

The Australian Ecolabel Program Good Environmental Choice Australia Standard

Thermal Building Insulation Materials



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Use of This Standard

This voluntary environmental labelling standard may be used by competent environmental assessors to establish product compliance to the Australian Ecolabel Program. Products that are certified with the mark of conformity, the “Good Environmental Choice Label” have been independently tested and demonstrate compliance to the environmental and social performance criteria detailed in this standard. The overall goal of environmental labels and declarations is the communication of verifiable and accurate information, which is not misleading, on environmental aspects of products and services. This encourages the demand for, and supply of, those products and services that cause less stress on the environment, thereby stimulating the potential for market-driven continuous environmental improvement.

This standard identifies environmental, quality, regulatory and social performance criteria that products sold on the Australian market can meet in order to be considered as good “environment practice”. Products that have been certified as complying to this standard may gain greater market recognition and a marketing advantage in government and business procurement programs, as well as broad consumer preference.

This standard can be used by Australian producers to guide their designs for environment programs by using the environmental criteria as key performance benchmarks to reduce the environmental loads of their product. The standard is necessarily restricted in its identification of environmental loads from the product life-cycle. Producers should consider other environmental measures along the product cycle, which are not included in this standard, in their environment program designs for and aim for even higher levels of environmental performance where technically possible.

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GOOD ENVIRONMENTAL CHOICE AUSTRALIA STANDARD

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Abstract

This Standard specifies environmental performance requirements of thermal insulation products for the Australian Ecolabel Program. The Australian Ecolabel Program complies with ISO 14024: "Environmental labels and declarations - Guiding principles" which requires environmental labelling specifications to include criteria that are objective, reasonable and verifiable.

Definitions

ABCB means the Australian Building Codes Board.

Blowing agents means chemicals used to produce cellular structure in plastic or foam insulation. These chemicals include hydrocarbons and halogenated hydrocarbons, which change from liquid to gas when heated and develop cells within plastic material.

Cellulose fibre insulation refers to any loose-fill insulation product derived from wood. Examples include fire-proofed fibres made from recycled paper and cardboard.

ISO means International Standards Organisation.

Label means the Australian Good Environmental Choice Label.

Loose fill thermal insulation means fibre granules, nodules, or similar forms of material designed to be installed by hand pouring or blowing by pneumatic equipment. This includes loose-fill cellulose fibre, loose-fill glass fibre and loose-fill mineral wool.

Mineral wool is a broad term referring to fibrous inorganic minerals or metal oxides. This includes the sub-categories of:

Rock wool using raw materials including basalt, limestone and recycled mineral products,

Slag wool using waste slag from steel making or other industrial smelting processes, and

Glass wool using silica-glass as a raw material.

Ozone Depletion Potential (ODP) refers to the ratio of a particular compound's ozone depleting effect compared to the ozone depleting ability of the standard reference compound, CFC-11, which arbitrarily defined as 1.0.

Polybrominated diphenyl ethers means chemicals that have the molecular formula $C_{12}H_xBr_yO$. This includes penta-, octa-, and deca-brominated diphenyl ethers;

Reflective Insulation means thermal insulation products that rely solely on a reflective (often metallic) surface.

Recycled materials includes both pre- and post-consumer recycled materials:

Post-Consumer: Material generated by households, or by commercial, industrial and institutional facilities in their role as end-users of a product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

Pre-Consumer: Material diverted from the waste stream during a manufacturing process. This does not include re-utilisation of materials such as rework, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

R-value means thermal resistance, measured in $\text{m}^2 \text{ }^\circ\text{C}/\text{W}$ or $\text{m}^2 \text{ K}/\text{W}$ with increasing values indicating a greater capacity to resist heat transfer. $R \text{ value} = \text{thickness mm} / 1000 / \text{thermal conductivity}$

Spray-on thermal insulation means material supplied in the form of fibre granules, nodules, or similar forms of material designed to be installed in conjunction with a binder material by means of spraying, or thermoplastic insulation materials designed to be installed by means of spraying using a blowing agent;

Synthetic Polymer is a high molecular weight material consisting of repeating monomer units. This includes plastics and many foams, including the common insulation materials polyester (polywool), polyethylene, polyolefin, polyimide, polystyrene and many proprietary polymer preparations.

