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CONSTRUCTION INDUSTRY COUNCIL

CIC GREEN PRODUCT CERTIFICATION

Assessment Standard

Technical Requirements

Pavement Block



CIC GREEN
PRODUCT CERTIFICATION

(Version 2)

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Pavement Block

Summary of Assessment Criteria

CORE CRITERIA

Criteria	Requirements	Verification	Points		Index														
			Basic	+Bonus															
Product Information	Provide following information with delivered products or made accessible to public: <ul style="list-style-type: none"> • 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 catalogue, technical datasheet, and webpages	5	-	4.1.1														
RESOURCE																			
Material Optimization	Raw Materials: <u>Option A</u> Adopt a combination of recycled materials as stated in Table 9, and meet the following: <ul style="list-style-type: none"> • 10 Basic Points for $\geq 50\%$ • 10 Basic + 10 Bonus Points for $\geq 80\%$ OR <u>Option B</u> The density shall meet the following level: <ul style="list-style-type: none"> • 10 Basic Points for $< 700 \text{ kg/m}^3$ • 10 Basic + 10 Bonus Points for $< 400 \text{ kg/m}^3$ 	Documentation including, but not limited to, product catalogue, MSDS, test reports, and written declaration	10	+10	4.3.1.1														
ENVIRONMENT																			
Human Toxicity and Ecosystem Impact	Hazardous Substances: product shall limit the concentration of following organic compounds below threshold listed <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="width: 20%; text-align: center;">Limit (mg/L)</th> </tr> </thead> <tbody> <tr> <td>Organic Compounds</td> <td></td> </tr> <tr> <td>Cyanide</td> <td style="text-align: center;"><10</td> </tr> <tr> <td>Organic Phosphorus</td> <td style="text-align: center;"><1</td> </tr> <tr> <td>Trichloroethylene</td> <td style="text-align: center;"><0.3</td> </tr> <tr> <td>Tetrachloroethylene</td> <td style="text-align: center;"><0.1</td> </tr> <tr> <td>Phenolic Compounds</td> <td style="text-align: center;"><0.2</td> </tr> </tbody> </table>		Limit (mg/L)	Organic Compounds		Cyanide	<10	Organic Phosphorus	<1	Trichloroethylene	<0.3	Tetrachloroethylene	<0.1	Phenolic Compounds	<0.2	Laboratory test report(s) for organic compounds Laboratory test report(s) or self-declaration letter for carcinogenic and any other hazardous substances	10	-	4.4.3.1
		Limit (mg/L)																	
	Organic Compounds																		
	Cyanide	<10																	
	Organic Phosphorus	<1																	
	Trichloroethylene	<0.3																	
Tetrachloroethylene	<0.1																		
Phenolic Compounds	<0.2																		
AND																			
Limit the Carcinogenic Substances, listed in IARC Group 1, 2A, and 2B, to be below 0.1% by weight of the product.																			

Criteria	Requirements	Verification	Points		Index														
			Basic	+Bonus															
	<p>AND The product shall also not contain any substances or chemicals that are classified as Fatal, Toxic, Harmful in accordance with Regulation (EC) No 1272/2008.</p>																		
	<p>Heavy Metals: Product shall limit the heavy metals concentration below the listed threshold.</p> <table border="1"> <thead> <tr> <th>Heavy Metal</th> <th>Limit (mg/L)</th> </tr> </thead> <tbody> <tr> <td>Arsenic</td> <td><5</td> </tr> <tr> <td>Barium</td> <td><100</td> </tr> <tr> <td>Cadmium</td> <td><1</td> </tr> <tr> <td>Chromium VI</td> <td><5</td> </tr> <tr> <td>Lead</td> <td><5</td> </tr> <tr> <td>Mercury</td> <td><0.2</td> </tr> </tbody> </table>	Heavy Metal	Limit (mg/L)	Arsenic	<5	Barium	<100	Cadmium	<1	Chromium VI	<5	Lead	<5	Mercury	<0.2	Laboratory test report(s)	15	-	4.4.3.2
Heavy Metal	Limit (mg/L)																		
Arsenic	<5																		
Barium	<100																		
Cadmium	<1																		
Chromium VI	<5																		
Lead	<5																		
Mercury	<0.2																		
PERFORMANCE																			
Product Life	<p>Serviceability: Carry out at least FIVE testing items to demonstrate quality, durability and performance properties of the product. Relevant tests include the followings:</p> <ul style="list-style-type: none"> • Weathering/ Freeze–thaw resistance • Thermal properties/ conductivity/ prestress • Water absorption capacity • Crushing/ Fragmentation resistance • Tensile splitting/ Bending/ Flexural strength • Resistance/ Reaction to fire • Abrasion resistance • Slip/ skid resistance • Resistance to disintegration • Chemical resistance • Resistance to polishing/ abrasion/ wear/ attrition • Compaction/ Loadbearing capacity • Drying shrinkage 	Laboratory test report(s) and any production documentation for all relevant quality and performance tests	10	-	4.5.2.1														
		Subtotal:	50	+10															

