actions considered in this compliance report are: <ul style="list-style-type: none"> ○ Wind ○ Seismic ○ Gravity/self-weight <p>Compliance is demonstrated by:</p> <ul style="list-style-type: none"> • Product Certification – UK BBA Certificate, Environmental Product Declaration • Manufacturer’s product data sheets, technical manuals, span tables, installation guides <p>When installed within a wall assembly, the insulation board must be secured to the building, and it must enable the transfer of loads applied to the cladding system back to the main structure. There are a few ways to achieve this, and all are dependent on project-specific design of the cladding:</p> <ul style="list-style-type: none"> • Fasteners through the insulation into the structure using battens compressing the insulation to create a truss system. • Clips or z-girts holding battens supporting the cladding and restraining the insulation • Insulation secured with screws/fasteners separate from the structure of the cladding. <p>The insulation is semi-flexible and installed in sections and as such will be able to accommodate inter-storey drift caused in a seismic event.</p> <p>ROCKWOOL Stone Wool insulation will vary in weight due to different thicknesses and densities of different products, but generally will have a density of 40-140kg/m³. This weight is able to be fixed back to the supporting structure through mechanical fasteners as outlined in the technical specifications and fixing methodologies.</p> <p>This product will not contribute to the structural performance of the timber frame. The structure of the project would remain the responsibility of the structural engineer and as such is out of the scope of this document.</p>



<p>B2 Durability</p>	<p>B2/AS1 and B2/VM1: Compliance is demonstrated by:</p> <ul style="list-style-type: none"> As per B2/VM1, verification that the durability of a building element complies with B2.3.1 and B2.3.2 can be by proof of: <ul style="list-style-type: none"> In-service history Comparable performance of similar building elements Product Certification – Where the use of a product is outside the scope of the product certification due to height of building (>10 m), engineering judgement is made regarding whether a comparable durability could reasonably be expected based on the project use/conditions. <p>ROCKWOOL Stone Wool insulation, when installed properly within the wall assembly, cannot be accessed for continuous maintenance. It is durable to meet the lifetime requirements of the wall assembly in which it is installed. For example, when installed behind brick masonry, of which a 50-year durability expectation is known, the ROCKWOOL Stone Wool will have a life span to match that of the wall assembly's life durability.</p> <p>The product BBA certificate describes the product ROCKWOOL Stone Wool as “unaffected by normal conditions in a wall. It is durable, rot-proof, water resistant and sufficiently stable to remain effective as insulation for the life of the building.” suggesting the product is accepted as sufficiently durable to meet the requirements of the UK building regulations.</p> <p>ROCKWOOL Stone Wool is made of entirely non-organic material and therefore is under no threat from organic degradation or destruction from vermin. It is water resistant (discussed further in code clause E2) and therefore degradation from water is not expected. Due to its composition and tested performance, in addition to international use, we are reasonably satisfied that ROCKWOOL Stone Wool will meet the necessary performance requirements of B2 Durability.</p>						
<p>C3 Fire affecting areas beyond the fire source</p>	<p>C/AS2, Section 5.8</p> <p>Rockwool Stone Wool Insulation has an A1 reaction to fire classification to BS EN 13501-1:2007 which requires test results from EN ISO 1182 and EN ISO 1716 test methods. This reaction deems a classification of 'Non-Combustible' in accordance with NZBC C/VM2.</p> <table border="1" data-bbox="411 1339 1471 1433"> <thead> <tr> <th>Test</th> <th>Test Result</th> <th>Standard</th> </tr> </thead> <tbody> <tr> <td>Fire Performance</td> <td>Non-combustible /Euro Class A1 (without facing)</td> <td>EN 13501-1</td> </tr> </tbody> </table> <p>ROCKWOOL Stone Wool insulation is typically used as fireproofing, as it is extremely resilient to fire and can withstand temperatures of up to 1000°C.</p> <p>Due to A1 classification there is no restriction in building height and it is acceptable for use in buildings ≤10m , > 10m and <25m , and ≥ 25m.</p>	Test	Test Result	Standard	Fire Performance	Non-combustible /Euro Class A1 (without facing)	EN 13501-1
Test	Test Result	Standard					
Fire Performance	Non-combustible /Euro Class A1 (without facing)	EN 13501-1					
<p>E2 External Moisture</p>	<p>Alternative Solution</p> <ul style="list-style-type: none"> Rockwool Stone Wool Insulation in itself is not a water barrier and does not contribute to the functional requirements of E2 External Moisture. However, when installed as a part of a wall assembly as outlined in section 2 of this report, it acts as a part of a system that is 						



- well designed to the 4 Ds of weathertightness and sufficient to meet the functional requirements of E2 by deflecting water away from reaching any vulnerable locations.
- While the insulation board is advertised as being water resistant, this is in relation to its own durability, as it is not intended to form a weathertight barrier around the building.
 - As a result, edges and fixings etc. may provide a passage for water to bypass the insulation. Where this does occur, the sheathing board and/or building wrap are installed with taped/lapped seams and sealed penetrations behind the insulation to create a continuous weather resistant barrier suitable to meet the requirements of E2.

Technical Parameters for Rockwool Stone Wool Insulation

Test	Test Result	Standard
Water Vapour Absorption (Moisture Resistance)	< 0.04%, by volume	ASTM C1104/C1104M
Water Absorption (Partial Immersion)	< 0.5 kg/m ²	EN 1609

The Rockwool Stone Wool insulation product is not required to meet E2 External Moisture in itself, however with its water-resistant properties, it may contribute to the functional requirements of the code clause within a full wall assembly when installed per the technical requirements.

E3 Internal Moisture

Alternative Solution

- Where the insulation board is installed outside of the sheathing board and building wrap, the internal surfaces within the stud frame should remain above the dew point when considering wintertime inside to out vapour drive. This should ensure, that under normal operating conditions, condensation should not occur within the framing. This will ensure that damage to building components and fungal growth will not occur as a result of interior moisture therefore fulfilling the performance requirements of code clause E3. The insulation is also vapour permeable, and therefore will allow outward drying of any incidental water within the wall assembly.

H1 Energy Efficiency

H1/AS1 –

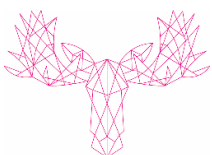
The product's BBA certificate lists a declared thermal resistance of:

Insulation Thickness (mm)	Thermal Conductivity (W/mK)
50 to 90	0.034
90 to 230	0.035

The primary purpose of the ROCKWOOL Stone Wool insulation is to reduce the rate of heat flow in an enclosure assembly reducing the rate at which heat is lost in the winter making the building easier to heat while reducing the rate heat flows into the building during the summer reducing the cooling load on HVAC systems.

The total assembly thermal resistance or R-value will depend on the thermal resistance of the other components in this assembly. For the wall assemblies shown above the insulation is likely to be the only component with a significant contribution to the assembly's thermal resistance and the insulation is installed as one continuous layer with nominal thermal bridges through the insulation in the form of ties and fixings.

Where installed in a manner similar to the typical installation details above we expect this product to improve the thermal performance and energy efficiency of a wall.



Subject to the project-specific design, As long as the insulation is installed per the manufacturer recommendations, Oculus Limited are satisfied on reasonable grounds that the product described above will meet the relevant provisions of the New Zealand Building Code.

Prepared by:



Eva Rowe
Graduate Building Enclosure Engineer

Reviewed by:



Peter Raimondo
Senior Building Enclosure Engineer, Oculus Architectural Engineering Ltd

