



CONSTRUCTION INDUSTRY COUNCIL

CIC GREEN PRODUCT CERTIFICATION

ADHESIVE & SEALANT

(Version 1.2a)

Assessment Standard

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ADHESIVE & SEALANT

Summary of Assessment Criteria

CORE CRITERIA

<i>Criteria</i>	<i>Requirements</i>	<i>Verification</i>	<i>Points</i>		<i>Index</i>
			<i>Basic</i>	<i>+Bonus</i>	
Product Information	Provide the following product information on the packaging of the product and/ or company website: <ul style="list-style-type: none"> ▪ Chemical composition ▪ Possible toxicity or health hazards imposed by the chemical components ▪ Instructions for use ▪ Recommendation on the amount of adhesive or sealant per unit area ▪ Instructions for disposing the waste packaging as well as any remaining adhesive or sealant ▪ Methods of cleaning the application equipment 	Documentation related to the label, care instructions and relevant information	5		4.1.3 (page 4)
Formaldehyde	Formaldehyde shall be less than 0.01% (by weight of product)	Laboratory test report(s), MSDS and production documentation	10		4.2.1 (page 5)
Phthalates	Concentration of phthalates in the product shall be less than 0.1% by weight of the product. The limited phthalates including the following types: <ul style="list-style-type: none"> ○ BBP ○ DBP ○ DEHP ○ DINP ○ DIDP ○ DNOP 	Laboratory test report(s), MSDS and production documentation	10		4.2.2 (page 5)
Heavy Metals	The following heavy metals shall be less than 0.01% (by weight of product): <ul style="list-style-type: none"> ▪ Lead ▪ Cadmium ▪ Mercury ▪ Hexavalent chromium 	Laboratory test report(s), MSDS and production documentation	10		4.2.3 (page 5)

Volatile Organic Compounds	Lower than the limit of volatile organic compounds as shown in Tables 1 or 2 in section 4.3.1. by	Laboratory test report(s), MSDS and production documentation	10	+5 / +10	4.3.1 (page 7)
Ozone Depleting Substances	Ozone depleting substances shall be less than 0.1% by weight of the product	Laboratory test report(s), MSDS and production documentation	5		4.3.2 (page 9)
Subtotal:			50	+10	

NON-CORE CRITERIA

Criteria	Requirements	Verification	Points	Index
			+Bonus	
Environmental Management System	<ul style="list-style-type: none"> Valid certification of ISO14001 or the EU Eco-Management and Audit Scheme (EMAS) 	ISO14001 or EMAS certificate issued by accredited certification body	+10	4.1.1 (page 3)
Packaging Requirements	The packaging materials shall: <ul style="list-style-type: none"> Not contain chlorinated or halogenated plastics; Use environmental friendly packaging such as aluminium foil packaging; and Be re-sealable after first use. 	Documentation on the packaging materials used	+10	4.1.2 (page 3)
Durability	The performance of product shall be maintained for 5 years (interior) or 10 years (exterior)	Documentation or test report(s) on product warranty or guarantee performance	+5	4.1.4 (page 4)
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	+5	4.2.5 (page 6)
Hazardous Substances	<ul style="list-style-type: none"> The following substance shall be less than 0.1%: <ul style="list-style-type: none"> Alkylphenolethoxylates Halogenated solvents Bioaccumulative preservatives Aromatic solvents 	Laboratory test report(s), MSDS, self-declaration letter and production documentation	+5	4.2.6 (page 6)

Toxic Compounds	<p>The product shall not be toxic for inhalation. Inhalation LC₅₀ values of non-toxic product shall be:</p> <ul style="list-style-type: none"> ▪ > 2,000 ppm of vapour or gas OR ▪ > 20 mg/L of mist, dust or fumes 	Laboratory test report(s), MSDS and production documentation	+5	4.2.4 (page 6)
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 adhesives and sealants 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

Adhesives and sealants are two commonly used materials in the construction industry worldwide. They come in many formulations and are used for bonding a wide variety of substrates in fabrication, maintenance and repair applications by industry, contractors and individual consumers. Adhesives and sealants are well known for their fumes and odours which may affect the installers and/or building occupants and they are one of the main contributors of toxic air emissions to the environment worldwide. They contain a large range of chemicals to ensure superior binding strengths for different applications in the construction sector. The adhesive industry has made a certain progress in reducing the level of toxic compounds while still maintain their bonding strength for the intended purposes. The purposes of the assessment criteria developed for adhesives and sealants are therefore to minimise the use and subsequent release of harmful substances to the human health and environment throughout the product’s life cycle.

2. SCOPE

The Standard shall apply to all adhesives and sealants applied on-site in the building interior and exterior as stated in Table 1 & 2.

Types and ratio (formulation) of the major 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 colour could be included in ONE application. Each application should also specify the product code / model number.

Note:

The product category shall not be changed once the application is submitted.

The ingredient contains 1% or more (by weight) in the product shall be indicated in the documentation, such as product information or MSDS.