NON-CORE CRITERIA

Criteria	Requirements	Verification	Points	Index
			+Bonus	
CARBON				
CFP Quantification	Provide a 3 rd party endorsed life cycle assessment report with the carbon footprint of products (CFP), covering at least A1 to A3 OR provide an Environmental Product Declaration (EPD).	CFP quantification report OR Environmental Product Declaration (EPD)	+10	4.2.1
RESOURCE				
Circularity	Recyclability: Developed a recycling plan for the product and declared options for reuse, recycling, recovery, and disposal.	Documentation on recycling Plan	+5	4.3.2.1
	Packaging Requirement: The packaging materials shall not contain halogenated plastics; <i>OR</i> Shall be comprised of 100% recycled materials, readily recyclable materials, or decomposable materials; <i>OR</i> Shall not be impregnated, labelled, coated, or otherwise treated in a manner which would prevent or significantly limit recycling.	Documentation on the packaging materials used	+5	4.3.2.2
	Waste Management Plan: Implementing effective Waste Management Plan detailing the policies, procedures, and/or a waste management program covering manufacturing operations.	Waste management plan	+5	4.3.3.1
Water Management	Option A: Water Consumption Reporting: Report both potable and non-potable water usage in the production process of the past year.	Water consumption report	+5/ +10	4.3.4.1
	Water Recycling Program: Develop and implement a water recycling program during the manufacturing process.	Documentation on water recycling		4.3.4.2
	Option B: Water Management System: Process valid certificate under ISO 14046: Water Footprint Assessment.	ISO 14046 Certificate issued by accredited certification body		4.3.4.3
Energy Management	Option A: Energy Management Plan: Implement effective energy management policies and procedures and/or an energy management programme.	Energy Management Plan	+5/ +10	4.3.5.1

Criteria	Requirements	Verification	Points	Index
			+Bonus	
	Option B: Energy Management System: Possess valid certificate under ISO 50001: Energy management systems – Requirements with guidance for use.	ISO 50001 Certificate issued by accredited certification body		4.3.5.2
	Clean Energy: Procure or produce renewable electricity or carbon offsets to compensate 5% of total electricity used and greenhouse gas emissions from other energy sources.	Calculation report	+5	4.3.5.3
ENVIRONMENT				
Environmental Management	Environmental Management System: Possess valid certificate under ISO 14001: Environmental management systems or EU Eco-Management and Audit Scheme (EMAS).	ISO 14001 or EMAS Certificate issued by accredited certification body	+5	4.4.1.1
	Particulate Matters: Manufacturer shall implement effective dust management policies and procedures and/or a dust management programme for the manufacturing plant.	Detailed policies, procedures, programs, and/or plans of dust management	+5	4.4.1.2
Regional Product	Regional Manufactured Product: Products that are manufactured within 800km radius of HKSAR by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation.	Location map with distance between manufacturer and HKSAR	+5	4.4.2.1
Human Toxicity and Ecosystem Impact	Radioactivity: External Hazard Index, $H_{ex} \leq 1.2$ Internal Hazard Index, $H_{in} \leq 0.9$	Laboratory test report(s)	+5	4.4.3.3
	Plasticisers: Concentration of phthalates in the product is below 0.1% by weight of the product. The limited phthalates include the following types: <ul style="list-style-type: none"> • Bis(2-ethylhexyl)phthalate (DEHP) • Dibutyl phthalate (DBP) • benzylbutylphthalate (BBP) • Diisononylphthalate (DINP) • Diisodecylphthalate (DIDP) • Di-n-octylphthalate (DNOP) 	Laboratory test report(s)	+5	4.4.3.4
PERFORMANCE				
Performance Property	Permeability: Product shall obtain a permeability rate of at least 0.01cm/s;	Product catalogue and testing reports	+5	4.5.1.1

Criteria	Requirements	Verification	Points	Index
			+Bonus	
	Solar Reflectance Index: Products shall obtain a solar reflectance index (SRI) of at least 29 in accordance with relevant testing methods.	Documentation such as test reports and product catalogue	+5	4.5.1.2
INNOSMART				
Innovation & Additions	Adopt new practice, technology and strategy, <i>OR</i> Achieve exemplary performance.	Narrative with supporting documents	+5	4.6.1
		Subtotal:	+90	

