CONSTRUCTION INDUSTRY COUNCIL

CIC GREEN PRODUCT CERTIFICATION

EXTRUDED ALUMINIUM PRODUCT
(Version 1.0a)

Assessment Standard

Last Updated: 11 June 2020

EXTRUDED ALUMINIUM PRODUCT

Summary of Assessment Criteria

CORE CRITERIA

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<tr><th>Basic</th><th>+Bonus</th></tr>
<tr><td>Raw Materials</td><td>o Recycled content of aluminium ingot by weight:<table><tr><th>Recycled content</th><th>Points</th></tr><tr><td>≥ 85%</td><td>10 [basic]</td></tr><tr><td>≥ 90%</td><td>+5 (bonus)</td></tr><tr><td>≥ 95%</td><td>+10 (bonus)</td></tr></table></td><td>Detailed report(s) of the recycled content which is backed by supporting documents</td><td>10</td><td>+5 / + 10</td><td>4.2.1 (page 5)</td></tr>
<tr><td>Product Information</td><td>o Provide the following product information:
▪ Instructions for use / installation
▪ Possible toxicity or health hazards
▪ Methods of cleaning /maintenance</td><td>Documentation related to the label and relevant information</td><td>5</td><td></td><td>4.1.3 (page 4)</td></tr>
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<tr><td>Acidification</td><td>Emissions during the production:
o SO_2: < 100 mg/m^3
o NO_x : < 100 mg/m^3</td><td>Detailed report(s) of acidifying emissions, and documentation of any measures taken to reduce the acidifying emissions</td><td>10</td><td></td><td>4.4.1 (page 7)</td></tr>
<tr><td>Emission of Fluorides</td><td>o Production emission requirements:
▪ Gaseous fluoride: < 0.6 kg/tonne
▪ Particulate fluoride: < 0.5 kg/tonne</td><td>Laboratory test report(s)</td><td>5</td><td></td><td>4.4.2 (page 7)</td></tr>
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<table>
<tr>
<td>Discharge of Waste Water</td>
<td>o Pollutants in waste water discharged shall not exceed the following maximum allowable limits:
<table>
<tr><th></th><th>10 [basic]</th><th>+5 (bonus)</th></tr>
<tr><td></td><td colspan="2">Concentration (mg/L)</td></tr>
<tr><td>F</td><td>8.0</td><td>5.0</td></tr>
<tr><td>N (NH_3)</td><td>25</td><td>15</td></tr>
<tr><td>Total N</td><td>30</td><td>15</td></tr>
<tr><td>Total P</td><td>2.0</td><td>1.0</td></tr>
<tr><td>Oil & Grease</td><td>8</td><td>3</td></tr>
<tr><td>CN</td><td>0.5</td><td>0.5</td></tr>
<tr><td>Total S^{2-}</td><td>1.0</td><td>1.0</td></tr>
<tr><td>Phenols</td><td>0.5</td><td>0.5</td></tr>
</table>
</td>
<td>Detailed report(s) of the amount of pollutants in waste water discharged from the manufacturing plant</td>
<td>10</td>
<td>+5</td>
<td>4.4.3 (page 7)</td>
</tr>
<tr>
<td colspan="3">Subtotal:</td>
<td>50</td>
<td>+20</td>
<td></td>
</tr>
</table>

NON-CORE CRITERIA

Criteria	***Requirements***	***Verification***	***Points*** ***+Bonus***	***Index***
Environmental Management System	o Valid certification of ISO14001 or the EU Eco-Management and Audit Scheme (EMAS)	ISO14001 or EMAS certificate issued by accredited certification body	+5	*4.1.1 (page 3)*
Packaging Requirements	o Product packaging shall not contain halogenated plastics o All packaging materials shall be either comprised of 100% recycled material or readily recyclable	Documentation on the packaging materials used	+5	*4.1.2 (page 4)*
Energy Management	The manufacturer of the product shall have: o Effective energy management policies and procedures and / or an energy management programme; o Initiatives taken to reduce energy use and improve energy efficiency	Detailed plan(s) of energy consumption and reduction programme	+5	*4.2.2 (page 5)*
Carcinogenic Substances	o 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	+5	*4.3.1 (page 5)*
Water Management	o Manufacturer shall prepare a water management plan for the	Water consumption and management plan	+5	*4.4.4 (page 8)*

	manufacturing process to facilitate the conservation of water			
Waste Management	○ The manufacturer shall prepare management plan on waste generated during the manufacturing process.	Waste management plan	+5	*4.4.5 (page 8)*
		Subtotal:	**+30**	

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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 extruded aluminium 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

The manufacturing of extruded aluminium products involves two major processes. The first stage is the production of primary aluminium, i.e. aluminium ingot, from bauxite. This process begins with bauxite mining. It is then followed by alumina production, anode production, electrolysis and finally ingot casting. The second stage involves the production of extruded aluminium products from aluminium ingot obtained from the first production stage. Extrusion is a process where a hot cylindrical billet (ingot) of aluminium is pushed through a shaped die. The production of extruded aluminium products in these two stages may generate a significant amount of greenhouse gases (GHGs), acidifying emissions (i.e. SO_2 and NO_x), and other pollutants.