Thermal insulant or **thermal insulation** means bulk (resistive-type) thermal insulation material.

Wool means fibres derived from sheep fleece. The word “wool” may be used to describe the fibrous properties or appearance of a material (eg mineral wool), but must only refer to sheep wool if the term is used on its own.

1 INTRODUCTION

1.1 Purpose

This Standard seeks to define good environmental performance benchmarks for bulk insulation materials for use in the construction of buildings. The voluntary environmental labelling standard implemented by the Australian Environmental Labelling Association (GECA) specifies environmental performance criteria for insulation materials including batts, boards and blankets. These products form a significant proportion of items manufactured for the thermal insulation of residential, commercial and government structures. This standard stipulates the environmental load of such products throughout the major aspects of their life cycle.

1.2 Background

It is generally accepted that high quality thermal insulation in buildings has the potential to reduce the energy consumption required for space heating and cooling over the lifetime of a building. Achieving good building in-situ thermal performance is therefore critical to the overall environmental benefits that can be achieved through reduced greenhouse gas emissions from lower energy consumption. Other benefits of having well insulated buildings include improved indoor comfort levels, warmer internal surfaces in winter, cooler internal surfaces in summer, a reduction in the reliance on fossil fuels which contribute to global warming and an improved durability of internal finishes. Several studies have also shown that occupants of well-insulated buildings are generally healthier than the occupants of non-insulated buildings.

There are several additional key aspects that determine the overall environmental benefits of a thermal insulation product. For example, the environmental burden caused by the manufacture and disposal of thermal insulation materials can be significant if the raw materials are sourced using environmentally damaging processes, are manufactured using ozone depleting substances, or waste product can only be disposed of in landfill facilities. Correct handling and installation of the product is also a critical factor since the thermal performance of an insulation product can be reduced by 50% even if small (5%) gaps result from poor installation. For insulation products that are stored in a compressed state, the importance of recovery of insulation to declared thickness is also critical to in situ performance.

Products which comply with this standard will produce environmental benefits at each major stage of the product life cycle, most notably by improving energy efficiency during the life of the building, and therefore reducing greenhouse gas emissions and the use of non-renewable fuels. Products compliant with this standard also make use of recycled material where possible in order to reduce resource consumption and also ensure that product formulations are of low toxicity. Effective and comprehensive product information is a necessity to ensuring proper installation and use of certified products in order to enhance the environmental and human health benefits from certified thermal insulants.

2 STANDARD CATEGORY SCOPE

This Standard is applicable to bulk insulation materials used in building applications, namely resistive-type boards, blankets, batts and loose-fill or spray-on thermal insulation. It excludes reflective foil-type insulants and those used for specialist applications, such as pipe and hot water cylinder lagging.

Innovative bulk insulation products that do not fall directly within the above categories may be considered for certification if the product can be demonstrated to comply with all other requirements of this standard. Other sub-categories may be added at a later date.

It is noted that correct installation of insulation products is generally outside the direct control of manufacturers. This standard refers only to insulation materials and does not control installation or use of thermal insulants. Regulations governing this aspect of thermal insulation are provided by the ABCB.

This Standard prescribes material requirements only. Testing and labelling of thermal resistances (R-values) of insulation materials is specified by the Australian Standard AS 4859.1 – 2006.

How this Standard relates to Australian Standards

This is a voluntary environmental labelling standard only.

All GECA voluntary ecolabelling standards require that products satisfy the relevant Australian Standard as a prerequisite for GECA certification. In this case, fulfilment of AS4859.1:2006 is required.