TABLE OF CONTENTS

1. INTRODUCTION	1
1.1 PURPOSE	1
1.2 BACKGROUND.....	2
2. SCOPE.....	2
3. DEFINITIONS.....	2
4. EVALUATION CRITERIA	3
4.1 BASIC INFORMATION	4
4.1.1 Product Information – Core Criteria	4
4.2 CARBON.....	4
4.2.1 CFP Quantification – Non-core Criteria.....	4
4.3 RESOURCE.....	5
4.3.1 Material Optimization	5
4.3.2 Circularity.....	6
4.3.3 Waste Management.....	7
4.3.4 Water Management.....	8
4.3.5 Energy Management	9
4.4 ENVIRONMENT	10
4.4.1 Environmental Management.....	10
4.4.2 Regional Product.....	11
4.4.3 Human Toxicity and Ecosystem Impact	12
4.5 PERFORMANCE	14
4.5.1 Performance Property	14
4.5.2 Product Life	15
4.6 INNOSMART	17
4.6.1 Innovations & Additions-Non-core Criteria.....	17
5. SCORING.....	19
Appendix.....	20

1. INTRODUCTION

1.1 PURPOSE

The CIC Green Product Certification (the “Scheme”) is a green product labelling scheme, owned by the Construction Industry Council (CIC) and implemented by the Hong Kong Green Building Council (HKGBC). The primary goal of the scheme is to support Hong Kong’s transition to a low-carbon economy by encouraging the adoption of environmentally friendly construction practices.

With the Green Product Certification, various stakeholders, including consumers, building professionals, construction practitioners, and policymakers, can easily and unequivocally identify environmentally preferable construction materials and building products. This certification serves as a reliable indicator of a product’s sustainability, helping to drive market demand for greener options.

To ensure the credibility and effectiveness of the certification, the CIC and the HKGBC has jointly developed this Technical Assessment Standards (the “Standard”), which sets out the assessment criteria and their benchmarks to govern the application and award of a grade under the Scheme. The comprehensive assessment evaluates the overall sustainability of construction materials and building products across multiple dimensions. These dimensions include environmental impact, resource efficiency, technical performance, and the use of smart manufacturing technologies.

The Standard is divided into two main parts:

- General Requirements (Refer to General Requirements provided in separate document). This part introduces Scheme's framework, outlines the application procedure, and details the grades.
- Technical Requirements (This document refers). This part defines the principles, requirements, and guides for quantifying and reporting the products’ carbon footprint (CFP), along with other sustainability assessment criteria and scoring standards.

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.

The Scheme is owned by the Construction Industry Council (CIC), 38/F, COS Centre, 56 Tsun Yip Street, Kwun Tong, Kowloon, Hong Kong; and operated by Hong Kong Green Building Council (HKGBC), 1/F, Jockey Club Environmental Building, 77 Tat Chee Avenue, Kowloon Tong, Hong Kong, Phone: +852 3994 8888, Email: cicgpc@hkgbc.org.hk

1.2 BACKGROUND

Pavement block 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 pavement block in the market, a more comprehensive and systematic approach to assess the environmental impacts of the furniture products shall be developed. The aim of this Standard is to help designers and end-users choose 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 the pavement block. 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 pavement blocks including basic pavement block (block with recycled materials, permeable block, block for vegetation, tactile block, etc.) and interlocking pavement block (interlocking block with recycled materials, permeable interlocking block, interlocking block for vegetation, tactile interlocking block, etc.).

Note:

Each application should specify the product code / serial number. The types and ratio (formulation) of raw materials shall be specified clearly in each application. **ONE** application is only for **ONE** product series with same raw materials and ratio (formulation). Products under the same series with different sizes, thickness, colour 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, but with different ratio (formulation). The deviation of ratio (formulation) of products in each subsequent application shall be $\pm 5\%$ and the information of the ratio (formulation) is required to be provided for the application.

Maximum 5 (FIVE) subsequent applications shall be available, and the subsequent application is only eligible for applying within the validity period of the label.

3. DEFINITIONS

<i>Applicant:</i>	Organisation which applies for the label under the CIC Green Product Certification of the Construction Industry Council
<i>ASTM:</i>	American Society for Testing and Materials
<i>Biological Cycle:</i>	The cycle by which materials or parts are released to, and ideally reprocessed in, the environment via composting, biodegradation, nutrient extraction, or other biological metabolic pathways
<i>BS:</i>	British Standards

<i>CIC:</i>	Construction Industry Council
<i>CNAS:</i>	China National Accreditation Service for Conformity Assessment
<i>EMAS:</i>	Eco-Management and Audit Scheme (EMAS) is an environmental management tool which enables organisations to assess, manage, and continuously improve their environmental performance
<i>GB:</i>	Chinese National Standard
<i>HKAS:</i>	Hong Kong Accreditation Service
<i>HKGBC:</i>	The Hong Kong Green Building Council Limited
<i>HOKLAS:</i>	The Hong Kong Laboratory Accreditation Scheme
<i>IARC:</i>	International Agency for Research on Cancer
<i>ISO:</i>	International Organisation for Standardisation
<i>SRI:</i>	Solar Reflectance Index
<i>MSDS:</i>	Material safety data sheet. To qualify as suitable, MSDS and information therein must not be more than 5-years old
<i>Technical Cycle:</i>	The cycle by which a product’s materials or parts are reprocessed for a new product use cycle via recycling, repair, refurbishment, remanufacturing, or reuse
<i>Third-party:</i>	An entity without any financial interest or stake in the sales of the product or service being evaluated or other conflict of interest
<i>US EPA:</i>	United States Environmental Protection Agency

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) grade under the Scheme. Bonus points may be awarded if the product meets the “Non-core Criteria”. “Bronze”, “Silver”, “Gold”, or “Platinum” grade will be awarded according to the total points accumulated, as shown in Table 1.

