



CONSTRUCTION INDUSTRY COUNCIL

CIC GREEN PRODUCT CERTIFICATION

Thermal Insulation

Assessment Standard

(Version 1.1a)

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Thermal Insulation

Summary of Assessment Criteria

CORE CRITERIA

Criteria	Requirements	Verification	Points		Index
			Basic	+Bonus	
Serviceability	Quality, durability and performance properties of the product shall be demonstrated through at least <i>FIVE</i> testing items including, but not limited to, the followings: • Water Vapour Permeance / Sorption / Transmission • Surface Burning/ Hot-surface Performance • Fungi Resistance • Corrosion Resistance • Odour Emission • Elevated Temperature and Humidity Resistance • Shrinkage • Tensile/ Bond Strength • Water Resistance/ Absorption • Flammability / Flame Retardance Permanence • Smoldering Combustion • Adhesive / Cohesive Strength • Compressive / Flexural Strength	Laboratory test report(s) and any production documentation for all relevant quality and performance tests	5		4.1.3 (page 4)
Thermal Conductivity	Thermal conductivity of the product shall not be more than the following limit: • 0.038 kcal/mh°C, or 0.044 W/mK at 22°C to 24°C mean, with respect to its insulation rate (heat conduction rate, heat resistance) (15 basic points) • 0.026 kcal/mh°C, or 0.030 W/mK at 22°C to 24°C mean, with respect to its insulation rate (heat conduction rate, heat resistance) (+5 bonus points)	Documentation including, but not limited to, test reports, product catalogue and MSDS	15	+5	4.4.1 (page 10)

Flame Retardants	Concentration of the following flame retardants in the product shall be below 0.1% by weight of the product: • Polybrominated diphenyl ether • Polybrominated biphenyls • Short-chained chlorinated paraffin • Hexabromocyclododecane	Laboratory test report(s), and any production documentation	10		4.2.3 (page 8)
Volatile Organic Compounds & Formaldehyde	The emissions of finished wall covering product shall not exceed the following limits: • Total volatile organic compounds: <0.5mg/m³ • Formaldehyde: < 0.05 mg/m³ or < 80 ppm	Laboratory test report(s), and any production documentation	10		4.2.4 (page 8)
Heavy Metals	Concentration of the following toxic heavy metals (and their related compounds) in the product shall be below 0.1% by weight of the product: • Hexavalent chromium (Cr6+) • Lead (Pb) • Mercury (Hg)	Laboratory test report(s), and any production documentation	10		4.2.1 (page 6)
Subtotal:			50	+5	

NON-CORE CRITERIA

Criteria	Requirements	Verification	Points	Index
			+Bonus	
Environmental Management System	Manufacturer shall possess valid certification of ISO 14001, EU Eco-Management and Audit Scheme (EMAS) or Cradle-to-Cradle.	A valid certificate issued by accredited certification body	+5	4.1.1 (page 3)
Energy Management	Manufacturer shall implement effective energy management policies and procedure and/or an energy management programme covering the manufacturing operations. The following information shall be documented (as relevant): • Initiatives taken to reduce energy use and improve energy efficiency • Initiatives or requirements for suppliers or contract manufacturers	Detailed policies, procedures, programs and/ or plans of energy management	+5	4.3.1 (page 9)

Raw Materials	Applicant shall provide a detailed breakdown of all materials composing the thermal insulation products for compliance. The product shall be made of required minimum percentage of recycled content by weight (where applicable) as below:			Documentation including, but not limited to, product catalogue, MSDS and written declaration	+5/ +10	4.3.3 (page 9)
	Product (if applicable)	Limit				
		Bonus (+5)	Bonus (+10)			
	Glass wool	≥50%	≥55%			
	Mineral Wool (Rock/ Slag Wool)	≥20%	≥35%			
	Cellulose	≥75%	≥80%			
	Plastics or synthetic polymers	≥50%	≥55%			
	Extruded polystyrene	≥20%	≥25%			
	Polyisocyanurate (plastic component only, e.g. not including facing)	≥10%	≥15%			
	Aluminium reflective insulation (plastic layer content)	≥20%	≥30%			
Product Information	Applicant shall provide the following product information on the product packaging, catalogue and/or company website for compliance: • Basic product specifications • The intended use of the product • Instructions for correct use and storage to maximise the lifetime of the product • Recommended maintenance instructions for the product • Installation method • Instructions for consumer product disposal • Country of origin			Documentation including, but not limited to, product label, product catalogue, MSDS, and written declaration	+5	4.1.2 (page 4)