Australian Standards typically define “fit-for-purpose” criteria but do not provide assurance of environmental preferability. This Standard seeks to define environmental performance benchmarks above and beyond the AS.

How this Standard relates to the Building Codes of Australia

This is a voluntary environmental labelling standard only.

The Standard does not specify R-ratings or thermal conductivities of insulation materials since this is already specified under the Building Codes.

This Standard assumes that two insulation products made of different materials that provide the same installed R-rating in the same building will lead to the same energy saving over the life of the building. The environmental difference between the two products is therefore materials based. This Standard specifies environmental performance benchmarks for materials only and leaves the assessment of R-values to the regulatory bodies, we simply ask for evidence that the product has been tested and that a standard R-value can be defined.

3 ENVIRONMENTAL PERFORMANCE CRITERIA

3.1 Fitness for Purpose

Certified products should be good performers in their intended application. The manufacturer of the product must ensure that the product is fit for its intended purpose and:

3.1.1 Australian Standards

The product meets or exceeds the requirements of AS/NZS 4859.1:2006. Materials for the thermal insulation of buildings – General criteria and technical provisions or;

3.1.2 Non-Australian Standards

The product meets the applicable and accepted standard in its target market if it is to be exported;

and

3.1.3 Warranty

The product is supplied to the consumer with a minimum warranty period of 20 years.

3.2 Material Requirements

3.2.1 Recycled Content

Certified products shall meet the minimum resource efficiency requirements outlined below for recycled material content by weight.

Table 1: Recycled content requirements for thermal insulation products.

Material	Recycled Content
Glass wool	65%
Rock Wool or Slag wool	25%
Cellulose	80%
Wool	80%
Plastics or Synthetic Polymers	85%

Note - If more than two types of recycled materials are mixed and used in a composite product, the whole use rate of recycled content shall satisfy the material requirements for the main raw material.

3.2.2 Production Waste Management

The manufacturer must have effective policies and procedures to minimise waste, including measures to recycle waste materials from the production process.

3.2.3 Energy and Water Use

The applicant is requested, on a voluntary basis, to provide information on energy and water use during the manufacturing process.

3.2.4 Raw Materials

3.2.4.1 Sand and Rock

Non-recycled sand and rock for use as raw materials in mineral wools (e.g., glass, rock or slag) must come from an operation with a registered environmental remediation program, not be located in a National Park or within an endangered community as defined by the Environment Protection and Biodiversity Conservation Act 1999 List of Threatened Ecological Communities.

3.2.4.2 Petrochemical Raw Materials

Non-recycled monomer or other petrochemical products for use as raw materials in insulation must be sourced from a production facility that complies with Section 4 of this Standard.

3.2.4.3 Timber and Natural Fibre Sources

Virgin fibre may be sourced from any combination of FSC or AFS certified fibre, plantation wood fibre, cellulose fibre, return fibre, cotton fibre, crop residue or other waste fibre. Any sources that are not certified under a recognised certification scheme (e.g. FSC or AFS) as being sustainably managed shall not originate from:

- a. *Illegal harvesting*
Illegally harvested wood and natural materials are those that are harvested, traded or transported in a way that is in breach with applicable national regulations (such regulations can for example address CITES species, money laundering, corruption and bribery, and other relevant national regulations).
- b. *Genetically modified organisms*
Wood and natural materials from genetically modified organisms are those which have been induced by various means to include genetic structural changes (for a definition of genetically modified, please refer to the European Union Directive 2001/18/EC on the deliberate release of genetically modified organisms in the environment). Traditional breeding programs do not constitute genetic modification.
- c. *Uncertified high conservation value communities*
High Conservation Value communities are those that possess one or more of the following attributes:
 - Communities containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia); and/or large landscape level communities, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.
 - Communities that are in [constitute] or contain rare, threatened or endangered ecosystems.
 - Communities fundamental to meeting basic needs of locally indigenous human populations (e.g. subsistence, health) and/or critical to these people's traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

For materials sourced from within Australia, please refer to the following:

The EPBC Act List of Threatened Fauna at

<http://www.deh.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=fauna>

The EPBC Act List of Threatened Flora at

<http://www.deh.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora>

The EPBC Act List of Threatened Ecological Communities

<http://www.deh.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl>

The Australian Heritage Database (for listings of areas of cultural significance) at <http://www.deh.gov.au/cgi-bin/ahdb/search.pl>

For materials sourced from outside Australia, please refer to credible lists detailing threatened species, threatened communities and areas of cultural significance in the respective countries.