Table 1: Benchmarks for grading

Points achieved	Grade to be awarded
90 or above	Platinum
80 – 89	Gold
70 – 79	Silver
60 – 69	Bronze
50 – 59	Green
Below 50	No grade

All submissions and documentations shall be endorsed by the Chief Executive Officer or other authorised persons of the Applicant to demonstrate conformance to the assessment criteria. All certification, laboratory reports, and documentation must be valid during the assessment process and labelling period. The date of issue of all laboratory reports and documentation shall be within 5 years from the first application submission date.

If the certification expires during the labelling period or upon renewal, the applicant is required to provide an updated and valid certification. Failure to resubmit the required certification will result in the revocation of CIC Green Product Certificate without compensation.

The chemical tests should be conducted by either a third party or the manufacturer, providing that they have obtained ISO 17025 certification or relevant national accreditations, such as HOKLAS or CNAS.

4.1 BASIC INFORMATION

4.1.1 Product Information – Core Criteria

The Applicant is required to achieve 5 Basic Points under this section.

Requirements

5 Basic Points for providing following information with delivered products or made accessible to public:

- 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 showing the product information and instructions including, but not limited to, product catalogue, technical datasheet, webpages, and/or any other information freely accessible by customers.

4.2 CARBON

4.2.1 CFP Quantification – Non-core Criteria

The Applicant can achieve maximum 10 Bonus Points under this section.

Requirements

10 Bonus Points for providing life cycle assessment report for quantifying and reporting the carbon footprint of products (CFP), covering at least A1 (raw material supply), A2 (transport), and A3 (manufacturing process). This can be achieved by either of the following:

Conduct CFP study report in accordance with ISO 14067:2018, GB/T 24067-2024 or equivalent.

OR

10 Bonus Points for providing the product's CFP value from a product level EPD issued in accordance ISO 14025:2006, ISO 14067:2018, ISO 21930:2017, GB/T 24067-2024, GB/T 24025-2009 or BS EN 15804:2012.

Verification

Either of the following documents shall be provided for verification:

CFP quantification report endorsed by a third-party critical review, in accordance with ISO 14067:2018, GB/T 24067-2024 or equivalent

OR

Environmental Product Declaration issued by 3rd party fulfilling the above requirements.

4.3 RESOURCE

4.3.1 Material Optimization

The Applicant can achieve maximum 20 Points under this section.

The Applicant is required to achieve 10 Basic Points under this section. Additionally, the Applicant can achieve maximum 10 Bonus Points under this section.

4.3.1.1 Raw Materials – Core Criteria

Requirements

Points are awarded for meeting the requirement on raw materials through one of the following options:

Option A

For concrete blocks including but not limited to dense concrete, lightweight aggregate concrete, and autoclaved aerated concrete, points are awarded according to the percentage (%) of raw materials or components of product (by weight) made from recycled materials or waste materials. The applicable recycled materials and waste materials are stated in *Appendix: Table 9*. The points shall be awarded according to table below.

Table 2 Percentage of Recycled and Waste Materials

Points	% of Recycled and Waste Materials
10 Basic	≥ 50%
10 Basic + 10 Bonus	≥ 80%

OR

Option B

For concrete blocks including but not limited to dense concrete, lightweight aggregate concrete, and autoclaved aerated concrete, points are awarded according to the density of the product, as stated in table below.

Table 3 Product Density

Points	Density
10 Basic	< 700 kg/m ³
10 Basic + 10 Bonus	< 400 kg/m ³

Verification

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

4.3.2 Circularity

The Applicant can achieve maximum 10 Bonus Points under this section.

4.3.2.1 Recyclability – Non-core Criteria

Requirements

5 Bonus Points for demonstrating that the manufacturer has developed a recycling plan for the product and declared options for reuse, recycling, recovery, and disposal. The plan shall include the following and be made available to public:

- Designate all homogeneous materials in the product as being intended for technical and/or biological cycles and define the intended cycling pathway(s) for each material; and
- Identify potential partners for product reuse, recycling, and recovery in accordance with the intended cycling pathway(s); and
- For products and materials intended for municipal recycling, the product and/or material must be compatible for municipal cycling systems (e.g., painted plastics and plastic laminated paper are not currently compatible for municipal recycling); and

- Instructions for how to cycle the product shall be made publicly available.

