CONSTRUCTION INDUSTRY COUNCIL

CIC GREEN PRODUCT CERTIFICATION

STONE
(Version 1.0a)

Assessment Standard

Last updated: 11 June 2020

Section A
NATURAL STONE

Summary of Assessment Criteria

CORE CRITERIA

Criteria	*Requirements*	*Verification*	*Points*		*Index*
			Basic	*+Bonus*	
Product Information	○ Provide the following product information: ▪ Nature of stone ▪ Information of product uses ▪ Instructions on the installation and protection of the product ▪ Recommendation on maintenance for the product	Documentation related to the label and relevant information	**5**		*4.1.1 (page 4)*
Reuse and Recycling of Wasted Materials	Provide the information on reuse and/or recycling of wasted stone materials during the processing.	Plan on wasted stone materials being reuse and/or recycled	**5**		4.2.1 *(page 4)*
Radioactivity	The effective concentration of potassium isotope K_{40} (C_K), radium isotope Ra_{226} (C_{Ra}) and thorium isotope Th_{232} (C_{Th}) shall fulfil 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 ≤ 1.3 and H_{in} shall be ≤ 1.0	Laboratory test report(s), MSDS and production documentation	**10**		4.3.1 *(page 6)*
Particulate Matters	Total particulate matters during the manufacturing process : < 150 µg/ m^3	Detailed report(s) of air emission of particulate matters	**10**		4.4.1 *(page 7)*
Heavy Metal in Waste Water	Heavy metal in waste water discharged shall be lower than the maximum allowable limit: ▪ Cadmium: < 0.015 mg/L ▪ Chromium (VI): < 0.15 mg/L ▪ Iron: < 1.5 mg/L ▪ Lead: < 0.15 mg/L	Detailed report(s) of the amount of hazardous substances in waste water discharged from the manufacturing plant	**10**		4.4.2 *(page 7)*
Suspended Solid in Waste Water	○ Suspended solids in waste water shall not exceed 40 mg/L.	Detailed report(s) of the amount of suspended solids in waste water discharged from the manufacturing plant	**10**		4.4.3 *(page 8)*
		Subtotal:	**50**		

NON-CORE CRITERIA

Criteria	***Requirements***	***Verification***	***Points*** / ***+Bonus***	***Index***
Environmental Management System	○ Valid certification of ISO14001, the EU Eco-Management and Audit Scheme (EMAS) or Natural Stone Council (NSC)	ISO14001, EMAS or NSC certificate issued by accredited certification body	*+10*	4.4.5 *(page 8)*
Extraction Efficiency	The extraction efficiency of the main mining or quarry operation shall be higher than or equal to 25%. ○ Extraction efficiency = Usable materials per annum (m^3) / Total extracted materials per annum (m^3)	Detailed report(s) on the amount of extracted materials and usable materials	*+5*	4.2.2 *(page 5)*
Water Management	The water recycling efficiency in the manufacturing process shall be equal to or higher than 25%. ○ Water recycling efficiency = Waste water recycled per annum (m^3) / Total water exists the process per annum (m^3) x 100%	Detailed report(s) on the amount of waste water recycled and total water used	*+5*	4.2.3 *(page 5)*
Chemical Management	A chemical management plan shall be provided to demonstrate that the chemical issues are well managed: ▪ MSDS ▪ Use and onsite storage record ▪ Safety training for workers responsible for handling materials and products ▪ Schedule and report for the review of management plan	Detailed plan of chemical consumption and management programme	*+5*	4.2.4 *(page 5)*
Energy Management	Effective energy management policies and procedures and / or an energy management programme shall include: ▪ Initiatives taken to reduce energy use and improve energy efficiency; ▪ Initiatives or requirements for suppliers or contract manufacturers.	Detailed plan of energy consumption and reduction programme	*+5*	4.2.5 *(page 6)*
Carcinogenic Substances	Substances listed in IARC Group 1, 2A and 2B shall be < 0.1% by weight of the product	Laboratory test report(s), MSDS, self-declaration letter and production documentation	*+10*	4.3.2 *(page 7)*
Environmentally Hazardous Substances	The product shall be less than 1% by weight of the environmental hazardous substances carrying the following risk phrases: R50, 51, 52, 53, 54, 55, 56, 57, 58 or 59	Laboratory test report(s), MSDS, self-declaration letter and production documentation	*+10*	4.4.4 (page 8)
		Subtotal:	**+50**	

