



Green Star PVC Credit

Auditor Verification Guidance

Date issued: November 2013

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Change log

Version	Release date	Description of changes
1	05 October 2011	First issue
1	20 November 2013	Addition of Vinyl Chloride Monomer emissions relevant to E-PVC following update of the Best Practice Guidelines for PVC in the Built Environment

1.0 Introduction

Since first published in 2003, Green Star rating tools included a 'Polyvinyl Chloride (PVC) Minimisation' credit to encourage the minimisation of PVC in base building and interior fitout applications. The 'PVC Minimisation' credit was included in the first Green Star rating tool, Green Star - Office Design v1, and has featured in all subsequent tools.

In late 2007, the GBCA commenced an extensive stakeholder engagement process to review the PVC minimisation credit, which included a review of independent literature and data, as well as the involvement of an Expert Reference Panel (ERP) and a stakeholder feedback period.

The Best Practice Guidelines for PVC in the Built Environment (The Guidelines) represent the most significant outcome of the PVC credit review. The Guidelines address opportunities for the minimisation of environmental and health impacts of the PVC life cycle. The Guidelines were first issued in April 2010. This document reproduces the Guidelines and provides the means by which auditors are to establish compliance. The document was produced in collaboration with the Plastics Industry Pipe Association (PIPA) and the Vinyl Council of Australia (VCA).

Under the PVC credit, projects are able to claim two points towards their Green Star rating if the project's flooring and resilient wall coverings, cable, pipe and conduit - which together account for the majority of PVC use in buildings - meet the compliance requirements of the Guidelines. The Guidelines address two PVC types, Suspension PVC (S-PVC) and Emulsion PVC (E-PVC). In relation to the PVC products relevant in the PVC credit, E-PVC is only used in carpet backing and some resilient flooring products whilst S-PVC is used in all other product groups.

1.1 General notes for auditors

The manufacturer's product(s) being assessed must conform with all relevant Guidelines.

Compliance with the requirements of the Guidelines is to be assessed on basis objective evidence. Objective evidence may include:

- Technical specifications of the product including Material Safety Data Sheets and product formulations
- Scientific test results and reports
- Environmental management system and audit reports and results
- A statement of confirmation signed by an Executive Officer
- An independently audited company annual environment/sustainability report
- An assessment of company or government records
- Other material that may be considered objective evidence, for example interviews or observation of activities.

Auditors must not only look for documents, technical data sheets and other records; they must also seek confirmation of practice in interviews conducted with management, workers and interested parties, as well as general observations.

Evidence must definitively validate claims that the compliance requirements outlined in the Guidelines have been achieved. The compliance requirements outlined in the Guidelines cannot be customised and are not to be optional, flexible or allowed to be achieved post-certification.

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All declarations and documentary evidence shall include:

- The company name
- The location of the manufacturing facility
- Product specific identification

Where the auditor identifies non-compliance, the manufacturer will need to adequately address the non-compliance before the auditor can issue a certificate of compliance to the manufacturer of the product(s).

Aside from verification of the claim of recycled content, post-consumer recycled PVC content that is used in the production of new PVC products is excluded from the Guidelines. Post consumer recycled content refers to material content in a product which has been diverted from an end user's waste stream. This excludes re-utilisation of materials such as re-work, re-grind or scrap generated in the producers own a manufacturing process which is termed post industrial recycled content. Internal post-industrial recycled content is treated in the same manner as virgin material.

2.0 Auditor Competencies and Documentation

Documenting compliance of a PVC product to the requirements of the guidelines shall be demonstrated using any of the following three pathways:

1. **Environmental Management System (EMS):** Compliance with all requirements outlined in the Guidelines as part of an independently audited, ISO 14001, Environmental Management System. Audits must be conducted by a JAS-ANZ (or equivalent) accredited certification body. The certificate issued by the auditor shall be valid for up to three years.
2. **Manufacturers Declaration:** Manufacturers or supplier declaration which is independently audited to confirm that all the requirements outlined in the Guidelines have been met for a specific product or a product range. An example of a manufacturers declaration is available at the Green Building Council of Australia website. The manufacturers declaration must be independently audited by either an accredited auditor registered by RABQSA or another equivalent national or international auditor accreditation system, or a JAS-ANZ (or equivalent) accredited certification body. This certificate issued by the auditor shall be valid for up to two years.
3. **Product Certification:** Independent accreditation program(s) or product certification schemes that integrate all the requirements outlined in the Guidelines into standard(s) or certification criteria (e.g. Type 5 ISO product certification, and eco labels). Independent accreditation programs and product certification schemes must either be JAS-ANZ accredited or pre-qualify for Green Building Council of Australia recognition by demonstrating full compliance with Part I, Section A – Governance and Transparency of the Green Building Council of Australia Assessment Framework for Product Certification Schemes. The certificate issued by the scheme shall be valid for up to five years. The Green Building Council of Australia will list relevant standards or eco labels as these become available, on the Green Building Council of Australia website.