Verification

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

4.3.2.2 Packaging Requirement – Non-core Criteria

Requirements

5 Bonus Points for minimizing the wastage from all primary packaging materials. The packaging materials shall achieve either of the following:

The packaging materials shall not contain halogenated plastics

OR

The packaging materials shall be comprised of 100% recycled materials, readily recyclable materials, or decomposable materials

OR

The packaging shall not be impregnated, labelled, coated, or otherwise treated in a manner which would prevent or significantly limit recycling.

Verification

Documentation describing the packaging materials used as well as their chemical composition (if any and where applicable), treatment process, and recyclability.

4.3.3 Waste Management

The Applicant can achieve maximum 5 Bonus Points under this section.

4.3.3.1 Waste Management Plan – Non-core Criteria

Requirements

5 Bonus Points for implementing an effective Waste Management Plan detailing the policies, procedures, and/or a waste management program covering manufacturing operations. The waste management plan should include, but should not be limited to, the following information:

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

Verification

Documentation of waste management plan detailing the above, supported by organisational policy or other equivalent documents.

4.3.4 Water Management

The Applicant can achieve maximum 10 Bonus Points under this section.

The Applicant can select one of the options below and comply with any or all the requirements under that option to achieve the associated points.

Option A:

4.3.4.1 Water Consumption Reporting – Non-core Criteria

Requirements

5 Bonus Points for reporting both potable and non-potable water usage in the production process of the past year.

Verification

Water consumption report, supported by water usage data acquired from water meter, water sub-meter, water bill, or other equivalent documents.

4.3.4.2 Water Recycling Program – Non-core Criteria

Requirements

5 Bonus Points for developing and implementing water recycling program during the manufacturing process.

Verification

Documentation demonstrating the implementation of water recycling program, supported by drawings, water usage data acquired from water sub-meter, or other equivalent documents.

Option B:

4.3.4.3 Water Management System – Non-core Criteria

Requirements

10 Bonus Points for possessing valid certificate under ISO 14046: Environmental management – Water footprint – Principles, requirements and guidelines.

ISO 14046 is a framework for assessing the water footprint of products, processes, and organizations. It provides principles, requirements, and guidelines for conducting and reporting water footprint assessments. It helps organizations evaluate and improve their water management practices.

Verification

A valid ISO 14046 certificate issued by accredited certification body.

4.3.5 Energy Management

The Applicant can achieve maximum 15 Bonus Points under this section.

The Applicant can select one of the options below and comply with any or all the requirements under that option to achieve the associated points.

Option A:

4.3.5.1 Energy Management Plan – Non-core Criteria

Requirements

5 Bonus Points for implementing effective energy management policies and procedures and/or an energy management programme including, but not limited to, the following items:

- Energy efficiency initiatives: Manufacturer should undertake specific initiatives to reduce energy use and improve energy efficiency throughout their operations. This could include upgrading to more efficient equipment, optimizing production processes, or implementing energy-saving technologies; and
- Supplier requirements: Manufacturers should extend their energy management efforts to their supply chain by establishing requirements or initiatives for suppliers and contract manufacturers to improve their energy performance where possible.

Verification

Documentation of energy management plan detailing the above, supported by organizational policy or other equivalent documents.

Option B:

4.3.5.2 Energy Management System – Non-core Criteria

Requirements

10 Bonus Points for possessing valid certificate under ISO 50001: Energy management systems — Requirements with guidance for use.

ISO 50001 provides a framework for organizations to establish, implement, maintain, and improve an Energy Management System. The goal is to help organizations improve their energy performance, increase energy efficiency, and reduce energy costs and greenhouse gas emissions. By achieving ISO 50001 certification, manufacturers can demonstrate their commitment to energy efficiency and sustainability.

Verification

A valid ISO 50001 certificate issued by accredited certification body.

4.3.5.3 Clean Energy – Non-core Criteria

Requirements

5 Bonus Points for procurement or production of renewable electricity or carbon offsets to compensate 5% of total electricity used and greenhouse gas emissions from other energy sources.

The targets can be met via a variety of methods. One or more of the methods listed below may be applied toward achieving the targets.

i) For electricity

- Procure or produce renewable electricity to match 5% of the electricity used; or
- Purchase carbon offsets to compensate for 5% of the resulting greenhouse gas emissions (using grid average emissions factors)

ii) For greenhouse gas emissions from other energy sources

- Purchase carbon offsets to compensate for 5% of the resulting greenhouse gas emissions

Verification

Calculation report include at least the following information:

- Quantity of electricity consumed with the associated carbon emission factor, supported by electricity bill and grid emission factor; and
- Quantity of other energy source consumed with the associated carbon emission factor, supported by purchase order, declaration letter, or other equivalent documents; and
- Quantity of renewable electricity produced onsite, supported by drawings, submeter reading, or other equivalent documents; and
- Quantity of renewable electricity or carbon offset purchased, supported by purchase agreement, carbon offset program certification, or other equivalent documents.

