Best Environmental Practice PVC v2.0

Guidelines, criteria and verification evidence requirements for best practice manufacturing of PVC products

May 2023

Contents

Change log

Version	Release date	Description of changes
1 (GBCA)	05 October 2011	First issue
1 (GBCA)	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
2 (VCA)	May 2023	Significant review and updates including updated guidance for verification, revised structure and conformance requirements, and revised evidence requirements. The Best Practice Guidelines for PVC in the Built Environment have been retained as CORE guidelines, with the inclusion of new MANDATORY requirements relating to EMS at Product Manufacturing Plants, Open Disclosure, Use of Post-Industrial Waste, and OPTIONAL guidelines relating to Responsible Sourcing Policy, Quality Management System, Modern Slavery, Life Cycle Thinking, Transition to Renewable Energy, and Packaging Waste.

Glossary

Auditor	Qualified third-party contractor or certification body conducting the verification and assessment of conformance of the product(s) to these Guidelines
BBP	Benzylbutyl phthalate
DBP	Diethylbutyl phthalate
DEHP	Diethylhexyl phthalate
DOP	Dioctyl phthalate
EDC	Ethylene dichloride
EMS	Environmental Management System
ERP	Expert Reference Panel
GBCA	Green Building Council of Australia
JAS-ANZ	Joint Accreditation System of Australia and New Zealand
PIPA	Plastics Industry Pipe Association of Australia Limited
PVC	Polyvinyl chloride
rVCM	Residual vinyl chloride monomer (in resin or product)
UNEP	United Nations Environment Program
VCM	Vinyl chloride monomer
VCA	Vinyl Council of Australia

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 featured in 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 2007 revision established criteria defining Best Environmental Practice (BEP) PVC manufacturing. The review process revealed that the lifecycle of PVC - from raw materials and production through use to end-of-life, recycling and disposal - had changed considerably leading the GBCA to conclude "there is a clear rationale for favouring PVC products that are manufactured and reclaimed through best practice production and end of life product management processes".

The GBCA Literature Review and Best Practice Guidelines for the Life Cycle of PVC Building Products represent the most significant outcome of the PVC Minimisation Credit[i]. Those guidelines, first issued in April 2010, and subsequently updated in November 2013, address opportunities for the minimisation of environmental and health impacts of the PVC life cycle. An Auditor Verification Guidance document[ii], produced in collaboration with the Plastics Industry Pipe Association (PIPA) and the Vinyl Council of Australia (VCA) provided the means by which auditors were able to establish compliance with the Best Practice PVC Guidelines for PVC in the Built Environment. As a result of the collaborative development of the Best Practice PVC Guidelines in the Built Environment and the Auditor Verification Guidance document, the Best Environmental Practice PVC requirements were written into all Australian/New Zealand PVC pipes and fittings product standards as normative appendices.

The guidelines in Best Practice PVC Guidelines in the Built Environment have been retained in Best Environmental Practice PVC v2.0 as 'core' guidelines. Best Environmental Practice PVC v2.0 also includes additional mandatory guidelines and optional credits, the details of which are outlined in the sections below.

Best Environmental Practice PVC is a recognised, third party verified product accreditation scheme in the Responsible Products Framework in Green Star, the GBCA's internationally recognised sustainability rating and certification system for built environment projects. The Responsible Products Framework is currently used to recognise initiatives that a product or manufacturer can comply with for the purposes of contributing to a building project's Green Star certification.

Best Environmental Practice PVC accreditation may also be recognised in other public and private procurement policies.

General notes for auditors

The Best Environmental Practice PVC v2.0 Guidelines (the Guidelines) establish the criteria by which PVC products are assessed and the requirements for conformance to be accredited as 'Best Environmental Practice PVC v2.0' (BEP 2.0). Application for assessment can be made by manufacturers of resins, compounds or finished PVC products. Table 1 summarises the criteria, evidence requirements and the relevance according to supply chain position.