Documentation for Green Star submission

Under all three options listed above, the certificate issued by the auditor must clearly state the following:

- The relevant compliance option (1-3 above) which the certificate relates to;
- Statement that the certificate is in evidence of compliance of specific PVC products (including names, trademark, etc) to requirements of the Guidelines for PVC in the Built Environment detailed as part of the Green Star PVC credit;
- Date of issue and validity of the certificate; and
- Relevant auditor qualifications as required in options 1-3 above.

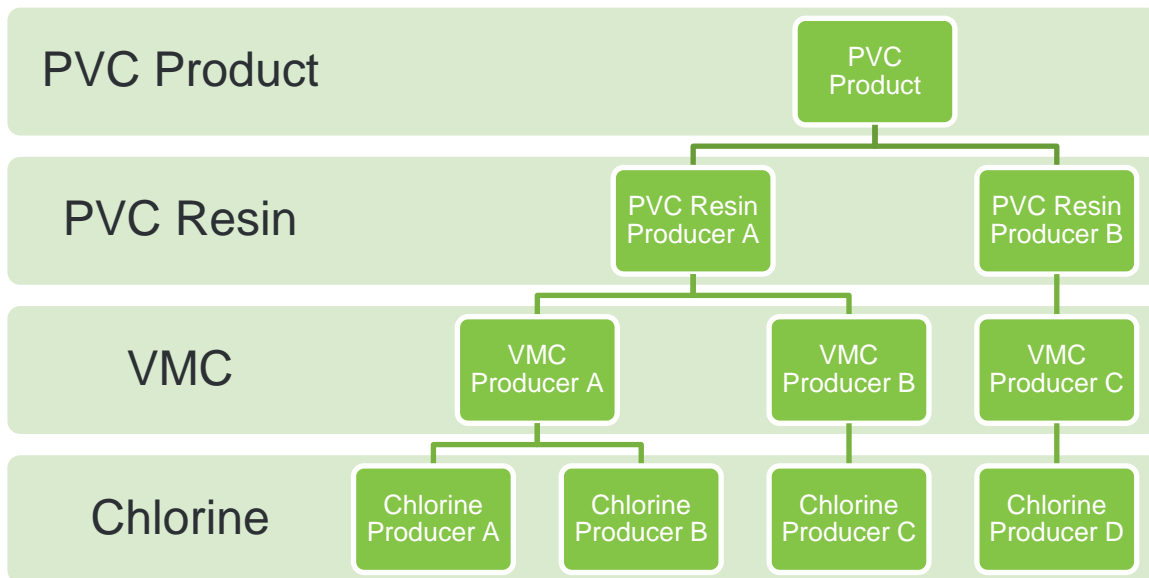
3.0 Guidelines and Demonstration of Compliance

The following list the Best Practice Guidelines for PVC in the Built Environment and details the evidence required for the auditor to verify compliance. For background information please refer to the Literature Review and Best Practice Guidelines for the Life Cycle of PVC Building Products document, found at the Green Building Council of Australia website. The Guidelines are presented in **green text**, the demonstration of compliance requirements are presented in **black text**.

3.1 Supply Chain

The supplier of the audited product(s) shall produce a declaration, including a flow chart, which details the chain of supply of PVC resin and its constituents (VCM and chlorine), including names of all entities in the supply chain, which is used in the manufacturing of a particular PVC product or a range of products. This shall be supported by a declaration from the PVC resin supplier(s) confirming they supply the PVC resin used in the assessed product.

This declaration shall be cross referenced by the auditor to ensure the suppliers of PVC resin and the VCM and chlorine used in this resin, as evidence through the best practice criteria set out below, correlate. The flow chart is intended to simplify this task for the auditor. Example flow chart as follows:



3.2 Manufacture of PVC Resin

Extract from the Guideline

Chlorine shall be sourced from membrane cell, non asbestos diaphragm or modified diaphragm chlorine production processes. Chlorine shall not be sourced from production plants using graphite anodes or mercury cells.