4.4 ENVIRONMENT

4.4.1 Environmental Management

The Applicant can achieve maximum 10 Bonus Points under this section.

4.4.1.1 Environmental Management System – Non-core Criteria

Requirements

5 Bonus Points for possessing valid certificate under ISO 14001: Environmental management systems — Requirements with guidance for use or EU Eco-Management and Audit Scheme (EMAS).

The target of the environmental management system shall be set to reduce the environmental impacts during the manufacturing process which include, but are not limited to, the reduction of hazardous substance emissions, energy consumption, CO₂ emissions, secondary environmental load, waste management, water management, etc.

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.

Verification

A valid ISO14001 or EMAS certificate issued by accredited certification body.

4.4.1.2 Particulate Matters – Non-core Criteria

Requirements

5 Bonus Points for implementing effective dust management policies and procedures and/or a dust management programme for the manufacturing plant including, but not limited to, the following items:

- Initiatives taken for dust management covering all areas of the operation and associated activities; and
- Monitoring plan for controlling the particulate matters (PM 2.5 & PM 10).

Verification

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

4.4.2 Regional Product

The Applicant can achieve maximum 5 Bonus Points under this section.

4.4.2.1 Regional Manufactured Product – Non-core Criteria

Requirements

5 Bonus Points for products that are manufactured within 800km radius of HKSAR by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation. The distance is measured by the direct distance, not by actual travel distance.

Verification

Documents demonstrating the location of the manufacturer and a map showing the distance between the manufacturer and HKSAR.

4.4.3 Human Toxicity and Ecosystem Impact

The Applicant can achieve maximum 35 Points under this section.

The Applicant is required to achieve 25 Basic Points under this section. Additionally, the Applicant can achieve maximum 10 Bonus Points under this section.

4.4.3.1 Hazardous Substances – Core Criteria

Requirements

10 Basic Points for demonstrating that the product shall limit the concentration of following organic compounds below threshold listed in Table 4.

Table 4: Limit of Organic Compounds

Organic Compounds	Limit (mg/L)
Cyanide	<10
Organic Phosphorus	<1
Trichloroethylene	<0.3
Tetrachloroethylene	<0.1
Phenolic Compounds	<0.2

AND

The product shall not contain any carcinogenic substances or chemicals that are classified as Group 1, 2A, or 2B according to International Agency for Research on Cancer (IARC)¹. Any such carcinogens which are known to be present as contaminants shall be less than 0.1% by weight of the product

AND

The product shall also not contain any substances or chemicals that are classified as H300 - Fatal if swallowed, H301 - Toxic if swallowed, H302 - Harmful if swallowed, H310 - Fatal in contact with skin, H311 - Toxic in contact with skin, H312 - Harmful in contact with skin, H330 - Fatal if inhaled, H331 - Toxic if inhaled, or H332 - Harmful if inhaled, in accordance with Regulation (EC) No. 1272/2008 of the European Parliament and of the Council².

Verification:

Laboratory test report(s) shall be provided for organic compounds requirements listed in Table 4. Laboratory test report(s) or self-declaration letter shall be provided for carcinogenic substances and concerned substances listed above.

¹ [Agents Classified by the IARC Monographs, Volumes 1–137 – IARC Monographs on the Identification of Carcinogenic Hazards to Humans](#)

² [Regulation - 1272/2008 - EN - clp regulation - EUR-Lex](#)

4.4.3.2 Heavy Metals – Core Criteria

Requirement

15 Basic Points for products limiting the heavy metals concentration below the listed threshold shown in Table 5.

Table 5: Limit of heavy metal

Heavy Metal	Limit (mg/L)
Arsenic	<5
Barium	<100
Cadmium	<1
Chromium VI	<5
Lead	<5
Mercury	<0.2

Product shall undergo a standard leaching test according to US EPA 1311: Test Toxicity Characteristic Leaching Procedure; other related testing methods are also acceptable with justification provided by the applicant.

US EPA 1311: Test Toxicity Characteristic Leaching Test is designed to determine the mobility of both organic and inorganic compounds present in liquid, solid, as well as multiphase samples.

Verification

Detailed laboratory report(s) shall be provided.

4.4.3.3 Radioactivity – Non-core Criteria

Requirements

5 Bonus Points for demonstrating the following:

The effective concentration of potassium isotope K_{40} (C_K), radium isotope Ra_{226} (C_{Ra}), and thorium isotope Th_{232} (C_{Th}) shall satisfy the following requirements:

External Hazard Index, H_{ex} :

$$H_{ex} = \frac{C_K}{4200} + \frac{C_{Ra}}{370} + \frac{C_{Th}}{260}$$

Internal Hazard Index, H_{in} :

$$H_{in} = \frac{C_{Ra}}{200}$$

where H_{ex} shall be ≤ 1.2 and H_{in} shall be ≤ 0.9 .