Conformance

All product(s) – resins, compounds or finished products – must demonstrate conformance through independent verification with the following:

• All relevant Core Guidelines

• All relevant Mandatory Guidelines

• At least one Optional Credit

Compliance with the requirements of the Core and Mandatory Guidelines and Optional Credits is to be assessed on the basis of objective evidence. This evidence may be collected through a desktop review, a site visit, or a combination of the two. Objective evidence varies according to the criteria and may be specified in the Demonstration of Compliance section. It 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 where the evidence requirement specifically requests it
- An independently audited, publicly available company annual environment/sustainability report
- An assessment of company or government records.
- Certification to the BEP PVC requirements defined in the AS/NZS PVC Pipe and Fittings Standards[iii.] is evidence of conformity with the Core Guidelines.

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.

Physical testing of the product is not required to meet any of the Guidelines.

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.

All declarations and documentary evidence shall include:

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

Declarations and documentary evidence should be cross-checked, where applicable, by the auditor to ensure compliance. Auditors must contact the VCA when cross-checking upstream suppliers of chlorine and VCM.

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).

Assessment of Recycled PVC

Aside from verification of the claim of recycled PVC content, recycled PVC content that is used in the production of new PVC products is excluded from the Guidelines.

Recycled PVC content refers to Pre-consumer and Post-consumer PVC waste procured from sources external to the manufacturer's business for reuse/recycling as a replacement for virgin PVC resin/compound, including externally sourced PVC waste arising from non-related manufacturing, fabrication, installation, repair, maintenance and end-of-life.

This excludes re-utilisation of materials such as re-work, re-grind or scrap generated in the producer's own manufacturing process which is termed 'internal post-industrial' recycled content. Internal post-industrial recycled content is treated in the same manner as virgin material.

Further information on definitions of post-consumer and pre-consumer PVC recyclate and measurement of recycled content can be found in the *VinylCycle Specifications for the Verification of Recycled PVC Content Claims in PVC Products* published by the Vinyl Council of Australia at https://www.vinyl.org.au/vinylcycle.

A current VinylCycle – GECA Claims Authentication certificate is acceptable as verification of a claim of recycled PVC content.

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. Manufacturer's Declaration:

Manufacturer's or supplier's declaration which is independently audited to confirm that all the requirements outlined in these Guidelines have been met for a specific product or a product range. The manufacturer's declaration must be independently audited by either an accredited auditor registered by Exemplar Global (formerly known as 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, AS/NZS standards, 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 three 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 Accreditation

Under all three options listed above, a certificate shall be issued by the conformance assessment body to confirm the product's conformance to the Guidelines has been verified. The certificate must clearly state the following:

- The conformance assessment body's name, address, contact details
- The relevant compliance pathway (1-3 above) which the certificate relates to
- A statement that the certificate is in evidence of compliance of specific PVC product(s) (including names, trademark, etc) to requirements of the Best Environmental Practice PVC Guidelines v2.0 2022
- The Optional Credit(s) to which the product(s) conforms
- Date of issue and validity of the certificate and
- Relevant auditor qualifications as required in options 1-3 above.

Certificates of verification and conformance shall be submitted to the Vinyl Council of Australia for product accreditation and registration of Best Environmental Practice PVC v2.0.

Certificate Upload and Product Registration

Once a product has been independently verified as conforming to the Guidelines, the product manufacturer may apply for accreditation under the Vinyl Council of Australia's Best Environmental Practice PVC v2.0. and submit the conformance certificate together with the BEP 2.0 application form for registration and licensing. The Vinyl Council of Australia will review an application and the conformance certificate and once the licensee agreement has been signed and License Fee has been paid, will register the product on the online Best Environmental Practice PVC Product register and issue the licence mark to the applicant.

Licensees will be:

• Publicly promoted on the VCA website

• May be promoted via VCA newsletters, media and social media channels

• Granted use of the VCA Best Environmental Practice PVC™ licence mark for online promotion & in print

• Provided with logo style and brand use guidelines

The Guidelines for Best Environmental Practice Manufacturing of PVC Products

The following table provides a summary of the Guidelines and evidence requirements. For full details, please refer to the relevant section of the document, the content of which will take precedent in case of any discrepancy.