Demonstration of Compliance

- Signed declaration from an Executive Officer of the chlorine supplier(s), addressed to the VCM supplier, describing the manufacturing process, naming the plant and location, the type of anodes used and confirming membrane cell or non-asbestos diaphragm or modified diaphragm cell chlorine production processes are used.

Assessed against list of mercury cell plants recorded by United Nations Environmental Programme (UNEP) at:

www.unep.org/hazardoussubstances/Portals/9/Mercury/Documents/chloralkali/Hg-cell%20chlor-alkali%20facility%20global%20inventory%20table_final.xls

- The auditor will check evidence provided for both the VCM and Chlorine criteria to ensure the entities declared to produce and deliver these constituents, used in a particular supply of PVC resin, correlate.

Where VCM and/or PVC are purchased from suppliers who operate fully integrated manufacturing facilities, a single signed declaration from an Executive Officer of the supplier stating compliance with the Chlorine criterion demonstration of compliance requirements is sufficient to demonstrate compliance. A fully integrated manufacturing facility covers production of Chlorine, EDC and VCM that are all internally manufactured. The auditor will still check the source of chlorine against the list of mercury cell plants recorded by UNEP.

Extract from the Guideline

VCM shall be sourced from non-mercury production processes.

Demonstration of Compliance

- Signed declaration from an Executive Officer of the VCM supplier(s), addressed to the PVC resin manufacturer, stating name and location of plant, describing the manufacturing process and whether mercury catalysts are used in the process.
- Assessed against list of Vinyl Chloride Plants by Production Process Type provided by the Chemical Markets Association Inc (CMAI) and available from the Vinyl Council of Australia.

Where VCM and/or PVC are purchased from suppliers who operate fully integrated manufacturing facilities, a single signed declaration from an Executive Officer of the supplier stating compliance with the VCM criterion demonstration of compliance requirements is sufficient to demonstrate compliance. A fully integrated manufacturing facility covers production of Chlorine EDC and VCM that are all internally manufactured. The auditor will still check the source of VCM against the list of Vinyl Chloride Plants by Production Process Type provided by the Chemical Markets Association Inc (CMAI).

Extract from the Guideline

EDC and VCM, as well as PVC resin shall be sourced from closed lid production manufacturing plants and processes that implement the following strategies:

- **Waste:** Hazardous solid waste and sludge, which can contain organohalogens including dioxins, shall be disposed of via government-approved high temperature emission-controlled incineration. Where incineration is not available or is illegal then diversion to other beneficial uses followed by disposal to hazardous waste landfill is acceptable, provided that these processes are government-approved.
- **Water:** Effluents shall be treated using advanced wastewater treatment processes to prevent emissions of halogenated hydrocarbons, such as EDC and dioxins, from being released in treated effluents. Residues from those treatments shall undergo further treatment to destroy possible captured contaminants.
- **Air:** Effective emission reduction measures shall be used to ensure that VCM and/ or EDC emissions and possibly other contaminants are close to, or below, negligible risk levels. In the case of VCM and PVC manufacturing plants the occupational exposure limit of VCM shall not exceed 1ppm (for 8 hours weighted average in 95% of cases).

Demonstration of Compliance

- Signed declaration from an Executive Officer of the supplier describing:
- the manufacturing process, confirming a closed lid process; AND
- the hazardous solid waste and sludge disposal method are compliant with government regulations; AND
- the water treatment process and hydrocarbon emissions to water; AND
- confirming that the occupational exposure limit of VCM is no greater than 1ppm measured on an 8 hour time-weighted average in 95% of cases over the course of 12 months.

AND supported by the following documentation:

- Copy of Regulatory Licence or Permit that demonstrates government approved disposal of solid wastes and hazardous solid waste disposal certificates.
- Copy of effluent discharge Licence or Permit including hydrocarbons tested for and emission limits and description of treatment & discharge process
- Copy of Regulatory Licence or Permit for air emissions for EDC and VCM as appropriate,
- Evidence of, occupational exposure measurement methodology and the average exposure results as well as the percentage compliance for most recent 12 month reporting period.

Extract from the Guideline

PVC Resin shall be sourced from manufacturing plants and processes that practice the following emissions-related indicators:

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- Air and Water: VCM emissions from Suspension PVC (S-PVC) manufacturing (both to air and water) shall not exceed 43g/tonne of product produced (measured on an annual basis). VCM emissions from E-PVC manufacturing (both to air and water) shall not exceed 500 g/tonne of product produced (measured on an annual basis).
- Products: VCM emissions from raw PVC resin shall not exceed 1ppm when delivered to the end processor.