Section B
ARTIFICIAL STONE

Summary of Assessment Criteria

CORE CRITERIA

Criteria	*Requirements*	*Verification*	*Points*		*Index*
			Basic	*+Bonus*	
Product Information	o Provide the following product information: ▪ Product composition ▪ Information of product uses ▪ Instructions on the installation and protection of the product ▪ Recommendation on maintenance for the product	Documentation related to the label and relevant information	**5**		5.1.1 *(page 9)*
Durability	o Provide information to demonstrate the product's properties including: ▪ Compressive strength / Flexural strength ▪ Density and water absorption	Laboratory test report(s) on properties performance	**5**		5.1.2 *(page 9)*
Raw materials	Raw materials or components of product (by weight) are made from combinations of recycled materials and /or waste materials: ▪ ≥ 30% (10 basic) ▪ ≥ 40% [+5 bonus] ▪ ≥ 50% [+10 bonus]	Detailed report(s) of the recycled content with substantiations	**10**	*+5 / +10*	5.2.1 *(page 10)*
Particulate Matters	o Total particulate matters during the manufacturing process: < 30 mg/m^3.	Detailed report(s) of the air emission of particulate matters	**10**		5.4.1 *(page 12)*
Heavy Metal in Waste Water	Heavy metal in waste water discharged shall be lower than the maximum allowable limit: ▪ Cadmium: < 0.015 mg/L ▪ Chromium (VI): < 0.15 mg/L ▪ Iron: < 1.5 mg/L ▪ Lead: < 0.15 mg/L	Detailed report(s) of the amount of hazardous substances in waste water discharged from the manufacturing plant	**10**		5.4.2 *(page 12)*
Suspended solid in Waste Water	o Suspended solids in waste water shall not exceed 40 mg/L.	Detailed report(s) of the amount of suspended solids in waste water discharged from the manufacturing plant	**10**		5.4.3 *(page 13)*
		Subtotal:	**50**	+10	

NON-CORE CRITERIA

Criteria	***Requirements***	***Verification***	***Points*** / ***+Bonus***	***Index***
Environmental Management System	○ Valid certification of ISO14001, the EU Eco-Management and Audit Scheme (EMAS) or Natural Stone Council (NSC)	ISO14001, EMAS or NSC certificate issued by accredited certification body	*+5*	5.4.4 *(page 13)*
Energy Management	Effective energy management policies and procedures and / or an energy management programme shall include: ○ Initiatives taken to reduce energy use and improve energy efficiency; ○ Initiatives or requirements for suppliers or contract manufacturers.	Detailed plan of energy consumption and reduction programme	*+5*	5.2.2 *(page 10)*
Water Management	Prepare a water management plan for the manufacturing process to facilitate the conservation of water	Water management plan	*+5*	5.2.3 *(page 10)*
Carcinogenic Substances	Substances listed in IARC Group 1, 2A and 2B shall be < 0.1% by weight of the product	Laboratory test report(s), MSDS, self-declaration letter and production documentation	*+10*	5.3.1 *(page 11)*
Hazardous Substances	The following chemicals shall be < 0.1% by weight of the product: ▪ Materials that give rise to dioxins; ▪ Halogenated organic flame retardants (e.g., decaBDE, chlorinated paraffins, etc); ▪ Flaming additives for natural products; ▪ Halogenated organic solvents; ▪ Aniline-based amines; ▪ Aziridine or polyaziridines; ▪ Phthalates, including DEHP, DBP, DAP, BBP, DMP, DMT, DEP, DMEP and DIBP; ▪ Alkylphenolethoxylates (APEO) or derivatives (APDs) ▪ 1,3 butadiene.	Laboratory test report(s), MSDS, self-declaration letter and production documentation	*+10*	5.3.2 *(page 11)*