3.3 Hazardous Substances

3.3.1 Prohibited substances

The following substances must not be used at any stage of production or be present in the finished product:

- Polybrominated diphenyl ether flame retardants
- Brominated paraffin flame retardants
- Short-chain chlorinated paraffin flame retardants.
- CFCs, HCFCs or HFCs
- Tin, lead, mercury, cadmium or chromium-containing catalysts or additives

3.3.2 Blowing Agents

Foam products shall not be manufactured using blowing agents with a global warming potential of more than 140, measured over a 100 year time-frame. Blowing agents must also have an ozone depletion potential (ODP) of zero. GECA accepts ODP and GWP figures for compounds as defined by the Montreal Protocol and its appendices.

3.3.3 Restricted Substances

The product must not contain more than 0.1% by weight (in total) of substances classified by the IARC as Class 1 or 2A, (see <http://monographs.iarc.fr/ENG/Classification/index.php>), or that carry the following risk phrases:

- R26 – Very toxic by inhalation.
- R27 – Very toxic in contact with skin.
- R39 – Danger of very serious irreversible effects.
- R40 – Limited evidence of a carcinogenic effect.
- R45 – May cause cancer.
- R46 – May cause heritable genetic damage.
- R47 – May cause birth defects
- R48 – Danger of serious damage to health by prolonged exposure.
- R49 – May cause cancer by inhalation.

Formaldehyde may be exempt from this criterion if the measured release of formaldehyde from new the product is less than 0.2 mg/m²h, measured by ASTM D5116 or ASTM 5197.

3.4 Packaging Requirements

Chlorinated or halogenated plastics must not be used in product packaging.

Used packaging shall be able to be recycled by local recycling systems.

Product packaging must be durable enough to withstand normal transport and storage without compromising the performance of the product in any way.

3.5 Product Information

Insulation products must be labelled according to the requirements of AS 4859.1 – 2006. Where R-values are specified, this must be a product rather than a system R-value. The following additional information for product suppliers, installers and consumers must also be provided:

- The material that the product is manufactured from, including the percentage recycled content. For composite materials, the percentage of each material must be clearly labelled by mass or volume.
- Maximum storage time or install-by date (if batch identification only is provided) for blanket and segment type insulation. If products are provided direct to the user from the manufacturer, then written storage instructions must also be provided to the user.
- For compression packaged materials, the time after installation at which the product will have re-lofted to its nominal thickness if installed before the install-by date using the prescribed installation instructions.
- Transportation and installation instructions, which, when followed, lead to the labelled thermal resistance being achieved.

If there is insufficient space for this information on the product label, it may be provided as a separate document provided to suppliers, distributors and consumers, and be made available on the manufacturer's website.

4 COMPLIANCE TO ENVIRONMENTAL REGULATIONS

The applicant is required to comply with relevant environmental legislation and government orders at the Local, State, and Commonwealth levels, if these have been issued. An applicant's compliance with these criteria may be established by undertaking a series of random checks; and/or by gathering samples of applicant operational procedures and documents from approved assessors as evidence to support compliance during the verification. Where an applicant is from an overseas jurisdiction, that jurisdiction's environmental regulations apply. Where the applicant is subject to a guilty verdict by a legally constituted court in the last 24 months on the basis of a breach of any environmental legislation or permits, there must be evidence of corrective action.

