

Insulation

There is a wide range of insulation materials available on the New Zealand market. The most commonly used has been glasswool mat or blanket. However, there is now a wider range of products to consider such as:

- sheep's wool
- polyester
- wool/polyester blend
- polystyrene
- mineral wool
- macerated paper.

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| GLASSWOOL | |
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| Extraction and manufacture | |
| Impact of extraction | Glasswool insulation is made from up to 85% recycled glass. |
| Energy use | Significant amounts of energy are required in glasswool insulation manufacture, but this is offset by durability and low maintenance. Embodied energy of glasswool is quoted as 32.1 MJ/kg. |
| By-products/emissions | None known |
| Sourcing | |
| Material sources | Glasswool insulation is both manufactured in New Zealand from imported raw materials and imported (Thailand, Australia) as a finished ready to install product. |
| Availability | Glasswool insulation is readily available throughout NZ. |
| Cost | Glasswool is generally the lowest cost option. |
| Construction/installation | |
| Health and safety during construction/installation | Protective clothing (gloves, overalls) and masks are recommended during installation to protect against fibre/skin contact and from breathing in fibres. New glasswool is generally more operator friendly than in the past – it is no longer considered the risk it once was. |
| Uses | Glasswool insulation can be used in walls (fitted tight in framing cavities) and ceiling/ roof spaces (installed without gaps) as a blanket or mat. |
| Ease of installation | Correct installation is necessary to ensure no thermal bridges (gaps to the framing) are created. This is extremely important to maximise insulation value. |
| Performance | |
| Health and safety during life of building | Material can collect dust - use protective clothing and masks if working with existing insulation during renovations. |
| Expected durability (assuming correct installation and maintenance) | 50+ years |
| Moisture resistance | Glasswool is resistant to moisture but insulation value will be lost if it gets wet. |
| Rot, mould and corrosion | Glasswool will not rot. |

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| Thermal insulation | R-value depends on density and thickness of material and installation quality – see specific manufacturer’s literature. High performance glasswool insulation is available. Glasswool insulation is only effective if dry. |
| Sound insulation | Glasswool insulation may provide small benefit in reducing sound transmission through a wall. Special formulations are available for use in sound rated construction. |
| Fire performance | Glasswool insulation will not support combustion. |
| Waste disposal/recycling/re-use | |
| Re-use | Material can be reused provided protective clothing and breathing masks are used during removal and reinsertion. |
| Recycling | Glasswool insulation is not currently recycled. |
| Waste disposal | Glasswool is non-toxic but will not decompose. |

| WOOL | |
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| Extraction and manufacture | |
| Impact of extraction | Wool is a natural, renewable product. Insulation can be made from virgin and/or recycled wool. There are environmental concerns related to wool scouring operations. |
| Energy use | Embodied energy of recycled wool is quoted as 14.6 MJ/kg. |
| By-products/emissions | Nil |
| Sourcing | |
| Material sources | Wool insulation is made in New Zealand. |
| Availability | Wool insulation is readily available in major centres. |
| Cost | Wool insulation is higher cost than fibreglass. |
| Construction/installation | |
| Health and safety during construction/installation | There are no specific handling requirements for wool insulation. |
| Uses | Wool insulation is available for wall, ceiling and roof installation as a blanket or mat. |
| Ease of installation | Correct installation is necessary to ensure no thermal bridges (gaps to the framing) are created. This is extremely important to maximise insulation value. |
| Performance | |
| Health and safety during life of building | 50+ years. |
| Expected durability (assuming correct installation and maintenance) | Wool insulation must be kept dry in-service. It is resistant to moisture but insulation value is lost if wet. |
| Rot, mould and corrosion | Wool insulation may contain suppressants to resist insect attack. |
| Thermal insulation | R-value depends on density and thickness of material and installation quality – see specific manufacturer’s literature. Wool insulation is only effective if dry. |
| Sound insulation | Wool insulation may provide small benefit in reducing sound transmission through a wall. |
| Fire performance | Wool insulation must be separated or protected from sources of heat. |
| Waste disposal/recycling/re-use | |
| Re-use | Material can be re-used provided protective clothing and breathing masks are used during removal and reinsertion. |
| Recycling | Wool insulation can be cleaned and re-manufactured. |
| Waste disposal | Wool insulation will slowly decompose. |