Waste Management	Manufacturer shall implement effective waste management policies and procedure and/or a waste management programme covering the manufacturing operations. The following information shall be documented (as relevant): • Initiatives taken to reduce waste generation and improve recovery/recycling of waste • Initiatives to recovery of post-consumer and/or pre-consumer waste that can be re-introduced to the manufacturing process • Other environmental benefits or constraints associated with waste minimisation objectives and processes	Detailed policies, procedures, programs and/ or plans of waste management	+5	4.3.2 (page 9)
Reuse and Recycling	Applicants shall provide information on reuse, recycling and biodegradability of the products including but not limited to for compliance: • Product shall not be impregnated, labelled, coated or treated in a manner preventing post-consumer recycling • Information related to the degradation or recycling of products	Documentation including, but not limited to, product catalogue, MSDS, and written declaration	+5	4.4.2 (page 10)
Hazardous Substances	Concentration of the hazardous substance in the product shall be below 0.1% by weight of the product. The restricted hazardous substance including the following types: • Organotin compounds • Carcinogens or any substance listed in the IARC's current Group 1, 2A and 2B • Mutagens substance (i.e. agents which increasing the occurrence of mutations) listed in the EU Legislation Group 1A, 2A and 2B • Reproductive toxins (Agents which cause adverse effects on sexual function and fertility in males and females, developmental toxicity in the offspring and effects through or via lactation) listed in the EU Legislation Group 1A, 2A and 2B	Laboratory test report(s), MSDS, self-declaration letter and production documentation	+5	4.2.2 (page 7)

	• Biocides • Aziridine or polyaziridines • Alkylphenol ethoxylates The following requirements are applicable to the products with plastic content only: Concentration of phthalate in the product shall be below 0.1% by weight of the product. The limited phthalates including the following types: • Bis(2-ethylhexyl)phthalate (DEHP) • Dibutyl phthalate (DBP) • benzylbutylphthalate (BBP) • Diisononylphthalate (DINP) • Diisodecylphthalate (DIDP) • Di-n-octylphthalate (DNOP)			
Packaging Requirement	• All packaging shall be able to be reused/recycled in the country • All plastic packaging (if applicable) shall be made of plastics that are able to be recycled in the country where the product is sold and shall not contain halogenated plastics • Packaging shall not be impregnated, labelled, coated or otherwise treated in a manner, which would prevent or significantly limit recycling (i.e. metallic labels) • Packaging shall provide the nature of the materials used for the packaging in order to facilitate identification and classification based on European Parliament and Council Directive 94/62/EC on packaging and packaging waste	Documentation including, but not limited to, product catalogue and written declaration	+5	4.4.3 (page 10)
Subtotal:			+45	

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1. INTRODUCTION

1.1 PURPOSE

The CIC Green Product Certification (*formerly known as HKGBC Green Product Accreditation and Standards [HK G-PASS]*) (herein after referred as the “Scheme”) is an environmental labelling scheme owned by the Construction Industry Council (CIC) and implemented by the Hong Kong Green Building Council (HKGBC) which aims to help consumers, building professionals and policy makers identify environmentally preferable building materials and products. This Assessment Standard (hereafter referred as the “Standard”) sets out the assessment criteria and their benchmarks for Thermal Insulation products to govern the application and award of a label under the Scheme. The Standard also defines the verification methods to determine which labelling grade should be awarded to the product according to the assessment criteria.

This Standard neither modifies nor supersedes laws and regulations. Compliance with this Standard is not a substitute for, and does not assure, compliance with any applicable laws or regulations. Compliance with all applicable laws and regulations is a prerequisite for the manufacturing and marketing of the product.