The assessment criteria developed for extruded aluminium products are designed to help conserve resources and energy consumption, to minimise the use and subsequent release of harmful substances to the environmental and human, and to encourage the implementation of proper environmental management systems.

2. SCOPE

This Standard assesses the environmental impacts caused by the manufacturing of extruded aluminium products. The criteria in this Standard cover (i) the process of manufacturing

primary aluminium, i.e. aluminium ingot, from bauxite; and (ii) the process of manufacturing extruded aluminium products from primary aluminium. Aluminium sheets and aluminium foils are, however, not covered in this Standard.

The type of alloys and serial number shall be specified clearly in each application. **ONE** application is only for **ONE** product series with same alloys (raw materials). All the related products have to be listed on the submitted documents.

3. DEFINITIONS

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

Aluminium: A metal with a minimum of 99% aluminium content by mass provided that the content of any other elements by mass does not exceed the following limits:

- Iron and silicon content does not exceed 1%
- The content of other elements does not exceed 0.10% each, with the exception of copper in which the permitted content is up to 0.20% provided that neither the chromium nor manganese content exceeds 0.05%

(Aluminium) scrap: An input material which may be used for the production of aluminium products, destined for trade and industry, mainly consisting of aluminium and/or aluminium alloys. The scrap can be collected from various stages of fabrication or from used products

Casting: A process in which molten metal is poured into a mould and solidified

CIC: Construction Industry Council

Clean scrap: Scrap which does not contain any foreign material

CNAS: China National Accreditation Service for Conformity Assessment

Extrusion: A process in which a billet being housed in a container is forced under pressure through a die aperture

Extrusion ingot: Aluminium or aluminium alloy cast in a form suitable for extrusion

Foreign material: Any materials other than aluminium or aluminium alloys which is physically identifiable as part of a scrap consignment. Foreign materials can be attached to pieces of scrap or separate. Examples of foreign materials are oil, wood, plastic, glass, other metals, dry paints, etc.

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 Organization for Standardization

MSDS: Material safety data sheet. To qualify as suitable, MSDS and information therein must not be more than 5-years old

NO_x: Nitrogen oxides

Primary aluminium: Aluminium produced by electrolytic reduction directly from alumina. Remelt metal should not be classified as primary aluminium

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

4. EVALUATION CRITERIA

A product to be assessed should 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 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 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 Environmental Management System

5 Points (Non-Core Criterion)
Manufacturer of the products shall possess valid certificate of ISO14001 or the EU Eco-Management and Audit Scheme (EMAS). 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 or EMAS Certificate issued by local or overseas accredited certification bodies.

4.1.2 Packaging Requirements

5 points (Non-Core Criterion)

The packaging requirements are relevant to all primary packaging materials, i.e. those being used to envelop the product and hold it. The primary packaging materials are usually in direct contact with the contents and shall be in the minimal amount of distribution and/or use as they may eventually be disposed by the consumers.

The packaging materials shall:

- Not contain halogenated plastics; and
- Be comprised of 100% recycled material or be readily recyclable, decomposable, or contain no coatings, impregnated chemicals or other materials that would prevent recycling or decomposition.

Verification

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

4.1.3 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:

- Instructions for use / installation;
- Possible toxicity or health hazards imposed by the chemical components; and
- Methods of cleaning / maintenance.

Verification

Documentation related to the product labels, care 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 Raw Materials

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

The total amount of recycled content of the aluminium ingot should be higher than 85% by weight. Bonus points will be awarded if the recycled content of the aluminium ingot is higher as shown in Table 1.

Table 1: Limits of recycled content and associated points

Recycled content	***Points***
≥ 85% of aluminium ingot by weight	10 [basic]
≥ 90% of aluminium ingot by weight	+5 (bonus)
≥ 95% of aluminium ingot by weight	+10 (bonus)

Verification

Detailed report(s) of the recycled content, i.e. the amount of recycled aluminium, for the aluminium ingot production should be submitted.

4.2.2 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:

- Effective energy management policies and procedures and / or an energy management programme;
- Initiatives taken to reduce energy use and improve energy efficiency.

Verification

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 Carcinogenic Substances

5 Points (Non-Core Criterion)

Hazardous substances listed in the International Agency for Research on Cancer's (IARC) Groups 1, 2A and 2B Classifications (details can be found in website: http://monographs.iarc.fr/ENG/Classification/) shall be avoided during the production process or present in the final product. Any such carcinogens which are known to be present as contaminants shall be less than 0.1% by weight of the product.