3. DEFINITIONS

Adhesives: Any substance which is used to bond one surface to another surface by attachment. Adhesives include adhesive bonding primer, adhesive primers, adhesive primers for plastics and other any other primers.

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

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, the MSDS and information therein must not be more than 5 years old.

Ozone depleting substances: The “scheduled substances” defined in Ozone Layer Protection Ordinance (Chapter 403).

Reproductive toxins: Chemical with reproductive toxicity includes impairment of male and female reproductive functions or capacity and the induction of non-inheritable harmful effects on the progeny (Refer to Commission Directive 2001/59/EC).

Sealants: Any materials with adhesive properties which are formulated primarily to fill, seal, or waterproof gaps and joints between two surfaces.

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

VOC: Volatile organic compounds. Any organic compound (compound which contains carbon) with either a boiling point below 250°C measured at 101.3 kPa or a vapour pressure of more than 0.1 mm Hg measured at 25°C

LC₅₀: The median lethal concentration. The concentration of a toxic agent (as a poison, virus, or radiation) that is sufficient to cause 50% of a population of test animals usually after a specified test duration.

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 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 Environmental Management System

10 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, CO₂ 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

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.

10 Points (Non-Core Criterion)

The packaging materials shall:

- Not contain chlorinated or halogenated plastics;
- Use environmental friendly packaging such as aluminium foil packaging; and
- Be re-sealable after first use.

Verification

Documentation that describes the packaging and the materials used.

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 the users to use the adhesive or sealant products in a sustainable manner:

- Chemical composition;
- Possible toxicity or health hazards imposed by the chemical components;
- Instructions for use;
- Recommendation on the amount of adhesive or sealant per unit area;
- Instructions for cleaning equipment and waste disposal methods for the packaging and any remaining adhesive or sealant; and
- Methods of cleaning application equipment.

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.

4.1.4 Durability

5 Points (Non-Core Criterion)

The performance of product shall be maintained for at least 5 years (for interior use) or 10 years (for exterior use) to minimise the resource consumption and maintenance time.

Verification

Documentation and test report(s) related to the product warranty or guarantee performance shall be submitted.

4.2 HUMAN TOXICITY

4.2.1 Formaldehyde

10 Points (Core Criterion)

The formaldehyde content in the product shall be less than 0.01% (by weight of product)

Verification

Laboratory test report(s), MSDS and any relevant production documentation shall be provided. The chemical shall be analysed according to National or International standards such as ASTM D5910.

4.2.2 Phthalates

10 Points (Core Criterion)

Concentration of phthalates in the product shall be less than 0.1% by weight of the product. The limited phthalates including the following types:

- Benzyl Butyl Phthalate (BBP)
- dibutyl phthalate (DBP)
- Di-(2-ethylhexyl) phthalate (DEHP)
- Diisononyl phthalate (DINP)
- Diisodecyl phthalate (DIDP)
- Di-n-octyl phthalate (DNOP)

Verification

Laboratory test report(s), MSDS and any relevant production documentation shall be provided. The chemical shall be analysed according to National or International standards such as Standard Operating Procedure for Determination of Phthalates (CPSC-CH-C1001-09.3).

4.2.3 Heavy Metals

10 Points (Core Criterion)

The product shall be less than 0.01% by weight of the product with toxic heavy metals, including lead (Pb), cadmium (Cd), mercury (Hg) and hexavalent chromium (Cr(VI)) respectively.

Verification

Laboratory test report(s), MSDS and any relevant production documentation. Test report(s) shall be compiled according to the National and International test methods including but not limited to ISO 3856-1 or ASTM D3335 for lead, ISO 3856-4 or ASTM D3335 for cadmium, ISO 3856-5 for hexavalent chromium, and ISO 3856-7 or ASTM D3624 for mercury.

4.2.4 Toxic Compounds

5 Points (Non-Core Criterion)

The product shall not be toxic for inhalation. A product is regarded as non-toxic if the following Lethal Concentration (LC) criterion related to inhalation applies:

Inhalation LC₅₀: > 2,000 ppm of vapour or gas or > 20 mg/L of mist, dust or fumes

Verification

Laboratory test report(s), MSDS and any relevant production documentation shall be provided. The tests in laboratories shall be performed in accordance with relevant testing methods including but not limited to the *Organization for Economic Cooperation and Development (OECD) Guidelines for the Testing of Chemicals - Acute Inhalation Toxicity (TG 403)*. Test can be exempted if the inhalation LC₅₀ is calculated by the following formula.

$$\frac{100}{ATE_{mix}} = \sum_n \frac{C_i}{ATE_i}$$

where

ATE = Acute Toxicity Estimate (i.e. LC₅₀)

C_i = Concentration of ingredient i

i = Individual Relevant ingredient from 1 to n

n = Number of ingredients

The value of ATE (LC₅₀) of particular ingredient of product may be found from the *Registry of Toxic Effects of Chemical Substances* (<http://www.cdc.gov/niosh/docs/97-119/pdfs/97-119.pdf>) and the *Hazardous Substances Data Bank* (<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>). The source of ATE (LC₅₀) of particular ingredient shall be stated clearly.