1.2 BACKGROUND

Thermal Insulation can place a significant burden on the environment, from raw material extraction to potential health hazards in the use phase. With increasing environmental claims of thermal insulation in the market, a more comprehensive and systematic approach to assess the environmental impacts of the thermal insulation shall be developed. The aim of this Standard is to help designers and end-users choosing greener products by conserving resources, reducing the amount of waste disposal in landfills and reducing the impact to human health throughout the life cycle of thermal insulation. The development of the assessment criteria in this Standard has made references to worldwide relevant eco-labelling schemes and some existing life cycle assessment (LCA) studies.

2. SCOPE

The scope of this Standard is applicable to thermal insulation materials used in the building applications (e.g. wall, floor, ceiling, floor, etc.) for reducing heat transfer. Insulation materials that fall under this guideline include:

- Batt and blanket type
- Rigid board-type
- Spray-on/loose-fill type
- Reflective type (e.g. aluminium foil)
- Radiant barrier type (e.g. plastic film)

The materials for the thermal insulation shall be specified clearly in each application. One application is applicable to the thermal insulation manufactured with same specifications and materials. Products under the same series with different sizes, thickness and shapes could be included in **ONE** application.

Subsequent application is available for products under the same product series and manufactured with the same type of raw materials.

Maximum **FIVE** subsequent applications shall be available and the subsequent application is only eligible for applying within the validity period of the label.

Note:

Each application should specify the product code / serial number.

CIC or an appointed third party would conduct a random check of the labelled product during the validity period of the label. One of the laboratory tests listed below will be selected and performed to verify the compliance of the product with the criteria stated in the Assessment Standard. Applicant shall be responsible for the cost of the laboratory test.

3. DEFINITIONS

Applicant:	Organisation which apply for the label under the CIC Green Product Certification of the Construction Industry Council
ASTM:	American Society for Testing and Materials
BS:	British Standards
CIC:	Construction Industry Council
CNAS:	China National Accreditation Service for Conformity Assessment
HKAS:	Hong Kong Accreditation Service
HKGBC:	The Hong Kong Green Building Council Limited
HOKLAS:	The Hong Kong Laboratory Accreditation Scheme
IARC:	International Agency for Research on Cancer
ISO:	International Organisation for Standardisation
MSDS:	Material safety data sheet. To qualify as suitable, MSDS and information therein must not be more than 5-years old

US EPA: United States Environmental Protection Agency

Thermal Conductivity: The time rate of steady state heat flow through a unit area of a homogeneous material induced by a unit temperature gradient in a direction perpendicular to that unit area.

4. EVALUATION CRITERIA

A product to be assessed shall meet all the minimum requirements of the “Core Criteria” in order to be awarded a “Green” (i.e. a “pass” grade) Label under the Scheme. Bonus points may be awarded if the product meets the “Non-core Criteria” and a “Bronze”, “Silver”, “Gold” or “Platinum” Label will be awarded according to the total points accumulated (see Section 5 for details). All submissions and documentation shall be endorsed by the Chief Executive Officer or other authorised persons of the Applicant to demonstrate conformance to the assessment criteria. All certifications, laboratory reports and documentations must be valid during the assessment process and labelling period. All laboratory reports and documentation shall be within 5 years from the date of issue. The chemical tests should be conducted by either a third party or the manufacturer who has received the ISO17025 certification or relevant national accreditation systems, e.g. HOKLAS, CNAS, etc. CIC or an appointed third party would conduct a random check of the labelled product during the period of validity of the label, through laboratory test to verify the compliance with the criteria as stated in the Standard. Manufacturer shall bear the cost of the laboratory test.

4.1 GENERAL REQUIREMENTS

4.1.1 *Environmental Management System*

5 Points (Non-core Criterion)

Manufacturer shall possess valid certification of ISO 14001, EU Eco-Management and Audit Scheme (EMAS) or Cradle-to-Cradle.

Note:

BS EN ISO 14001 is the international standard which provides an outline of how to meet the environmental policy and objectives for the business of the applicant.

Eco-Management and Audit Scheme (EMAS) is an environmental management tool which enables organisations to assess, manage and continuously improve their environmental performance.

Cradle-to-Cradle design is a biomimetic approach to the design of products and systems. It models human industry on nature's processes viewing materials as nutrients circulating in healthy and safe metabolisms.

Verification

A valid certificate issued by local or overseas accredited certification body.