Table 1. Summary of guidelines, evidence and relevance

R: Resin Producer; C: Compound Producer; FP: Finished Product Manufacturer

Ref no.	Core/Mandatory/ Optional	Guideline	Evidence requirements	Relevance	Check
1.0 SUPPLY CHAIN MANAGMENT					
1.1	**Core**	**Supply Chain Mapping -** Supply chain map shall detail the upstream supply chain relevant to the manufacturing of a particular PVC product or a range of products.	A document/diagram which details the chain of supply of PVC resin and its constituents (VCM and chlorine) including names, locations of suppliers' plants	R, C, FP	☐
1.2	**Optional**	**Responsible Sourcing Policy (Optional Credit)** - Policy shall outline the organisation's fundamental principles on the sourcing and procurement of raw materials and inputs.	A formal written Responsible Sourcing Policy signed by Executive Officer	R, C, FP	☐
1.3	**Optional**	**Quality Management System (Optional Credit)** - Quality management system shall follow the principles of ISO 9001:2015	Documents that support the existence of the quality management system and/or ISO 9001:2015 certification and a copy of the company's Responsible Sourcing Policy	R, C, FP	☐
1.4	**Optional**	**Modern Slavery (Optional Credit)** - Reasonable efforts to investigate the risk of modern slavery shall be undertaken within the organisation and supply chain, and action taken to address if required.	A published Modern Slavery Statement	R, C, FP	☐
2.0 BEST ENVIRONMENTAL PRACTICE MANUFACTURE OF PVC RESIN					
2.1	**Core**	**Chlorine Production** – chlorine shall be sourced from non-mercury production processes	Chlorine supplier details including plant name, location, production technology confirmed compliant	R, C, FP	☐
2.2	**Core**	**VCM Production** – VCM shall be sourced from non-mercury production processes	VCM supplier details including name, location, production technology confirmed compliant	R, C, FP	☐
2.3	**Core**	**Wastes & Effluent** – EDC, VCM and PVC resin will be sourced from closed lid production manufacturing plants which effectively manage hazardous solid waste and sludge and effluents which can contain organohalogens	A statement confirming closed lid production and copies of Regulatory Licences or Permits for hazardous solid waste disposal and effluent discharge showing organohalogens emissions control	R, C, FP	☐

2.4	**Core**	**Occupational Exposure Limits to VCM** – occupational exposure shall not exceed 1ppm (for 8 hours weighted average in 95% of cases) over the course of 12 months	Documents confirming that the occupational exposure to VCM at supplier PVC resin plants meets benchmark and evidence of measurement methodology, average exposure results and percentage compliance for most recent 12-month reporting period.	R, C, FP	☐
2.5	**Core**	**A) VCM Emissions** – **Air and Water** – VCM emissions from resin manufacturing to air and water, including licensed and fugitive emissions, shall not exceed: • For S-PVC: 43g/tonne of product produced p.a. • For E-PVC: 500 g/tonne of product produced p.a. using an industry recognised calculation methodology. **B) VCM Emissions** – **Product:** Residual VCM in raw PVC resin shall not exceed 1ppm when delivered to the end processor	Copy of Regulatory Licence or Permit for air emissions for VCM and test results for total VCM emissions to air and water per tonne of PVC produced for the most recent 12- month company reporting period and evidence of calculations and methodology. Certificates of analysis indicating rVCM ≤1 ppm for 99% resin batches tested.	R, C, FP	☐
3.0 ENVIRONMENTAL MANAGEMENT					
3.1	**Core**	**EMS at PVC Resin Plants** – An EMS that addresses above waste, air, water and product requirements, or current ISO 14001 certification, AND includes measures to protect the marine environment from powder or pellet leakage	Evidence the EMS includes the Waste, Water, Air and Product-related requirements, or current ISO 14001 Certificate, AND that the EMS includes measures to prevent and control losses of containment of resin powder, pellets or granulate.	R, C, FP	☐
3.2	**Mandatory**	**EMS at Product Manufacturing Plants** –ISO 14001 certification OR an EMS that meets the Australian PVC Industry Minimum Acceptable Standard for Environmental Management AND includes measures to protect the marine environment from powder or pellet leakage	Evidence of an EMS meeting the Minimum Acceptable Standard, or current ISO 14001 Certificate AND of measures to prevent and control losses of containment of resin powder or pellets.	R, C, FP	☐
3.3	**Optional**	**Life Cycle Thinking (Optional Credit)** – demonstrate that life cycle impacts have been considered and addressed in the development or introduction of new PVC products	Evidence of new product(s) or modified formulations, documentation showing how environmental, health and safety aspects were considered (e.g., design criteria, meeting minutes, etc), and documentation of life cycle analysis conducted.	FP	☐