Products shall be tested based on the requirement as stated in GB 6566-2010 (or latest version); other related testing methods are also acceptable with justification provided by the Applicant.

GB 6566-2010 specifies the limits and natural radionuclides in building materials radionuclide radium-226, thorium-232, potassium-40 Test Method for radioactivity.

Verification

Detailed laboratory report(s) shall be provided.

4.4.3.4 Plasticisers – Non-core Criteria

Requirements

5 Bonus Points for demonstrating the concentration of phthalates in the product is below 0.1% by weight of the product with plastic content. The limited phthalates include the following types:

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

Verification

Detailed laboratory report(s) shall be provided. Test report(s) shall be compiled according to the National and International test methods.

4.5 PERFORMANCE

4.5.1 Performance Property

The Applicant can achieve maximum 10 Bonus Points under this section.

4.5.1.1 Permeability – Non-core Criteria

Requirements

5 Bonus Points for achieving a permeability rate of at least 0.01cm/s in accordance with relevant national and international test methods (if applicable), including but not limited to the ASTM C1701/C1701M-17a and ASTM C1781/C1781M-21; other related testing methods are also acceptable with justification provided by the Applicant.

ASTM C1701/C1701M-17a specifies the determination of the field water infiltration rate of in place pervious concrete.

ASTM C1781/C1781M-21 specifies the determination of the field surface infiltration rate of in place permeable unit pavement systems surfaced with solid interlocking concrete paving units, concrete grid paving units, or clay paving brick.

Verification

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

4.5.1.2 Solar Reflectance Index – Non-core Criteria

Requirements

5 Bonus Points for products obtaining a solar reflectance index (SRI) of at least 29 in accordance with relevant ASTM testing method (if applicable) including, but not limited to, the ASTM E1980; other related testing methods are also acceptable with justification provided by the Applicant.

ASTM E1980 specifies the calculation of the solar reflectance index (SRI) of horizontal and low-sloped opaque surfaces at standard conditions. The method is intended to calculate SRI for surfaces with emissivity greater than 0.1.

Verification

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

4.5.2 Product Life

The Applicant is required to achieve 10 Basic Points under this section.

4.5.2.1 Serviceability – Core Criteria

Requirements

10 Basic Points for demonstrating the product quality, durability, and performance properties through at least **FIVE** (as applicable to material type) testing items which may include, but not be limited to, the following:

- Weathering/ Freeze–thaw resistance
- Thermal properties/ Conductivity/ Prestress
- Water absorption capacity
- Crushing/ Fragmentation resistance
- Tensile splitting/ Bending/ Flexural strength
- Resistance/ Reaction to fire
- Abrasion resistance
- Slip/ skid resistance
- Resistance to disintegration
- Chemical resistance
- Resistance to polishing/ abrasion/ wear/ attrition

- Compaction/ Loadbearing capacity
- Drying shrinkage

Table 6: Testing requirements for pavement block

Testing items	Testing Methods/ Requirements
• Weathering/ Freeze–thaw resistance	BS EN 1338: 2003, BS EN 1339: 2003, BS EN 12620: 2013, BS EN 13055:2016, GB/T 25993-2023
• Thermal properties/ Conductivity/ Prestress	BS EN 1338: 2003, BS EN 1339: 2003, BS EN 13055:2016, GB/T 25993-2023
• Water absorption capacity	BS EN 12620:2013, BS EN 13055-1:2002, BS EN 13055-2:2004, GB/T 25993-2023
• Crushing/ Fragmentation resistance	BS EN 12620:2013, BS EN 13055:2016, GB/T 25993-2023
• Tensile splitting/ Bending/ Flexural strength	BS EN 1338: 2003, BS EN 1339: 2003, GB/T 25993-2023
• Resistance/ Reaction to fire	BS EN 1338: 2003, BS EN 1339: 2003, GB/T 25993-2023
• Abrasion resistance	BS EN 1338: 2003, BS EN 1339: 2003, GB/T 25993-2023
• Slip/ skid resistance	BS EN 1338: 2003, BS EN 1339: 2003, GB/T 25993-2023
• Resistance to disintegration	BS EN 13055:2016, GB/T 25993-2023
• Chemical resistance	BS EN 12620:2013, BS EN 13055:2016, GB/T 25993-2023
• Resistance to polishing/ abrasion/ wear/ attrition	BS EN 12620:2013, BS EN 13055:2016, GB/T 25993-2023
• Compaction/ Loadbearing capacity	BS EN 13055:2016, GB/T 25993-2023
• Drying shrinkage	BS EN 12620:2013, GB/T 25993-2023

Requirement of concrete paving blocks/flags (if applicable)

- BS EN 1338:2003
- BS EN 1339:2003

Requirement of aggregates (if applicable)

- BS EN 13055:2016
- BS EN 12620:2013

Verification

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

4.6 INNOSMART

4.6.1 Innovations & Additions-Non-core Criteria

The Applicant can achieve maximum 5 Bonus Points under this section.