Verification

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

4.3.2 Volatile Organic Compounds

10 Basic + 5 Bonus Points (Core Criterion)

Architectural paints, coatings and primers applied to aluminium extruded products shall not exceed the volatile organic compound (VOC) content limits shown in Table 2. The calculation of VOC shall exclude water and colorants added at the point-of-sale.

Table 2: Limits of Volatile Organic Compounds

	10 [basic]	**+5 (bonus)**
Product Type	**VOC level (in g/L)**	
Flat Topcoat	50	40
Non-Flat Topcoat	100	80
Primer or Undercoat	100	80
Anti-Corrosive Coating	250	200

Verification

The Applicant shall submit relevant laboratory test report(s). The tests in laboratories shall be performed in accordance but not limited to testing methods including USEPA Test Methods (Method 24); South Coast Air Quality Management District Method 303 and Method 316A; California Air Resources Board Method 310; ASTM Methods (ASTM D6886); NIOSH Manual of Analytical Methods.

4.4 ECOSYSTEM IMPACT

4.4.1 Acidification

10 Points (Core Criterion)

SO_2 and NO_x emissions during the production of extruded aluminium product should be less than 100 mg/m^3 respectively (Table 3).

Table 3: Limits of acidifying emissions and associated points

Acidifying emissions	***Points***
o SO_2 : < 100 mg/m^3 o NO_x : < 100 mg/m^3	10

Verification

Detailed report(s) of the amount of acidifying emissions shall be submitted. The Applicant shall assess the emissions in accordance with relevant USEPA or ASTM test methods. Measures taken to reduce the emissions should also be reported.

4.4.2 Emission of Fluorides

5 Points (Core Criterion)

For the production from bauxite mining to the extruded aluminium product, fluoride emissions should be limited as below (Table 4):

Table 4: Limits of fluoride emissions and associated points

Fluoride emission	***Points***
o Gaseous fluoride: < 0.6 kg/tonne of extruded aluminium products o Particulate fluoride: < 0.5 kg/tonne of extruded aluminium products	5

Verification

Detailed test report(s) of the amount of fluoride emitted into the air (in the forms of both gaseous and particulate fluorides) shall be submitted. The Applicant shall assess the fluoride emissions in accordance with relevant testing methods including but not limited to ISO, USEPA and ASTM. Any measures taken to reduce the emissions should also be reported.

4.4.3 Discharge of Waste Water

10 Basic + 5 Bonus Points (Core Criterion)

The waste water discharged from the manufacturing plant to water shall be monitored and collected. The pollutants contained in the waste water shall be measured and not

exceed the following maximum allowable limits. Bonus points will be awarded if the concentration of the pollutants reach the lower limits as shown in Table 5:

Table 5: Discharge limits for waste water

	10 [basic]	+5 (bonus)
	Concentration (mg/L)	
Fluorides	8.0	5.0
Nitrogen (Ammonia)	25	15
Total nitrogen	30	15
Total phosphorous	2.0	1.0
Oil & Grease	8	3
Cyanide	0.5	0.5
Total sulphide	1.0	1.0
Phenols	0.5	0.5

Verification
Detailed report(s) of the amount of pollutants in waste water discharged from the manufacturing plant.

4.4.4 Water Management

5 Points (Non-Core Criterion)
To facilitate the conservation of water, Applicant shall report the ways to manage water consumption and the total fresh water use in extrusion of aluminium products.

Verification
Detailed water management plan of fresh water for extrusion of aluminium products shall be provided.

4.4.5 Waste Management

5 Points (Non-Core Criterion)
The manufacturer shall provide a detailed waste management plan with the following information provided:

- Approaches / ways to minimise and manage the waste including, but not limited to, process scrap generated from aluminium production process, waste generated in anodizing line, process scrap remelted or refined internally, waste scrap disposed of to landfill;
- Strategies or policies implemented to minimise waste generation.

Verification

Related documents / plan on waste management as mentioned above shall be provided.

5. SCORING AND GRADING

The points for meeting each criterion stated in Section 4 are summarised in the Table 6.

Table 6: Points to be awarded under the assessment criteria of this Standard

Evaluation Criteria	***Points***	
	Basic	***+Bonus***
4.1.1 Environmental Management System		+5
4.1.2 Packaging Requirements		+5
4.1.3 Product Information [CORE]	**5**	
4.2.1 Raw Material [CORE]	**10**	+5 / +10
4.2.2 Energy Management		+5
4.3.1 Carcinogenic Substances		+5
4.3.2 Volatile Organic Compounds [CORE]	**10**	+5
4.4.1 Acidification [CORE]	**10**	
4.4.2 Emission of Fluorides [CORE]	**5**	
4.4.3 Discharge of Waste Water [CORE]	**10**	+5
4.4.4 Water Management		+5
4.4.5 Waste Management		+5
	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 7: Benchmarks for grading extruded aluminium 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