4.0 SAFE AND SUSTAINABLE USE OF ADDITIVES					
4.1	**Core**	**Stabilisers and Pigments** – cadmium, lead and hexavalent chromium stabilisers and pigments shall not be used in PVC products	Statement of the composition of the product and evidence such as purchase orders, technical specifications, material safety data sheets and process control documents confirming avoidance of these metals.	C, FP	☐
4.2	**Core**	**Plasticisers** – low molecular weight ortho-phthalate plasticisers shall not be used in PVC products	Statement of the composition of the product and evidence such as purchase orders, technical specifications, material safety data sheets and process control documents confirming avoidance of these plasticisers.	C, FP	☐
4.3	**Core**	**Recycling PVC Using Legacy Additives** – demonstrate, if applicable, responsible recycling of PVC waste materials containing legacy additives to protect health, safety and the environment	Product formulation sheets indicating recyclate use and legacy additives content; Standard Operating Procedures related to handling the recycled material; a statement from an authorised executive signatory confirming compliance.	C, FP	☐
4.4	**Mandatory**	**Transparency: Open Disclosure** – disclose information on constituent ingredients used in the PVC products	A list of intentionally added substances in technical documentation such as a Product Data Sheet.	FP	☐
5.0 TRANSITION TO RENEWABLE ENERGY					
5.0	**Optional**	**Transition to Renewable Energy (Optional Credit)** – use of renewable energy accounts for at least 15% of total energy consumption per annum attributable to the PVC product manufacture	Evidence from the PVC product manufacturer and/or its energy supplier on the proportion of renewable energy supplied to the company over the previous 12 month period, OR evidence all PVC resin consumed is sourced from a resin production plant which meets the 15% minimum renewable energy requirement, OR 15% of the resin with which the product is manufactured is bio-attributed PVC resin.	R, C, FP	☐
6.0 RESOURCE EFFICIENCY & MATERIAL CIRCULARITY					
6.1	**Mandatory**	**Post-industrial Waste** – PVC scrap sent to landfill is <2% of the total production of saleable PVC product	Records of production and waste management	C, FP	☐
6.2	**Core**	**Use of PVC Recyclate in PVC Products** – recycled PVC is used in manufacture of PVC products (unless use of recycled materials is specifically restricted by product standards)	Verification of recycled content claim either through VinylCycle-GECA Claims Authentication or from purchasing and production records. Documents from recyclate suppliers showing volumes of waste PVC/recyclate purchased or acquired and production records. Confirmation the PVC recyclate is externally sourced.	FP	☐

6.3	**Core**	**Managing End of Product Use** – independent verification of at least one of the following: A) Contractual agreements offered to Australian customers for extended supplier responsibility B) Contractual agreements with third parties for the collection of end-of-life product and delivery to a recycling service provider/re-user C) Proposals for other innovative end of life initiatives quantifying the amount of PVC waste that will be diverted from landfill.	A) Copy of documentation outlining the take back service B) Copy of contractual agreements with third parties in at least two capital cities in Australia C) Objective evidence of proposal and its implementation, including clear justification and quantification of the amount of PVC waste that will be diverted from landfill as a result of implementation.	FP	☐
6.4	**Core**	**Consumer Responsible Care** – publicly inform Australian consumers on how and where to reuse, recycle or dispose of the product safely at end-of-life	Evidence of information being publicly disseminated in Australia e.g., via corporate website, product catalogues etc.	FP	☐
6.5	**Optional**	**Packaging Waste (Optional Credit)** – divert a minimum of 70% of all incoming packaging materials from landfill and encourage the recycling of packaging materials leaving the facility	Documents showing calculation of packaging waste landfill diversion rate and end destinations of materials. Evidence of encouraging the recycling of packaging materials leaving the facility e.g. labelling, packaging take-back programs, etc.	FP	☐