4.1.2 Product Information

5 Points (Non-core Criterion)

Applicant shall provide the following product information on the product packaging, catalogue and/or company website for compliance:

- Basic product specifications
- The intended use of the product
- Instructions for correct use and storage to maximise the lifetime of the product
- Recommended maintenance instructions for the product
- Installation method
- Instructions for consumer product disposal
- Country of origin

Verification

Documentation including, but not limited to, product label, product catalogue, MSDS, and written declaration.

4.1.3 Serviceability

5 Points (Core Criterion)

Quality, durability and performance properties of the product shall be demonstrated through at least FIVE testing items (as applicable to material type) including, but not limited to, the following, in accordance with relevant testing methods (or later version); other related testing methods are also acceptable with justification provided by the applicant:

• Water Vapour Permeance / Sorption / Transmission	ASTM C209-15, ASTM C739-11, ASTM C1289-14a, ASTM C1497-12, ASTM C547-15, ASTM C553-13, ASTM C612-14, ASTM C665-12, ASTM C1104/C1104M-13a, ASTM C1136-17, ASTM E96/96M-16
• Surface Burning/ Hot-surface Performance	ASTM C1149-11, ASTM C547-15, ASTM C553-13, ASTM C612-14, ASTM C665-12, ASTM C1136-17, ASTM E84-16, ASTM C411-11, ASTM E84-16
• Fungi Resistance	ASTM C739-11, ASTM C1149-11, ASTM C1338-14, ASTM C1497-12, ASTM C553-13, ASTM C612-14, ASTM C665-12, ASTM C1136-17
• Corrosion Resistance	ASTM C739-11, ASTM C1149-11, ASTM C1497-12, ASTM C547-15, ASTM C553-13, ASTM C612-14, ASTM C665-12

• Odour Emission	ASTM C739-11, ASTM C1149-11, ASTM C1497-12, ASTM C553-13, ASTM C612-14, ASTM C665-12, ASTM C1304-08 (13)
• Elevated Temperature and Humidity Resistance	ASTM C553-13, ASTM C612-14, ASTM C1136-17, ASTM C1258-08
• Shrinkage	ASTM C1497-12, ASTM C547-15, ASTM C612-14, ASTM C356-17
• Tensile/ Bond Strength	ASTM C209-15, ASTM C1289-14a, ASTM C1136-17, ASTM E736/ E736M-00 (15)
• Water Resistance/ Absorption	ASTM C209-15, ASTM C1149-11, ASTM C1289-14a, ASTM C1136-17
• Flammability / Flame Retardance Permanence	ASTM C209-15, ASTM C1497-12, ASTM C1136-17
• Smoldering Combustion	ASTM C739-11, ASTM C1149-11, ASTM C1497-12
• Adhesive / Cohesive Strength	ASTM C1149-11, ASTM C1136-17, ASTM E736/ E736M-00 (15)
• Compressive / Flexural Strength	ASTM C209-15, ASTM C1289-14a

Requirement of cellulosic insulation:

- ASTM C209-15
- ASTM C739-11
- ASTM C1149-11
- ASTM C1338-14
- ASTM C1289-14a
- ASTM C1497-12

Requirement of mineral fibre insulation:

- ASTM C547-15
- ASTM C553-13
- ASTM C612-14
- ASTM C665-12
- ASTM C1104/C1104M-13a

Requirement of pipe insulation:

- ASTM C335/C335M-10

Requirement of overall insulation:

- ASTM C1136-17 ASTM
- ASTM E96/96M-16

- ASTM E84-16
- ASTM C356-17
- ASTM C411-11
- ASTM C518-17
- ASTM C1258-08
- ASTM C1304-08 (13)
- ASTM E736/E736M-00 (15)
- ASTM C1363-11
- ASTM E84-16

Verification

Laboratory test report(s) and any production documentation for all relevant quality and performance tests.

4.2 HUMAN TOXICITY

4.2.1 Heavy Metals

10 Points (Core Criterion)

Concentration of toxic heavy metals (and their related compounds) in the product shall be below 0.1% by weight of the product. The limited heavy metals including the following types:

- Hexavalent chromium (Cr6+)
- Lead (Pb)
- Mercury (Hg)

Product shall be tested based on the requirements as stated in BS EN 62321:2009 (or later version); other related testing methods are also acceptable with justification provided by the applicant.