Radioactivity	The effective concentration of potassium isotope K_{40} (C_K), radium isotope Ra_{226} (C_{Ra}) and thorium isotope Th_{232} (C_{Th}) shall fulfil 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 ≤ 1.3 and H_{in} shall be ≤ 1.0	Laboratory test report(s), MSDS and production documentation	*+5*	5.3.3 *(page 11)*
			Subtotal:	**+40**	

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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 natural stone 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

Natural Stone

Natural stones are commonly used in the construction industry as floor and wall covering materials. Natural stone products mainly induce environmental impacts during its pre-production, production and use stage. The production cycle of natural stones typically include quarry operation, raw blocks cutting, polishing and buffing. Major environmental impacts associated with the production of natural stones include raw materials consumption, human toxicity and waste discharge.

Natural stones (CEN TC 246) are pieces of naturally occurring rock, and include marble, granite and other natural stones. "Other" natural stones refers to natural stones whose technical characteristics are on the whole different from those of marble and granite as defined by CEN/TC 246/N.237 prEN 12670 "Natural stones - Terminology". Generally, such stones do not readily take a mirror polish and are not always extracted by blocks: sandstone, quartzite, slate, tuff, schist.

Artificial Stone

Artificial stones are commonly applied as the decorative surface material of interior and exterior wall, such as wall cladding, non-load-bearing exterior veneer, and wall finishes etc. The product could also be used as the table and desk tops, kitchen and bath countertops and backsplashes. The production cycle of artificial stones includes mixing of natural stones or

aggregate, a resin (as a binder), pigments and additives. The mixture is compacted into slabs under pressure, vibration and controlled temperature. Major environmental impacts associated with the production of artificial stones include raw materials consumption, human toxicity and waste discharges.

The purposes of assessment criteria developed for both natural and artificial stone products are, therefore, to minimise the impacts to both the human health and environment throughout the product's life cycle.

2. SCOPE

Natural Stone

This Standard covers natural stone products as stated in ASTM C119, which includes slate, granite, quartz-based dimension stone, marble, limestone, alabaster, soapstone, and other relevant hard surfacing stone products for interior use but not carry the structural function, the scope also does not include the support structure or system of the product.

Stone products being used as raw materials, such as aggregates, dolomite, chalk, etc., are not covered in this section for natural stone. This section for natural stones also excludes any hybrid and composite products and those containing materials not directly specified in the scope for natural stone in this Standard.

The types of raw materials and its source i.e. quarry or mine shall be specified clearly in each application. **ONE** application is only for **ONE** product series with same raw materials and source. All the related products have to be listed on the submitted documents.

Artificial Stone

The scope of this Standard includes all artificial stone products made from natural stones, aggregates and combining with other materials such as fibre, mineral, cement, ash and resin etc. The products could be in the form of blocks or slabs, which can be transformed in finished slabs, tiles, vanity tops or similar elements complementary to products for flooring and wall finishes. But the scope does not include the support structure or system of the product and the product serving any structural function.

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). All the related products have to be listed on the submitted documents.

E.g. Composition of mixed quartz stone and glass fibre plus binding agent A and various colouring is regarded as one application.
Subsequent application is available for the similar products with the same raw materials i.e. quartz and fibre of a labelled product series with different ratio (formulation), which is only eligible for applying within the validity period of the label.