Guidelines and Demonstration of Compliance

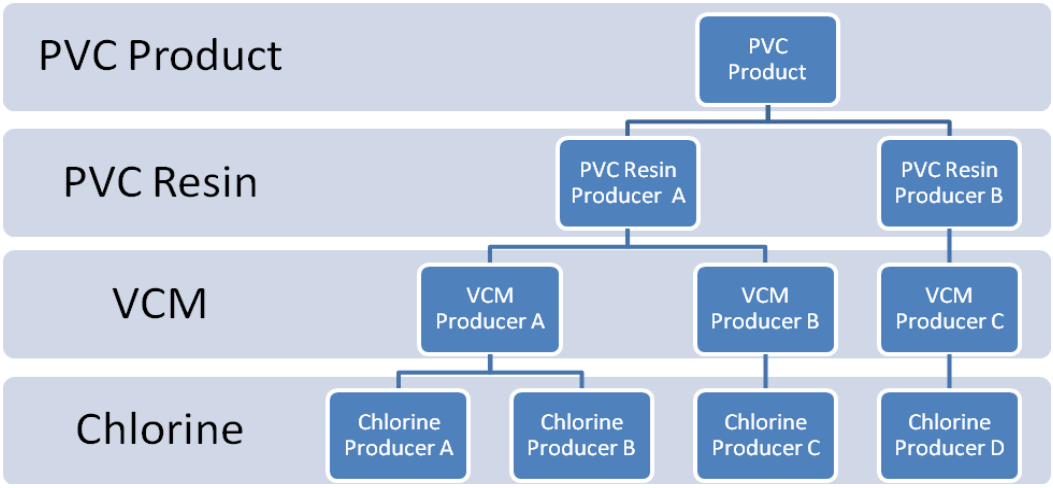
The following lists the Best Environmental Practice Guidelines for PVC including both Core and Mandatory Guidelines, and Optional Credits, and details the evidence required for the auditor to verify compliance. For background information please refer to the Literature Review.

1.0 Supply Chain Management

1.1 CORE REQUIREMENT - Supply Chain Mapping

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 (vinyl chloride monomer (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:



Demonstration of Compliance

- A document/diagram which details the chain of supply of PVC resin and its constituents (VCM and chlorine) including names, locations of suppliers' plants

1.2 OPTIONAL CREDIT (1) - Responsible Sourcing Policy

A formal, written Responsible Sourcing Policy will be provided as evidence in a form that is relevant to the organisation and PVC product range under evaluation, and follows the principles associated with the criteria set out in these Best Environmental Practice PVC Guidelines. The Policy shall outline the organisation's fundamental principles of how it monitors and manages the sourcing and procurement of raw materials and inputs and expects its suppliers to conduct their business, including, for example:

- compliance with all applicable laws
- implementation of policies to maintain business integrity
- respect of human rights / protection against Modern Slavery
- be consistent with ISO 20400 Sustainable Procurement guidelines
- avoidance of cause or contribution to adverse human rights or environmental impacts through its activities, e.g., via Best Environmental Practice PVC accreditation or similar schemes, and addressing such impacts when they occur

The Policy must be signed by the organisation's Executive Officer.

Demonstration of Compliance

- A copy of the Responsible Sourcing Policy signed by the organisation's Executive Officer

1.3 OPTIONAL CREDIT (2) - Quality Management System

Evidence that there is a documented quality management system for the PVC product or product range under evaluation, which follows the principles of ISO 9001:2015 and includes or refers to a Responsible Sourcing Policy.