Note:

BS EN 62321 specifies the determination of the levels of lead (Pb), mercury (Hg), cadmium (Cd), hexavalent chromium (Cr(VI)) contained in inorganic and organic compounds.

Verification

Laboratory test report(s), and any production documentation.

4.2.2 Hazardous Substances

5 Points (Non-core Criterion)

Concentration of the hazardous substance in the product shall be below 0.1% by weight of the product. The restricted hazardous substance including the following types:

- Organotin compounds
- Carcinogens or any substance listed in the IARC's current Group 1, 2A and 2B
- Mutagens substance (i.e. agents which increasing the occurrence of mutations) listed in the EU Legislation Group 1A, 2A and 2B
- Reproductive toxins (i.e. agents which cause adverse effects on sexual function and fertility in males and females, developmental toxicity in the offspring and effects through or via lactation) listed in the EU Legislation Group 1A, 2A and 2B
- Biocides
- Aziridine or polyaziridines
- Alkylphenol ethoxylates

The following requirements are applicable to the products with plastic content only:

The concentration of phthalate in the product shall below 0.1% by weight of the product.

The limited phthalates including the following types:

- Bis(2-ethylhexyl)phthalate (DEHP)
- Dibutyl phthalate (DBP)
- Benzylbutylphthalate (BBP)
- Diisononylphthalate (DINP)
- Diisodecylphthalate (DIDP)
- Di-n-octylphthalate (DNOP)

Applicant shall test all the above phthalates in according to National or International standard such as CPSC-CH-C1001-09.3.

Note:

CPSC-CH-C1001-09.2 is a document which provide detailed information on the test methods that will be used by the U.S. Consumer Product Safety Commission's (CPSC) testing laboratory (LSC) for the analysis of phthalate content in children's toys and child care articles covered by the standard set forth in the Consumer Product Safety Improvement Act Section 108.

Verification

Laboratory test report(s), MSDS, self-declaration letter and production documentation.

4.2.3 Flame Retardants

5 Points (Core Criterion)

Concentration of the flame retardants in the product shall be below 0.1% by weight of the product. The restricted flame retardants including the following types:

- Polybrominated diphenyl ether
- Polybrominated biphenyls
- Short-chained chlorinated paraffin
- Hexabromocyclododecane

Product shall be tested based on the requirement as stated in BS EN 62321:2009 (or later version); other related testing methods are also acceptable with justification provided by the applicant.

Note:

BS EN 62321 specifies the determination of the levels of brominated flame retardants, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) contained in electrotechnical products.

Verification

Laboratory test report(s), and any production documentation.

4.2.4 Volatile Organic Compounds & Formaldehyde

10 Points (Core Criterion)

The finished wall covering products shall not exceed the following limits:

- Total volatile organic compounds: $< 0.5 \text{ mg/m}^3$
- Formaldehyde: $< 0.05 \text{ mg/m}^3$ or $< 80 \text{ ppm}$

Products shall be tested in accordance including but not limited to ASTM D 5116-10: Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials / Products or the California Department of Public Health (CDPH) standard method, other related testing methods are also acceptable with justification provided by the applicant.

Verification

Laboratory test report(s), and any production documentation.

4.3 RESOURCE CONSUMPTION

4.3.1 *Energy Management*

5 Points (Non-core Criterion)

Manufacturer shall implement effective energy management policies and procedure and/or an energy management programme covering manufacturing operations. The following information shall be documented (as relevant):

- Initiatives taken to reduce energy use and improve energy efficiency;
- Initiatives or requirements for suppliers or contract manufacturers.

Verification

Detailed policies, procedures, programs and/ or plans of energy management issued by the Manufacturer.

4.3.2 *Waste Management*

5 Points (Non-core Criterion)

Manufacturer shall implement effective waste management policies and procedure and/or a waste management programme covering manufacturing operations. The following information shall be documented (as relevant):

- Initiatives taken to reduce waste generation and improve recovery/recycling of waste;
- Initiatives to recovery of post-consumer and/or pre-consumer waste that can be re-introduced to the manufacturing process;
- Other environmental benefits or constraints associated with waste minimisation objectives and processes.