3. DEFINITIONS

Applicant: Organisations which apply for the label of the CIC Green Product Certification of the Construction Industry Council

CIC: Construction Industry Council

CNAS: China National Accreditation Service for Conformity Assessment

Granite: Granite is generally composed of feldspar, mica and quartz crystals and is a plutonic igneous rock having visibly crystalline texture of medium to coarse graining

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

Limestone: Limestone is composed of mineral calcite (calcium carbonate) and is a sedimentary rock

Marble: Marble is a hard crystalline metamorphic rock

MSDS: Material Safety Data Sheets. To qualify as suitable, the MSDS and information therein must not be more than 5-year old

Natural stones: Naturally occurring rock, such as marble, granite, sandstone and limestone

Sandstone: Sandstone is a clastic sedimentary rock composed of sand sized grains set in a matrix of silt or clay. It is generally united by silica, iron oxide or calcium carbonate

Slate: Slate is a fine-grained metamorphic rock derived from shale-type sedimentary rock. It is composed of clay or volcanic ash through low grade metamorphism

Third-party: An entity without any financial interest or stake in the sales of the product or service being evaluated or other conflict of interest

Usable Materials: The materials or substances produced from natural resources. The usable materials are suitable for further processing and use; all materials destined for disposal are

not defined as usable materials.

4. EVALUATION CRITERIA FOR NATURAL STONE

A product (natural stone) 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 6 for details). All submission 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 certification, laboratory report and documentation must be valid during the assessment process and labelling period. The validity of all laboratory report and documentation shall be 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.

4.1 GENERAL REQUIREMENTS

4.1.1 Product Information

5 Points (Core Criterion)
The following information shall be supplied with the product or made available to the public to help users using the products in a sustainable manner:

- Nature of stone
- Information of product uses
- Instructions on the installation and protection of the product
- Recommendation on maintenance for the product

Verification
Documentation related to the product labels, instructions and other information provided with the product, material safety data sheets (MSDS), web pages and any other information shall be freely available to customers or the public.

4.2 RESOURCE CONSUMPTION

4.2.1 Reuse and Recycling of Wasted Materials

5 Points (Core Criterion)
The manufacturer shall provide the information on reuse and/or recycling of wasted stone materials during the processing. The information shall be able to indicate the sources and the means of reuse and/or recycling of wasted materials quantitatively.

Verification
Detailed report(s) on the amount of wasted stone materials being reused and/or recycled with proper substantiations.

4.2.2 Extraction Efficiency

5 Points (Non-Core Criterion)
The Applicants shall report the total amount of extracted materials and usable materials per annum. The extraction efficiency of the main mining or quarry operation shall be higher than or equal to 25%. The extraction efficiency can be calculated by the following formula:

$$\text{Extraction efficiency} = \frac{\text{Usable materials } (m^3)}{\text{Total extracted materials } (m^3)}$$

Verification
Detailed report(s) on the amount of extracted materials and usable materials with proper substantiations.

4.2.3 Water Management

5 Points (Non-Core Criterion)
The Applicant shall report the total amount of waste water recycled and total water used in the manufacturing process per annum. The water recycling ratio in the manufacturing process shall be equal to or higher than 25%. The water recycling ratio can be calculated by the following formula:

$$\text{Water recycling efficiency} = \frac{\text{Waste water recycled } (m^3)}{\text{Total water exists the process } (m^3)} \times 100\%$$

Verification
Detailed report(s) on the amount of waste water recycled and total water exists the manufacturing process with proper substantiation.

4.2.4 Chemical Management

5 Points (Non-Core Criterion)
A chemical management plan shall be provided to demonstrate the chemical issues are well managed:

- MSDS of used chemicals
- Use and onsite storage record
- Safety training for workers responsible for handling materials and products

- Schedule and report for the review of management plan

Verification

Detailed report(s) that describes the chemical management policies, procedures and programmes that is written or signed by Chief Executive Officer or other authorised representative of the Applicant.

4.2.5 Energy Management

5 Points (Non-Core Criterion)

The Applicant shall have effective energy management policies and procedures and / or an energy management programme. The followings shall be submitted as support:

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

Verification

Detailed report(s) that describes the energy management policies, procedures and programmes that is written or signed by Chief Executive Officer or other authorised representative of the Applicant.