| POLYESTER | |
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| Extraction and manufacture | |
| Impact of extraction | Polyester is a product of the petrochemical industry. |
| Energy use | Embodied energy of polyester insulation is quoted as 53.7 MJ/kg. |
| By-products/emissions | None known |
| Sourcing | |
| Material sources | Polyester insulation is locally made from imported raw products. |
| Availability | Polyester insulation is readily available in main centres. |
| Cost | Polyester insulation is more expensive than fibreglass. |
| Construction/installation | |
| Health and safety during construction/installation | There are no specific irritants currently identified. A dust mask is recommended during installation. |
| Uses | Polyester insulation is available for wall, ceiling and roof installation as a blanket or mat. |
| Ease of installation | Correct installation is necessary to ensure no thermal bridges (gaps to the framing) are created. This is extremely important to maximise insulation value. |
| Performance | |
| Health and safety during life of building | None currently identified |
| Expected durability (assuming correct installation and maintenance) | 50 plus years. |
| Moisture resistance | Polyester insulation is resistant to moisture but insulation value will be lost if wet. |
| Rot, mould and corrosion | Polyester insulation will not rot |
| Thermal insulation | R-value depends on density, thickness of material and installation quality – see specific manufacturer’s literature. Insulation is only effective if dry. |
| Sound insulation | Polyester insulation may provide small benefit in reducing sound transmission through a wall. |
| Fire performance | Polyester insulation must be separated or protected from sources of heat. |
| Waste disposal/recycling/re-use | |
| Re-use | Material may be removed and reused. |
| Recycling | No current data |
| Waste disposal | No current data |

| WOOL/POLYESTER BLEND | |
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| Extraction and manufacture | |
| Impact of extraction | Wool is a natural, renewable product. Insulation can be made from virgin and/or recycled wool. There are environmental concerns related to wool scouring operations. Polyester is a synthetic by-product of the petrochemical industry. |
| Energy use | A small amount of energy is used in manufacture. No specific embodied energy figures are available. |
| By-products/emissions | None currently known |
| Sourcing | |
| Material sources | Raw material is sourced from within and outside of New Zealand. |
| Availability | Wool-polyester insulation is available throughout New Zealand. |
| Cost | Costs for wool-polyester insulation are similar to fibreglass. |
| Construction/installation | |
| Health and safety during construction/installation | A dust mask is recommended during installation |
| Uses | Wool-polyester insulation is available as wall and ceiling blanket or mat insulation. |
| Ease of installation | Correct installation is necessary to ensure no thermal bridges (gaps to the framing) are created. This is extremely important to maximise insulation value. |
| Performance | |
| Health and safety during life of building | No issues currently identified |
| Expected durability (assuming correct installation and maintenance) | 50+ years |
| Moisture resistance | Wool-polyester insulation is not affected by moisture but should be kept dry in use. |
| Rot, mould and corrosion | Resistant |
| Thermal insulation | R-value depends on density, thickness of material and installation quality – see specific manufacturer’s literature. Insulation is only effective if dry. |
| Sound insulation | Wool-polyester insulation may assist in reducing sound transmission. |
| Fire performance | Wool-polyester insulation must be separated or protected from sources of heat. |
| Waste disposal/recycling/re-use | |
| Re-use | Product can be removed and reinstalled. |
| Recycling | Not known |
| Waste disposal | No specific requirements identified. |

| MINERAL WOOL | |
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| Extraction and manufacture | |
| Impact of extraction | Mineral wool contains an average of 75% post-industrial recycled content, which reduces the impacts of mineral extraction. |
| Energy use | A high energy input is needed to break down the raw material (rock). No specific embodied energy figures are available. |
| By-products/emissions | Low levels of respirable rock and slag wool fibres may be released during installation. There is no consistent association between exposure to rock and slag wool and respiratory disease or cancer in humans. |
| Sourcing | |
| Material sources | Mineral wool insulation is made from local and imported raw materials. |
| Availability | Mat or blanket mineral wool insulation is widely available. For blown-in material, there is not always an applicator in a particular locality. |
| Cost | Blown-in mineral wool insulation is generally cheaper. |
| Construction/installation | |
| Health and safety during construction/installation | Protective clothing and breathing apparatus are recommended during installation. |
| Uses | Mineral wool insulation is available as a mat material for walls and ceilings, or as a blown-in ceiling insulation. |
| Ease of installation | Correct installation is necessary to ensure no thermal bridges (gaps to the framing) are created. This is extremely important to maximise insulation value. For blowing-in, specialised installation equipment is required. |
| Performance | |
| Health and safety during life of building | None currently identified. |
| Expected durability (assuming correct installation and maintenance) | 50 years. Blown-in insulation may move in ceilings that have a lot of wind-induced air movement. |
| Moisture resistance | Mineral wool insulation is not affected by moisture but should be kept dry in use. |
| Rot, mould and corrosion | Resistant |
| Thermal insulation | R-value depends on density and thickness of material – see specific manufacturer’s literature. Insulation is only effective if dry. |
| Sound insulation | Mineral wool insulation may assist in reducing sound transmission. |
| Fire performance | Non-combustible |
| Waste disposal/recycling/re-use | |
| Re-use | Blown-in material cannot be reused. |
| Recycling | Not currently recycled |
| Waste disposal | Mineral wool insulation is inert – it will decompose very slowly. |