Verification

Detailed policies, procedures, programs and/ or plans of waste management issued by the Manufacturer.

4.3.3 *Raw Materials*

5/ 10 Bonus Points (Non-core Criterion)

Applicant shall provide a detailed breakdown of all materials composing the thermal insulation products for compliance. The product shall be made of the following minimum percentage of recycled content by weight (where applicable):

Product	Limit
---------	-------

(if applicable)	Bonus (+5)	Bonus (+10)
Glass wool	≥50%	≥55%
Mineral Wool (Rock/ Slag Wool)	≥20%	≥35%
Cellulose	≥75%	≥80%
Plastics or synthetic polymers	≥50%	≥55%
Extruded polystyrene	≥20%	≥25%
Polyisocyanurate (plastic component only, e.g. not including facing)	≥10%	≥15%
Aluminium reflective insulation (plastic layer content)	≥20%	≥30%

Verification

Documentation including, but not limited to, product catalogue, MSDS and written declaration.

4.4 ECOSYSTEM IMPACT

4.4.1 Thermal Conductivity

15 Basic Points + 5 Bonus Points (Core Criterion)

Thermal conductivity of the product shall not be more than the following limit:

- 0.038 kcal/mh°C, or 0.044 W/mK at 22°C to 24°C mean, with respect to its insulation rate (heat conduction rate, heat resistance) (15 basic points);
- 0.026 kcal/mh°C, or 0.030 W/mK at 22°C to 24°C mean, with respect to its insulation rate (heat conduction rate, heat resistance) (5 bonus points).

Verification

Documentation including, but not limited to, test reports, product catalogue and MSDS.

4.4.2 Reuse and recycling

5 Points (Non-core Criterion)

Applicant shall provide information on reuse, recycling and biodegradability of the products including but not limited to for compliance:

- Product shall not be impregnated, labelled, coated or treated in a manner preventing post-consumer recycling;
- Information related to the degradation or recycling of products.

Verification

Documentation including, but not limited to, product catalogue, MSDS, and written declaration.

4.4.3 Packaging Requirement

5 Points (Non-core Criterion)

- All packaging shall be able to be reused/recycled in the country;
- All plastic packaging (if applicable) shall be made of plastics that are able to be recycled in the country where the product is sold and shall not contain halogenated plastics;
- Packaging shall not be impregnated, labelled, coated or otherwise treated in a manner, which would prevent or significantly limit recycling (i.e. metallic labels);
- Packaging shall provide the nature of the materials used for the packaging in order to facilitate identification and classification based on European Parliament and Council Directive 94/62/EC on packaging and packaging waste;

Verification

Documentation including, but not limited to, product catalogue, MSDS, and written declaration.

5. SCORING AND GRADING

The points for meeting each criterion stated in Section 4 are summarised in Table 1.

Table 1: Points to be awarded under the assessment criteria of this Standard

<i>Evaluation criteria</i>	<i>Points</i>	
	<i>Basic</i>	<i>+Bonus</i>
4.1.1 Environmental Management System		+5
4.1.2 Product Information		+5
4.1.3 Serviceability [CORE]	5	
4.2.1 Heavy Metals [CORE]	10	
4.2.2 Hazardous Substances		+5
4.2.3 Flame Retardants [CORE]	10	
4.2.4 Volatile Organic Compounds (VOCs) & Formaldehyde [CORE]	10	
4.3.1 Energy Management		+5
4.3.2 Waste Management		+5
4.3.3 Raw Materials		+5/+10
4.4.1 Thermal Conductivity [CORE]	15	+5
4.4.2 Reuse and recycling		+5
4.4.3 Packaging Requirement		+5
Total:	50	+50
	100	

The minimum requirement to be awarded a “Green” Label under this product category is to obtain 50 points by meeting all minimum requirements laid down in the “Core Criteria”.

Table 5: Benchmarks for grading

<i>Grade to be awarded</i>	<i>Points required</i>
Platinum	90 or above
Gold	80 – 89
Silver	70 – 79
Bronze	60 – 69
Green	50 – 59
No Label	Below 50