4.3 HUMAN TOXICITY

4.3.1 Radioactivity

10 Points (Core Criterion)

The effective concentration of potassium isotope K40 (CK), radium isotope Ra226 (CRa) and thorium isotope Th232 (CTh) shall fulfil the following requirements:

External Hazard Index, Hex:

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

Internal Hazard Index, Hin:

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

where Hex shall be $\leq$ 1.3 and Hin shall be $\leq$ 1.0

Verification

A detailed laboratory report(s) shall be provided. The product has to be crushed during preparation and gamma spectroscopy shall be used to measure the effective concentration of the product. Or the manufacturer shall indicate the product materials do not contain any radioactive substances.

4.3.2 Carcinogenic Substances

10 Points (Non-Core Criterion)
Hazardous substances that are classified as carcinogenic, harmful to the reproductive system or genetic harmful, or substances / chemicals that are classified by the International Agency for Research on Cancer (IARC) in Groups 1, 2A and 2B (http://monographs.iarc.fr/ENG/Classification/) shall be avoided during the manufacturing processes and shall not be present in the final product. Any carcinogen which is known to be present as a contaminant shall be less than 0.1% by weight of the product.

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

4.4 ECOSYSTEM IMPACT

4.4.1 Particulate Matters

10 Points (Core Criterion)
Air emissions of total particulate matters during the whole manufacturing process shall be less than 150 ug per m3.

Verification
Detailed report(s) of the air emission of total particulate matters shall be compiled according to the National and International test methods including but not limited to EN 12341. Other related testing methods are also acceptable with justification provided by the applicant.

4.4.2 Heavy Metal in Waste Water

10 Points (Core Criterion)
The waste water discharged from the manufacturing plant shall be tested and the hazardous substances contained in the waste water shall be lower than the following limits:

Table 1: Limits of hazardous substances in waste water

Emission	***Limit (mg/L)***
Cadmium	< 0.015
Chromium (VI)	< 0.15
Iron	< 1.5
Lead	< 0.15

Verification

Detailed report(s) of the amount of heavy metals in waste water discharged from the manufacturing plant. Test report(s) shall be compiled according to the National and International test methods including but not limited to ISO 8288 for lead and cadmium, ISO 11083 for hexavalent chromium and ISO 6332 for Iron.

4.4.3 Suspended Solid in Waste Water

10 Points (Core Criterion)

The waste water discharged from the manufacturing plant shall be tested and the suspended solid contained in the waste water shall not exceed 40mg/L.

Verification

Detailed report(s) of the amount of suspended solid in waste water discharged from the manufacturing plant. Test report shall be compiled according to the National and International test methods including but limited to ISO 5667-17 or APHA 2540D.

4.4.4 Environmentally Hazardous Substances

10 Points (Non-Core Criterion)

The product shall be less than 1% by weight of any environmental hazardous substances carrying the following risk phrases: R50, 51, 52, 53, 54, 55, 56, 57, 58 or 59, in accordance with the Directive 2001/59/EC and 1272/2008/EC.

Verification

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

4.4.5 Environmental Management System

10 Points (Non-Core Criterion)

Manufacturer of the products shall possess valid certificates of ISO14001, the EU Eco-Management and Audit Scheme (EMAS), or relevant certificate verified by Natural Stone Council (NSC) (e.g. NSC 373). Targets shall be set to reduce the environmental impacts during the manufacturing process which include but not limited to the reduction of hazardous substance emissions, energy consumption, CO_2 emissions, secondary environmental load, waste management, water management, etc.

Verification

A valid ISO14001, EMAS or NSC certificate issued by local or overseas accredited certification bodies.

5. EVALUATION CRITERIA FOR ARTIFICIAL STONE

A product (artificial stone) 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 6 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 certification, laboratory report and documentation must be valid during the assessment process and labelling period. The validity of all laboratory report and documentation shall be 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.

5.1 GENERAL REQUIREMENT

5.1.1 *Product Information*

5 Points (Core Criterion)
The following information shall be supplied with the product or made available to the public to help users using the products in a sustainable manner:

- Major composition
- Information of product uses
- Instructions on the installation and protection of the product
- Recommendation on maintenance for the product

Verification
Documentation related to the product labels, care instructions and other information provided with the product, MSDS, web pages and any other information shall be freely available to customers or the public.

