

BACKGROUND

The Hong Kong Green Label Scheme (HKGLS) is an independent and voluntary scheme which aims to identify products that are, based on life cycle analysis consideration, more environmentally preferable than other similar products with the same function. The Scheme is organized by the Green Council (GC) with contributions from the HKGLS Advisory Committee and a number of supporting organizations.

The prime objectives of HKGLS are:

- For Consumers: assist in making purchases of products that are less harmful to the environment;
- For Industry: stimulate development and production of environmentally preferable alternatives.

This specification sets out the requirements that Building Products using Recycled Materials will be required to meet in order to be licensed to use the HKGLS label. The requirements cover product environmental criteria.

POTENTIAL ENVIRONMENTAL IMPACTS

The use of Recycled Materials in Building Products helps to avoid continuous extraction of valuable virgin resources, thereby reducing the constant strain on the natural environment. On the other hand, waste recycling effectively diverts the increasing volume of waste generated in municipal environments from landfills, thus conserving landfill space and reducing the waste volume.

The fibres used for reinforcement are most commonly glass fibres. Special-purpose glass fibres such as E-glass and “475” glass fibres are listed by the International Agency for Research on Cancer (IARC) as Class 2B “possibly carcinogenic to humans”. Other materials which may be used for reinforcing include carbon fibres, synthetic fibres such as acrylic and polyester, metallic and non-metallic, and polyacrylamide fibres.

Another important health concern arises from resins, the most commonly used being unsaturated polyester resins (representing about 75% of the total resins used in the composites industry in the US), epoxy and vinyl ester resins. The resins used in the manufacturing process may give off vapours which may be both harmful to health and flammable over a given range of concentrations, as shown below:

- Unsaturated polyester resins and vinyl esters, dissolved in a reactive monomer such as styrene, evolve styrene vapour before and during initial curing. The IARC has listed styrene as Class 2B “possibly carcinogenic to humans.”

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- Molding compounds containing melamine, phenolic, or acetyl resins are capable of releasing formaldehyde when subjected to heat and/or pressure in the molding process.
- Some epoxy resin hardeners can cause dermatitis and/or asthma, and may cause sensitization in susceptible individuals.

Adhesive which may contain environmentally hazardous substances, and organic solvent, may be used for bonding purposes of building products. The most common adhesives are acrylics, epoxies and urethanes.

The environmental benefits of building materials using recycled materials are increasingly known with a gradually increasing demand for them.

A variety of recycled materials can be used, including the following :

- Fibre (paper, wood, fiberglass)
- Plastics (polystyrene foam, polyethylene etc), rubber
- Ceramic waste
- Incineration ash and sludge, coal ash, blast furnace slag.
- Gypsum (including desulphurization gypsum).

The recycled content of a material can be described as either *post-consumer* or *post-industrial content*.

Owing to the diverse types of waste materials that can be used as components of building products, concerns arise as to the possible environmental contamination by these products such as the leaking of toxic chemicals or the emission of poisonous gases and radiation and their likely effects on human health. Assurance is therefore needed that building materials with recycled content do not pose adverse environmental impacts. The entire life cycle, including production processes, application, disposal, as well as the initial stage of raw material consumption has to be considered.

LABEL OBJECTIVE

The aim of the environmental criteria developed for “Building Products using Recycled Materials” is to:

- promote the use of recycled materials in building products
- reduce the discharge of toxic, hazardous or otherwise polluting substances, including heavy metals and asbestos, into the environment during production and use of the product.
- prohibit the use of hazardous fibres in the production of the products
- limit the use of toxic substances, especially resins, during the production of the product, and reduce VOCs from the use of adhesives and surface coatings, as well as contents of formaldehyde in relation to surface treatment
- prohibit substances based on lead, cadmium, mercury, chromium VI or their compounds in chemical substances used in the surface treatment of the products.

PRODUCT DEFINITION

The following products are included in this criteria document:

1. Boards: Cement bonded wood-wool, pulp cement boards, fiber reinforced cement boards, rock wool sheathing boards, gypsum boards.
2. Roof /floor materials : Clay roof tiles, pressed cement roof tiles, cement shingles for dwelling roofs, ceramic floor tiles, panels containing recycled plastic, rubber, fiber etc.
3. Exterior materials/interior materials : Plastic floor tiles, ceramic tiles, glass-silicate tiles, ceiling tiles, building blocks, bricks etc.
4. Cements: Portland blast-furnace slag cement, Portland fly-ash cement, Portland cement.
5. Insulation/sound absorbing materials
6. Manhole covers

Recycled materials can be *post-consumer materials* or *pre-consumer materials* or a combination of both, as defined below. Logs, unused wood, by-products such as blast furnace slag, coal ash, and sludge are additionally included in this product category.

- **Post-consumer materials:** Materials or products disposed of after they have been used as goods.
- **Pre-consumer materials:** Materials or rejected products generated in products manufacturing process, excluding those, which are recycled within the same process.