| POLYSTYRENE | |
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| Extraction and manufacture | |
| Impact of extraction | Polystyrene is a petrochemical based product. |
| Energy use | Embodied energy of expanded polystyrene is quoted as 58.4 MJ/kg. |
| By-products/emissions | Current material does not contain CFC. Polystyrene foam products are now manufactured primarily using two types of blowing agents: Pentane and CO2 (manufacturers capture excess blowing agent). |
| Sourcing | |
| Material sources | Raw material is sourced overseas, individual products are locally made. |
| Availability | Polystyrene insulation is readily available. |
| Cost | Polystyrene insulation costs more than fibreglass insulation. |
| Construction/installation | |
| Health and safety during construction/installation | None currently identified |
| Uses | Polystyrene insulation is available for wall, ceiling roof and subfloor as rigid sheets fitted to or between framing. |
| Ease of installation | Correct installation is necessary to ensure no thermal bridges (gaps to the framing) are created. This is extremely important to maximise insulation value. |
| Performance | |
| Health and safety during life of building | No issues identified |
| Expected durability (assuming correct installation and maintenance) | 50+ years |
| Moisture resistance | Low moisture absorption |
| Rot, mould and corrosion | Will not rot |
| Thermal insulation | Polystyrene insulation has lower thermal conductivity than most other insulation materials. R-value depends on density and thickness of material – see specific manufacturer's literature. |
| Sound insulation | Polystyrene insulation may provide some sound reduction. |
| Fire performance | Polystyrene insulation must be protected from the interior by a flame barrier. |
| Waste disposal/recycling/re-use | |
| Re-use | Inserted panels may be able to be removed and reused. |
| Recycling | Material can be recycled. |
| Waste disposal | Polystyrene insulation won't quickly degrade in land fill. |

| PAPER FILL | |
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| Extraction and manufacture | |
| Impact of extraction | Paper fill insulation is made from waste paper so there are no impacts from extraction. |
| Energy use | Embodied energy of paper fill insulation is quoted as 3.3 MJ/kg. |
| By-products/emissions | None currently identified |
| Sourcing | |
| Material sources | Local |
| Availability | There are a limited number of applicators (not always an applicator in a particular locality) |
| Cost | Paper fill insulation is usually cheaper than fibreglass. |
| Construction/installation | |
| Health and safety during construction/installation | No issues identified. |
| Uses | Paper fill insulation is available for use as blown-in attic ceiling insulation. |
| Ease of installation | Specialised installation equipment is required. Correct installation is necessary to ensure no thermal bridges (gaps to the framing) are created. This is extremely important to maximise insulation value. |
| Performance | |
| Health and safety during life of building | No issues identified |
| Expected durability (assuming correct installation and maintenance) | 50 years in dry environments. Wind movement in roof space may displace or move the material. |
| Moisture resistance | None |
| Rot, mould and corrosion | Paper fill insulation will rot if wet – binders may corrode metals if damp. |
| Thermal insulation | R-value depends on density and thickness of material – see specific manufacturer’s literature. Insulation is only effective if dry. Paper fill insulation will settle and lose performance over time. |
| Sound insulation | Limited |
| Fire performance | Paper fill insulation has a fire retardant added but will burn – it must be separated or protected from sources of heat. |
| Waste disposal/recycling/re-use | |
| Re-use | Paper fill insulation cannot be reused as insulation. |
| Recycling | Not currently recycled |
| Waste disposal | Paper fill insulation will degrade in a landfill. |