5.1.2 Durability

5 Points (Core Criterion)
The applicant shall provide production information on compressive strength or flexural strength, density and water absorption based on relevant British and European (BS EN), China (GB) (China), American Society for Testing and Materials (ASTM) or ISO standards.

Verification

Laboratory test report(s) on properties performance shall be compiled according to the National and International test methods including but not limited to BS EN, GB, ASTM or ISO standard.

5.2 RESOURCES CONSUMPTION

5.2.1 Raw Materials

10 Basic + 5 / 10 Bonus Points (Core Criterion)

Raw materials or components of product (by weight) are made from combinations of recycled materials and /or waste materials: Bonus points will be awarded if the recycled content and/or natural waste content reached certain proportion as listed below:

- ≥ 30% (10 basic)
- ≥ 40% [+5 bonus]
- ≥ 50% [+10 bonus]

Verification

Detailed report(s) of the recycled content or the source of raw materials with relevant substantiations.

5.2.2 Energy Management

5 Points (Non-Core Criterion)

The Applicant shall have effective energy management policies and procedures and / or an energy management programme. The followings shall be submitted as support:

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

Verification

Detailed report(s) that describes the energy management policies, procedures and programmes that is written or signed by Chief Executive Officer or other authorised representative of the Applicant.

5.2.3 Water Management

5 Points (Non-Core Criterion)

The Applicant shall monitor the water consumption for production. The followings shall be submitted as support:

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

Verification

Detailed water consumption and water management policies, procedures and programmes that is written or signed by Chief Executive Officer or other authorised representative of the Applicant.

5.3 HUMAN TOXICITY

5.3.1 Carcinogenic Substances

10 Points (Non-Core Criterion)

Hazardous substances that are classified as carcinogenic, harmful to the reproductive system or genetic harmful, or substances / chemicals that are classified by the International Agency for Research on Cancer (IARC) in Groups 1, 2A and 2B (http://monographs.iarc.fr/ENG/Classification/) shall be avoided during the manufacturing processes and shall not be present in the final product. Any carcinogen which is known to be present as a contaminant shall be less than 0.1% by weight of the product.

Verification

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

5.3.2 Hazardous Substances

10 Points (Non-Core Criterion)

The following compounds, their functional derivatives or in-situ precursors shall not be contained in the product or be added to the products and their component parts and / or packaging or used at any stage of the manufacturing process, including as the preparatory agents, cleaners or degreasers in the production facility:

- Materials that give rise to dioxins;
- Halogenated organic flame retardants (e.g., decaBDE, chlorinated paraffins, etc);
- Flaming additives for natural products;
- Halogenated organic solvents;
- Aniline-based amines;
- Aziridine or polyaziridines;
- Phthalates, including DEHP, DBP, DAP, BBP, DMP, DMT, DEP, DMEP and DIBP;
- Alkylphenolethoxylates (APEO) or derivatives (APDs); and
- 1,3 butadiene.

Verification

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

5.3.3 Radioactivity

5 Points (Non-core Criterion)

The effective concentration of potassium isotope K40 (CK), radium isotope Ra226 (CRa) and thorium isotope Th232 (CTh) shall fulfil the following requirements:

External Hazard Index, Hex:

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

Internal Hazard Index, Hin:

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

where Hex ≤ 1.3 and Hin ≤ 1.0

Verification

A detailed laboratory report(s) shall be provided. The product has to be crushed during preparation and gamma spectroscopy shall be used to measure the effective concentration of the product. Or the manufacturer shall indicate the product materials do not contain any radioactive substances.

5.4 ECOSYSTEM IMPACT

5.4.1 Particulate Matters

10 Points (Core Criterion)

The air emissions of total particulate matters during the whole manufacturing process shall be less than 30 mg per m^3.