Demonstration of Compliance

- Documents that support the existence of the quality management system and/or
- ISO 9001:2015 certification and
- A copy of the Responsible Sourcing Policy

1.4 OPTIONAL CREDIT (3) - Modern Slavery

The product supplier has undertaken reasonable efforts to investigate the risk of modern slavery within their organisation and in their supply chain and taken action to address if required.

Demonstration of Compliance

- A Modern Slavery Statement produced and published by the product manufacturer or supplier describing the approach taken in respect of its PVC business to identify and minimise the risk of modern slavery occurring in its business and supply chains.

2.0 Best Environmental Practice Manufacture of PVC Resin

Note: A fully integrated manufacturing facility covers production of Chlorine, EDC, VCM and PVC that are all internally manufactured. In this case, the auditor will still check the source of chlorine and VCM against reference documents to ensure compliance.

2.1 CORE REQUIREMENT - Chlorine Production

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

- Chlorine supplier details confirmed (including where PVC is sourced from an integrated production facility) including plant name, location, production technology.

2.2 CORE REQUIREMENT – VCM Production

VCM shall be sourced from non-mercury production processes.

Demonstration of Compliance

- VCM supplier details confirmed (including where PVC is sourced from an integrated production facility) including name and location of plant, the manufacturing process and whether mercury catalysts are used in the process.

Note: *A fully integrated manufacturing facility covers production of Chlorine, EDC and VCM that are all internally manufactured. The auditor is still required to crosscheck the source of chlorine and VCM with the Vinyl Council of Australia.*

2.3 CORE REQUIREMENT - Wastes & Effluent

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

- 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.
- 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.

Demonstration of Compliance

A 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 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

2.4 CORE REQUIREMENT - Occupational Exposure Limits

Evidence that effective emission reduction measures are used to ensure that VCM and/ or EDC emissions and possibly other contaminants to air are close to, or below, negligible risk levels.

In the case of VCM and PVC manufacturing plants, the occupational exposure to VCM shall not exceed 1ppm (for 8 hours weighted average in 95% of cases).

Demonstration of Compliance

- Documents confirming that the occupational exposure to VCM at supplier PVC plants is no greater than 1ppm measured on an 8-hour time-weighted average in 95% of cases over the course of 12 months.
- Evidence of occupational exposure measurement methodology and the average exposure results as well as the percentage compliance for most recent 12-month reporting period.

2.5 CORE REQUIREMENT - VCM Emissions

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

Air and Water

- VCM emissions (licensed and fugitive) from Suspension PVC (S-PVC) manufacturing (to both air and water) shall not exceed 43g/tonne of resin produced (measured on an annual basis).

Note: mass/bulk polymerisation emissions will be treated as per S-PVC standard and must therefore not exceed 43g/tonne emission standard.

- VCM emissions (licensed and fugitive) from E-PVC manufacturing (to both air and water) shall not exceed 500 g/tonne of product produced (measured on an annual basis).

Products:

• Residual VCM in raw PVC resin shall not exceed 1ppm in 99% batches tested when delivered to the end processor.

Demonstration of Compliance

Documentary evidence from the supplier(s):

- Copy of Regulatory Licence or Permit for air emissions for VCM as appropriate.
- Of 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;[iv] AND
- Certificates of analysis indicating rVCM ≤1 ppm for 99% resin batches tested.

3.0 Environmental Management

3.1 CORE REQUIREMENT - At PVC Resin Plants

The Plant shall have

- 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 OR
- The plant shall have current EMS ISO 14001 certification AND
- The EMS includes appropriate loss prevention, contamination and clean up procedures for protection of the marine environment from leakage of plastic pellets (also known as nurdles), resin powder and granulated PVC arising from the manufacture of PVC resins and compounds.