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PRODUCT ENVIRONMENTAL CRITERIA

The product environmental criteria for the product category of “Building Products using Recycled Materials” (GL-008-009) under the Hong Kong Green Label Scheme (HKGLS) are set out in the ensuing table.

Product Environmental Criteria	Verification Methods*
<p>PRODUCT ENVIRONMENTAL CRITERIA</p> <p>1. The percentage of recycled materials in the product shall be at least 50% of the product’s net weight.</p>	<ul style="list-style-type: none"> ✓ Review of supporting information; AND ✓ Performance of an on-site factory visit; AND ✓ Interview with relevant personnel. <p>The gross weight of the product shall be specified, along with the components of the products, in weight per cent or in per cent by volume.</p>
<p>2. Hazardous substances shall not be used as an ingredient of the product (whether as a substance or as part of any preparation).</p> <p>The levels of the following hazardous substances as impurities shall not exceed the following:</p> <p>Cadmium: 10 ppm Lead: 300 ppm Chromium VI: 10 ppm Arsenic: 50 ppm Mercury: 10 ppm Selenium: 20 ppm</p>	<ul style="list-style-type: none"> ✓ Review of laboratory test report(s); AND ✓ Review of supporting information. <p>Test report(s) shall be submitted by the applicant to show compliance with the requirement. Suggested test methods include:</p> <p>Lead and Cadmium: USEPA 3051A/7000B Chromium VI: USEPA 3060A/7196A Arsenic: USEPA 3051A/7061A Mercury: USEPA 3051A/7471B Selenium: USEPA 3051A/7741A.</p> <p>Equivalent methods are acceptable.</p>
<p>3. E-glass and “475” glass fibres shall not be used for reinforcement.</p>	<ul style="list-style-type: none"> ✓ Review of supporting information <p>The type and percentage of fiberglass materials used shall be provided by the applicant in a <i>declaration</i>.</p>

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Product Environmental Criteria	Verification Methods*
<p>4. If adhesive is used for bonding purposes, it shall not contain environmentally hazardous substances, and shall only contain a minimal quantity of organic solvent.</p>	<p>✓ Review of supporting information</p> <p>The applicant shall <i>declare</i> compliance with the requirement.</p>
<p>5. Surface treatment of product: Regarding chemical substances used in the surface treatment of the product:</p> <ul style="list-style-type: none"> • The content of formaldehyde shall not exceed 10mg/kg (10 ppm) • Surface coatings shall be of low VOCs content. 	<p>✓ Review of laboratory test report(s); AND</p> <p>✓ Review of supporting information</p> <p>The applicant shall <i>declare</i> compliance with the requirement, and submit supporting documentation from the manufacturer (s) of the surface treatment product(s).</p>
<p>6. The gamma radiation shall comply with relevant national regulations on building material the activity index I_r shall less than 1.3 for indoor and less than 2.8 for outdoor use. The I_r index is expressed in accordance with:</p> $I_r = C_{Ra}/370 + C_{Th}/260 + C_K/4200$ <p>In the above mentioned formula C_K, C_{Ra} and C_{Th} signifies respectively the concentration of Potassium-40, Radium-226 and Thorium-232, expressed in bequerel per kilogram (Bq/kg) of the material.</p>	<p>✓ Review of supporting information</p> <p>A certificate issued by the manufacturer of the product concerning safety with regard to exposure to radioactivity material shall be submitted. A certificate of test results carried out by a third party shall also be submitted if available.</p> <p>Applicable to product which contain crushed materials of granites or pegmatites, brick, clinker or light clinker of clay, gypsum plasterboard and slag products from the smelting of iron ores or ash from coal or peat</p>
<p>7. The product shall not contain asbestos (white, brown or blue asbestos).</p>	<p>✓ Review of supporting information</p> <p>A certificate shall be obtained from the manufacturer that asbestos is not present in the product.</p>

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Product Environmental Criteria	Verification Methods*
8. Production processes shall conform to relevant national or local environmental regulations on preventing air pollution and water contamination.	<ul style="list-style-type: none"> ✓ Review of supporting information <p>The applicant shall provide a <i>declaration</i> of conformity of the product with the requirements.</p>
9. For plastics used in 20% or more of the entire product, the product shall not contain any toxic chemicals (e.g. in dyes).	<ul style="list-style-type: none"> ✓ Review of supporting information <p>The applicant shall provide MSDS of all dye used, relevant production documentation and a <i>declaration</i> of conformity of the product with the requirements.</p>
10. General packaging requirement (Refer to criteria for packaging materials: GL-Packaging).	<ul style="list-style-type: none"> ✓ Inspection of product samples; AND ✓ Review of supporting information; AND ✓ Interview with relevant personnel.

*Analytical testing should be accredited and performed by laboratories that meet the requirement laid out in the IEC/ISO 17025 or EN45001 standards or any equivalent systems e.g. HOKLAS, CNAS. Under special situation and with the approval from GC, test can be performed by in-house method by the accredited laboratory or manufacturer.