Verification

Detailed report(s) of the air emission of total particulate matters shall be compiled according to the National and International test methods including but not limited to EN 13284-1. Other related testing methods are also acceptable with justification provided by the applicant.

5.4.2 Heavy Metal in Waste Water

10 Points (Core Criterion)

The waste water discharged from the manufacturing plant shall be tested and the hazardous substances contained in the waste water shall be lower than the following limits:

Table 2: Limits of hazardous substances in waste water

Emission	***Limit (mg/L)***
Cadmium	< 0.015

Chromium (VI)	< 0.15
Iron	< 1.5
Lead	< 0.15

Verification

Detailed report(s) of the amount of heavy metals in waste water discharged from the manufacturing plant. Test report(s) shall be compiled according to the National and International test methods including but not limited to ISO 8288 for lead and cadmium, ISO 11083 for hexavalent chromium and ISO 6332 for Iron.

5.4.3 Suspended Solid in Waste Water

10 Points (Core Criterion)

The waste water discharged from the manufacturing plant shall be tested and the suspended solid contained in the waste water shall not exceed 40 mg/L.

Verification

Detailed report(s) of the amount of suspended solid in waste water discharged from the manufacturing plant. Test report shall be compiled according to the National and International test methods including but limited to ISO 5667-17 or APHA 2540D.

5.4.4 Envrionmental Management System

5 Points (Non-Core Criterion)

Manufacturer of the products shall possess valid certificates of ISO14001, the EU Eco-Management and Audit Scheme (EMAS), or relevant certificate verified by Natural Stone Council (NSC) (e.g. NSC 373). Targets shall be set to reduce the environmental impacts during the manufacturing process which include but not limited to the reduction of hazardous substance emissions, energy consumption, CO_2 emissions, secondary environmental load, waste management, water management, etc.

Verification

A valid ISO14001, EMAS or NSC certificate issued by local or overseas accredited certification bodies.

6. SCORING AND GRADING

The points for meeting each criterion stated in Section 4 (Natural Stone) and 5 (Artificial Stone) are summarised in Table 3 and 4 respectively.

Table 3: Points to be awarded under the assessment criteria of Natural Stone of this Standard

Evaluation Criteria	**Points**	
	Basic	***+Bonus***
4.1.1 Product Information [CORE]	**5**	
4.1.2 Environmental Management System		+ 10
4.2.1 Reuse and Recycling of Wasted Materials [CORE]	**5**	
4.2.2 Extraction efficiency		+5
4.2.3 Water Management		+5
4.2.4 Chemical Management		+5
4.2.5 Energy Management		+5
4.3.1 Radioactivity [CORE]	**10**	
4.3.2 Carcinogenic Substances		+10
4.4.1 Particulate Matters [CORE]	**10**	
4.4.2 Heavy Metal in Waste Water [CORE]	**10**	
4.4.3 Suspended Solid in Waste Water [CORE]	**10**	
4.4.4 Environmentally Hazardous Substances		+10
	50	**+50**
Total:	**100**	

Table 4: Points to be awarded under the assessment criteria of Artificial Stone of this Standard

Evaluation Criteria	**Points**	
	Basic	***+Bonus***
5.1.1 Product Information [CORE]	**5**	
5.1.2 Durability [CORE]	**5**	
5.1.3 Environmental Management System		+5
5.2.1 Raw materials [CORE]	**10**	+5/+10
5.2.2 Energy Management		+5
5.2.3 Water Management		+5
5.3.1 Carcinogenic Substances		+10
5.3.2 Hazardous Substances		+10
5.3.3 Radioactivity		+5
5.4.1 Particulate Matters [CORE]	**10**	
5.4.2 Heavy Metal in Waste Water [CORE]	**10**	
5.4.3 Suspended Solid in Waste Water [CORE]	**10**	
	50	**+50**
Total:	**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 6: Benchmarks for grading stone products

Grade to be awarded	***Points required***
Platinum	90 or above
Gold	80 - 89
Silver	70 - 79
Bronze	60 - 69
Green	50 - 59
No Label	Below 50