4.2.5 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.

4.2.6 Hazardous Substances

5 Points (Non-Core Criterion)

The following substances shall be less than 0.1% in the product:

- Alkylphenolethoxylates;
- Halogenated solvents;
- Bioaccumulative preservatives;
- Aromatic solvents, including benzene, toluene and their derivatives;

Verification

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

The tests shall be performed in accordance with relevant international standards.

4.3 ECOSYSTEM IMPACT

4.3.1 Volatile Organic Compounds

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

The products shall meet the limits of VOCs as stated in Tables 1 and 2 below respectively:

Table 1: Limits of VOCs in adhesives

<i>Adhesive and application</i>	<i>Maximum limits of VOC content (g/L less water)</i>
<i>I. Architectural applications</i>	
1. Carpet pad adhesives	50
2. Ceramic tile adhesives	65
3. Cove base adhesives	50
4. Dry wall and panel adhesives	50
5. Indoor carpet adhesives	50
6. Multi-purpose construction adhesives	70
7. Outdoor carpet adhesives	150
8. Rubber flooring adhesives	60
9. Single-ply roof membrane adhesives	250
10. Structural glazing adhesives	100
11. Subfloor adhesives	50
12. VCT and asphalt tile adhesives	50
13. Wood flooring adhesives	100
<i>II. Specialty applications</i>	
14. ABS welding adhesives	325
15. Adhesive primers for plastic	550
16. Contact adhesives	80
17. CPVC welding adhesives	490
18. Graphic arts adhesives	150
19. Paper, fabric and film coating adhesives	265
20. Plastic cement welding adhesives	250
21. PVC welding adhesives	510
22. Sheet-applied rubber lining operation adhesives	850
23. Special purpose contact adhesives	250
24. Structural wood member adhesives	140
25. Wood flat stock adhesives	250
<i>III. Adhesive substrate specific applications: For adhesives not listed in Category (I) and (II) above and applied to the following substrates, the following limits shall apply</i>	
26. Adhesives for fibreglass	80
27. Adhesives for metal	30
28. Adhesives for plastic foams	50

29. Adhesives for porous material	50
30. Adhesives for wood	30
<i>IV. Other adhesives: Any adhesives not falling within Category (I) to (III) above</i>	
31. Other adhesives	250

Source: Environmental Protection Department (2012)

Table 2: Limits of VOCs in sealants

Sealant and application	Maximum limits of VOC content (g/L less water)
1. Portable sealants or caulking compounds	4%
<i>Sealants that are not portable sealants or caulking compounds</i>	
2. Architectural sealants (except sealant primers)	250
3. Architectural (non-porous) sealant primers	250
4. Architectural (porous) sealant primers	775
5. Modified bituminous sealant primers	500
6. Non-membrane roof sealants (except sealant primers)	300
7. Roadway sealants (except sealant primers)	250
8. Single-ply roof membrane sealants (except sealant primers)	450
9. Other sealants	420
10. Other sealant primers	750

Source: Environmental Protection Department (2012)

Basic and bonus points will be awarded to the Applicant according to the table below:

Table 3: Limits of VOCs and associated points

Criteria	Points
Lower than the limit of volatile organic compounds as shown in Tables 1 or 2 by $\geq 1\%$	10 [basic]
Lower than the limit of volatile organic compounds as shown in Tables 1 or 2 by $\geq 5\%$	+5 (bonus)
Lower than the limit of volatile organic compounds as shown in Tables 1 or 2 by $\geq 10\%$	+10 (bonus)

Verification

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

4.3.2 Ozone Depleting Substances

5 Points (Core Criterion)

Ozone depleting substance shall be less than 0.1% by weight of the product.

Verification

Laboratory test report(s), MSDS and relevant production documentation. The tests in laboratories shall be performed by “Gas chromatography–mass spectrometry (GC-MS)” testing method in accordance with but not limited to ISO 17895, ISO 11890 and ASTM 17895.

5. SCORING AND GRADING

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

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

<i>Evaluation Criteria</i>	<i>Points</i>	
	<i>Basic</i>	<i>+Bonus</i>
4.1.1 Environmental Management System		+10
4.1.2 Packaging Requirements		+10
4.1.3 Production Information [CORE]	5	
4.1.4 Durability		+5
4.2.1 Formaldehyde [CORE]	10	
4.2.2 Phthalates [CORE]	10	
4.2.3 Heavy Metals [CORE]	10	
4.2.4 Toxic Compounds		+5
4.2.5 Carcinogenic Substances		+5
4.2.6 Hazardous Substances		+5
4.3.1 Volatile Organic Compounds [CORE]	10	+5 / +10
4.3.2 Ozone Depleting Substances [CORE]	5	
Total:	50	+50
	100	

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

Table 5: Benchmarks for grading adhesive & sealant

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