Requirements:

5 Bonus Points for achieving significant, measurable environmental performance using new practices, technology, and strategy not addressed in this Standard.

OR

Demonstrating exemplary performance in any of the existing assessment criteria.

The benefits of environmental performance can be achieved throughout the lifecycle of the products, covering the production, construction process, use, and end of life stage.

Examples of innovative and smart technologies are shown below:

- Implementing technologies that significantly reduce resource consumption across various aspects.
- Adopting intelligent production methods that leverage automation, data analytics, and innovative design techniques.

Table 7: Examples for Innovative and Smart technologies

Permeable Pavement Blocks	<ul style="list-style-type: none"> • Designed to allow rainwater to pass through, reducing surface runoff and promoting groundwater recharge. • Helps prevent flooding and reduces the burden on drainage systems by managing stormwater naturally. • Often made from recycled materials, contributing to eco-friendly urban development.
Solar-Powered Pavement Blocks	<ul style="list-style-type: none"> • Integrated solar cells harness sunlight to generate renewable energy for street lighting or nearby facilities. • Can power LED lights embedded in the pavement, enhancing safety and visibility at night. • Reduces reliance on non-renewable energy sources, promoting sustainable urban infrastructure.
Smart Pavement Blocks with Sensors	<ul style="list-style-type: none"> • Equipped with sensors to monitor traffic patterns, temperature, and environmental conditions. • Provides data on wear and tear, allowing for proactive maintenance and reducing long-term repair costs. • Can be integrated with smart city applications to provide information on traffic, weather, or local events to pedestrians.

Verification

Report with a maximum length of 1,000 words, outline the objectives, solution, and evaluation of the performance achieved by the proposed Smart and Innovative Technologies; and

Include attachments that provide evidence of implementation, along with relevant technical specifications that support the claims made in the report.

5. SCORING

The points for meeting each criterion stated in this Standard are summarized below.

Table 8: Points to be awarded under the assessment criteria of this Standard

Label	Evaluation Criteria		Points		Related BEAM Plus Credits
			Basic	+Bonus	
	Product Information [CORE]		5	-	
Carbon	CFP Quantification		-	+10	
Resource	Material Optimization	Raw Materials [CORE]	10	+10	MW 6
		Circularity	Recyclability	-	+5
	Packaging Requirement		-	+5	
	Waste Management	Waste Management Plan	-	+5	
	Water Management	Water Consumption Reporting	-	+5/+10	
		Water Recycling Program			
		Water Management System			
	Energy Management	Energy Management Plan	-	+5/+10	
		Energy Management System			
Clean Energy		-	+5		
Environment	Environmental Management	Environmental Management System	-	+5	
		Particulate Matters	-	+5	
	Regional Product	Regional Manufactured Product	-	+5	MW 8
	Human Toxicity and Ecosystem Impact	Hazardous Substances [CORE]	10	-	
		Heavy Metals [CORE]	15	-	
Radioactivity		-	+5		
		Plasticisers	-	+5	
Performance	Performance Property	Permeability	-	+5	SS 11
		Solar Reflectance Index	-	+5	
	Product Life	Serviceability [CORE]	10	-	MW 4
InnoSmart	Innovations & Additions		-	+5	IA
Total:			50	+100	

Related BEAM Plus Credits refer to these relevant credits under BEAM Plus New Buildings Version 2.0, as listed below:

- MW 4: Design for Durability and Resilience
- MW 6: Recycled Materials
- MW 8: Regional Materials
- MW 9: Use of Green Products
- SS 11: Stormwater Management
- Innovations and Additions

Appendix

Table 9: Category of recycled materials/wastes for raw materials of concrete products

Category	Recycled Materials
Incinerated ashes	Incinerated ashes
Waste from metal industry	Copper slag
	Steel slag
	Ceramic material
	Electric furnace slag
	Ferronickel slag
	Casting sand
	Lime/plaster
	Moulding sand
	Lime powder
Inorganic sludge	Sewer sludge
	Waterworks sludge
	Sludge at bottom of lake
Sludge generated industrially	Paper manufacturing sludge
	Aluminium sludge
	Plating sludge
	Polishing sand sludge
Other industrial waste	Coal ash
	Disposed plastics
	Shells
	Disposed lumber from buildings
	Glass cullet
	Disposed rubber
Construction & Demolition Waste	Concrete
	Glass
	Disposed lumber from buildings
	Asphalt
	Metals
	Gypsum
Waste from mines and quarries	Waste sand from quarries and ceramics
	Micro silica sand generated at separation of silica by water