5 COMPLIANCE TO LABOUR, ANTI-DISCRIMINATION AND SAFETY REGULATIONS

An applicant shall demonstrate that all employees are covered by a Federal or State award or a certified industrial agreement or a registered workplace agreement as determined by the Industrial Relations Commission, the Employment Advocate or a State or Territory Workplace Relations Agency or a workplace agreement in compliance with Workplace Relations Act 1996 Part 7 – The Australian Fair Pay and Conditions Standard.

An applicant shall demonstrate general compliance to the terms of State or Territory Legislation concerning Occupational, Health and Safety and/or the *Commonwealth Safety, Rehabilitation and Compensation Act 1988*, where applicable. Where the applicant is subject to a breach order by a government agency, or a guilty verdict by an Australian Court within the last 24 months, on the basis of a breach of State, Territory or Commonwealth Occupational, Health and Safety Legislation, there must be evidence of corrective action.

The applicant shall demonstrate general compliance to the requirements of the Racial Discrimination Act 1975, Sex Discrimination Act 1984, Disability Discrimination Act 1992, Equal Opportunity for Women in the Workplace Act 1999, and complementary State Legislation. Applicants cannot be in the list of 'named' or non-compliant employers under the Equal Opportunity for Women in the Workplace Act 1999. Where the applicant is subject to a breach order by a government agency, or a guilty verdict by an Australian Court in the last 24 months on the basis of a breach of these Acts, there must be evidence of corrective action.

Where an applicant is from an overseas jurisdiction, the applicant shall demonstrate general compliance to that jurisdiction's anti-discrimination, occupational health and safety, and workers' compensations regulations. Where the applicant is subject to a breach order by a government agency, or a guilty verdict by a legal court in their respective country within the last 24 months on the basis of a the breach of anti-discrimination, occupational health and safety, and workers' compensation regulations, there must be evidence of corrective action.

An applicant's compliance with these criteria may be established by undertaking a series of random checks; gathering samples of applicant operational procedures and documents from approved assessors; and/or by providing a self-declaration document signed by an executive officer of the applicant organisation as evidence to support compliance during verification.

6 EVIDENCE OF CONFORMANCE

6.1 Audit Methodology

Conformance with this standard shall be demonstrated by undertaking an assessment under the above criteria by an approved assessor, following the certification and verification procedures detailed in the Good Environmental Choice Australia Ltd Documented Quality Management System, which generally follows the environmental auditing requirements of ISO 19 011.

6.2 Assessor Competency

The Australian Ecolabel Program classifies approved assessors as:

- a. Assessors registered by Good Environmental Choice Australia Ltd as environmental professionals that hold expertise relevant for an assessment, and who have undertaken training in the procedures of the Australian Ecolabel Program; or
- b. Environmental auditors accredited with the RABQSA.

6.3 Suitable Sources

Audit evidence should be of such a quality and quantity that competent environmental auditors, working independently of each other, will reach similar audit findings from evaluation of the same audit evidence against the same audit criteria.

Suitable sources of information to establish compliance may be, but are not limited to:

- a. Technical specification of the product.
- b. Obvious characteristics of the product under examination.
- c. Scientific test results and reports.
- d. Environmental management system and audit reports and results.
- e. Life-cycle assessment of each stage of the product life-cycle via a physical audit and examination.
- f. Life-cycle assessment via scientific testing.
- g. A statement of confirmation by an executive officer.
- h. An assessment of company or government records.
- i. Other material that can be considered objective evidence.

6.4 Laboratory Testing

New testing shall be undertaken by a laboratory accredited by the National Association of Testing Authorities (NATA), or similar overseas accreditation agents who can conduct the relevant tests and/or provide documentation detailing environmental performance against the criteria of this standard. The test results should be presented on NATA-endorsed reports or from a laboratory acceptable to Good Environmental Choice Australia Ltd.

If test results or environmental auditing results are not available, and/or there is insufficient data to establish full compliance with the criteria required by this standard, then certification cannot be awarded.