Demonstration of Compliance

- Objective evidence of the EMS(s) at the resin producer(s), 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 for PVC-resin producers AND/OR
- ISO 14001 Certificate(s) AND

- that the EMS includes the minimum criteria and measures to prevent and control losses of containment of resin powder, pellets or granulate OR the company is a current signatory to Operation Clean Sweep.

3.2 MANDATORY REQUIREMENT - At Product Manufacturing Plants

The Plant shall

- have ISO 14001 certification, OR
- Meet or exceed the Australian PVC industry's Minimum Acceptable Standard for Environmental Management[v] AND
- The EMS includes appropriate loss prevention, contamination and clean up procedures for protection of the marine environment from leakage of plastic pellets (also known as nurdles), resin powder and granulated PVC used during the manufacture of PVC products.

Demonstration of Compliance

- Objective evidence of the EMS for the product manufacturing plant(s), including but not limited to the scoping document or table of contents, that the EMS includes the Minimum Criteria AND/OR
- ISO 14001 Certificate(s) for the relevant product manufacturing plant(s) AND
- Evidence of measures to prevent and control losses of containment of resin powder, pellets or granulate OR the company is a current signatory to Operation Clean Sweep.

3.3 OPTIONAL CREDIT (4) - Life Cycle Thinking (LCT)

The product manufacturer demonstrates that environmental, health and safety impacts have been considered and addressed in the development and introduction of a new PVC product for the Australian market. This applies to a new application of PVC, or to a new or modified formulation of an existing application, other than colour changes.

Demonstration of Compliance

- Confirmation of development and introduction of new product(s) or modified formulations and
- Documentation showing how environmental, health and safety aspects at product design, manufacture, use, and end-of-life stages were considered during product development. (e.g., design criteria, meeting minutes, etc) and
- Documentation of the analysis process conducted to consider the product life cycle such as a sustainability matrix or ISO 14025 or EN 15804 LCA.

4.0 Safe and Sustainable Use of Additives

4.1 CORE REQUIREMENT - Stabilisers and Pigments

Cadmium, lead and hexavalent chromium stabilisers and pigments shall not be used in PVC products.

Demonstration of Compliance

- Statement of the composition of the product AND
- 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.

4.2 CORE REQUIREMENT - Plasticisers

Low Molecular Weight Ortho-phthalates (carbon backbone ≤6C) such as 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
- 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.

4.3 CORE REQUIREMENT - Recycling PVC Containing Legacy Additives

If applicable, demonstrate responsible recycling of waste PVC materials that contain legacy additives by:

- meeting relevant regulatory health and safety obligations to workers and customers;
- ensuring products meet relevant performance requirements;
- avoiding use of PVC recyclate containing legacy additives in sensitive end use applications such as children's toys, medical devices, or food contact products.

Demonstration of Compliance

- Product formulation sheets indicating recyclate use and legacy additives content (by type) and
- Any Standard Operating Procedures related to handling the recycled material which can be used to identify controls on source of materials in final product; and
- A statement from an authorised executive signatory of the Product Manufacturer confirming compliance with the safe and responsible handling and reprocessing of the recyclate addressing each point above.

4.4 MANDATORY REQUIREMENT - Transparency: Open Disclosure

Disclose information on all constituent ingredients used in the PVC products.

Evidence of Compliance

A list of intentionally added substances is given in technical documentation such as a Product Data Sheet which can readily be made available to stakeholders requesting the information.

Note: In order to protect proprietary formulations, specific quantities of each ingredient do not need to be disclosed. Intentionally added substances at concentrations of 0.1% (1000 ppm) of product content by weight, must be declared. Confidential ingredients may be disclosed as the function of the ingredient rather than by name. However, the health risk of all substances contained in the final product shall be indicated using Globally Harmonised System of classification and labelling.

5.0 OPTIONAL CREDIT (5) – Transition to Renewable Energy

Use of renewable energy accounting for at least 15% of total energy consumption per annum associated with PVC product manufacture.

'Renewable energy' includes wind power, hydroelectricity, solar PV, heat pumps, geothermal, wave and solar thermal energy. Carbon trading activities will not be considered to be equivalent to renewable or green energy.