Manufacturing plants or processes relates to a facility and not the different classifications of PVC resin product produced from the facility. As such, a manufacturing plant that produces a mix of PVC resins with differing vinyl chloride monomer emissions can still demonstrate compliance with the Best Practice Guidelines if vinyl chloride monomer emissions from the manufacturing plant or process (measured on an annual basis) do not exceed the figure of 43g/tonne of PVC resin.

Demonstration of Compliance

Signed declaration from an Executive Officer of the PVC resin supplier stating that the requirements related to VCM emissions from the manufacturing plant and the raw material meet the requirements defined above and supported by the following information/documents:

- test results showing total VCM emissions to air and water per tonne of PVC produced for the most recent 12 month company reporting period; AND
- confirming the basis of calculations includes licensed and fugitive emissions and uses a recognised calculation methodology such as European Council of Vinyl Manufacturers' (ECVM) reference method for identification, measurement and control of fugitive emissions from process equipment and gas holders;¹ AND
- confirming the scope of emissions data i.e. whether it relates to product derived from a facility or an individual plant AND
- test results confirming the residual VCM content in finished resin is below 1 ppm concentration using a calculation methodology based on recognised standards such as ASTM D3749, US EPA Method 107 or other internationally recognised methods such as ISO 6401. The frequency shall be per batch delivered and evidenced by certificates of analysis.

Extract from the Guideline

An Environmental Management System (EMS) that encompasses the above Waste, Water, Air and Product-related requirements, as well as continuous improvements in performance targets pertaining to these areas, shall be in place.

Demonstration of Compliance

Objective evidence of the EMS, including but not limited to the scoping document or table of contents, that the EMS includes the criteria Waste, Water, Air and Product-related requirements.

¹ Reference Method: Identification, measurement and control of fugitive emissions from process equipment leaks, October 2004, rev. 2, O/Ref.: 603684, European Council of Vinyl Manufacturers ECVM Reference Method for Assessment of Atmospheric Emissions From Gas holders edition : 20.12.2001 European Council of Vinyl Manufacturers

3.3 Manufacture and End of Life Management of PVC Product

Extract from the Guideline

- **Stabilisers:** cadmium and lead stabilisers shall not be used in PVC products.
- **Plasticisers:** diethylhexyl phthalate (DEHP, also known as dioctyl phthalate - DOP), benzylbutyl phthalate (BBP), and diethylbutyl phthalate (DBP) shall not be used in PVC products.

Demonstration of Compliance

- Statement of the composition of the product AND
- Declaration of non-use signed by an Executive Officer of the product manufacturer.
- Objective evidence shall be assessed by the auditor by means of a combination of purchase orders, technical specifications, material safety data sheets and process control documents.

Extract from the Guideline

End of life management: Independent verification of at least one of the following is required:

- Suppliers of PVC products have committed to offering contractual agreements with their customers for extended supplier responsibility (product stewardship). These extended supplier responsibility contracts shall entail arrangements to take products back at the end of the product's in-use phase for some form of recycling or reuse. Producers shall demonstrate that they have established the capacity to deliver the terms of the extended supplier responsibility contract.

Demonstration of Compliance

Copy of documentation outlining the take back service including the costs, contact details of the take-back service, relevant website documentation.

Extract from the Guideline

AND/OR

- Existing contractual agreements with recycling and waste transport service providers for the collection of end of life product and delivery of that product to a recycling service provider or the manufacturer, or another third party that will reuse or recycle the material. Agreements must service at least two or more Australian capital cities to demonstrate that adequate geographic coverage exists to recover domestically-sold end of life product.

Demonstration of Compliance

Copy of contractual agreements existing in at least two capital cities in Australia between the manufacturer with any of the following: third party waste contractors, transport companies, recyclers, reprocessors, council depots, charities etc. confirming the waste will be recycled or reused.

Extract from the Guideline

AND/OR

- Proposals for other innovative end of life initiatives may be considered on a case-by-case basis. Clear justification, including quantification of the amount of PVC waste that will be diverted from landfill as a result of implementation, must be provided.

Demonstration of Compliance

Objective evidence to be viewed by the auditor of one or more proposals for other innovative end of life initiatives and of the implementation of the proposal(s). Proposals to include clear justification including quantification of the amount of PVC waste that will be diverted from landfill as a result of implementation.

3.4 Use of PVC Recyclate in PVC Products

Extract from the Guideline

Claims of recycled content (post consumer and post industrial) must be verified as such.

Demonstration of Compliance

Contractor receipts showing volumes of recyclate purchased or acquired for use in manufacturing the product under assessment.