Demonstration of Compliance

Evidence from the PVC product manufacturer and/or its energy supplier on the proportion of renewable energy supplied to the company over the previous 12-month period.

Alternatively, a product manufacturer may demonstrate

- 100% of the PVC resin consumed is sourced from a resin production plant which meets the 15% minimum renewable energy requirement, evidenced by a written statement from the resin supplier and publicly available information supporting their claim OR
- At least 15% of the resin with which the product is manufactured is bio-attributed climate-preferred PVC resin, evidenced by purchase records.

6.0 Resource Efficiency & Material Circularity

6.1 MANDATORY REQUIREMENT - Post-industrial Waste

Post-industrial PVC waste is diverted from landfill to local recyclers.

Demonstration of Compliance

- Evidence showing that PVC scrap sent to landfill is <2% of the total production of saleable PVC product including documents used to calculate the ratio, based on total quantity of waste from PVC product manufacturing that is landfilled and total quantity of saleable PVC product manufactured.

6.2 CORE REQUIREMENT - Use of PVC Recyclate in PVC Products

PVC recyclate[1] is used in the manufacture of the PVC product under evaluation (unless product standards and codes restrict the use of recycled materials).

Note: There is no minimum percentage requirement for consumption of PVC recyclate across a product range.

Demonstration of Compliance

- Claims of recycled content (pre- and post-consumer) must be verified as such. Current VinylCycle-GECA Claims Authentication accreditation for the product being assessed is acceptable demonstration.
- Contractor receipts, purchase orders or documented confirmation from suppliers showing volumes of waste PVC/recyclate purchased or acquired for use in manufacturing the product under assessment.

Note: Where current product standards and codes restrict the use of recycled materials, provide evidence of explicit exclusion in relevant Australian Standards, codes or regulations. Aside from verification of the claim of recycled content use and the guideline 4.3 Recycling PVC Containing Legacy Additives, Recycled PVC content that is used in the production of new PVC products is excluded from the Guidelines.

6.3 CORE REQUIREMENT - Managing End of Product Use

Independent verification of one of the following is required:

[1] PVC recyclate is waste PVC generated outside the business, that is externally sourced from a recycler, supplier or other manufacturing plant. It may be in the form of unprocessed waste material or product, or reprocessed as flake, granulate, micronized or pelleted PVC.

(A) Contractual agreements offered to Australian 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.

AND/OR

(B) 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.

AND/OR

(C) 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 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 waste that will be diverted from landfill as a result of implementation.

6.4 CORE REQUIREMENT - Consumer Responsible Care

Publicly inform Australian consumers on how to, and where to reuse, recycle or dispose of the product safely at end-of-life.

Demonstration of Compliance

Evidence of the required information being publicly disseminated in Australia for Australian distributed product e.g., via corporate website, product catalogues etc.

6.5 OPTIONAL CREDIT (6) - Packaging Waste

Divert from landfill a minimum 70% of all incoming recyclable packaging materials associated with the manufacture or supply of PVC products to the Australian market and undertake actions to encourage the recycling of packaging materials leaving the facility.

Demonstration of Compliance

- Document showing calculation of packaging waste landfill diversion rate.

- Documents or contracts from waste service contractor(s) showing end destination.
- Evidence of actions in relation to outgoing packaging such as:
    - Reductions in packaging used or phase out of unnecessary packaging
    - Packaging designed for recyclability, including recyclable materials and effective design to aid recycling
    - Labelling to identify materials and indicate recyclability
    - Packaging take-back programs offered, etc.

[i] Background and Outcomes of the PVC Minimisation Credit Review – Green Building Council of Australia
[ii] Green Star PVC Credit Auditor Verification Guidance – Green Building Council of Australia
[iii] BEP PVC is detailed in all AS/NZS PVC Pipe and Fitting Standards. Currently in revision to transfer to a standalone AS/NZS BEP PVC Pipes and Fittings Standard.
[iv] 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
[v] Australian PVC Industry Minimum Acceptable Standard for Environmental Management – Vinyl Council of Australia