



Plastics Industry Pipe Association
of Australia Limited

ACN 086 511 686

Industry Guidelines

Verification Guidance for Best Environmental Practice PVC Pipe and Fittings

ISSUE 1.0

Ref: POP106
28 October 2011

Pipelines Integrity For a Cleaner Environment



Disclaimer

In formulating this guideline PIPA has relied upon the advice of its members and, where appropriate, independent testing.

Notwithstanding, users of the guidelines are advised to seek their own independent advice and, where appropriate, to conduct their own testing and assessment of matters contained in the guidelines, and to not rely solely on the guidelines in relation to any matter that may risk loss or damage.

PIPA gives no warranty concerning the correctness of accuracy of the information, opinions and recommendations contained in the guidelines. Users of the guidelines are advised that their reliance on any matter contained in the guidelines is at their own risk.

Verification Guidance for Best Environmental Practice PVC Pipe and Fittings

Purpose

This document is a companion to the appendices in the Australian Standards for PVC pipe products detailing the requirements for product to qualify as Best Environmental Practice PVC (BEP PVC). The Green Building Council of Australia has defined the standards for best practice environmental performance for PVC manufacturing against which PVC manufacturers are to be verified under the Green Star rating tool's PVC Credit. These standards, referred to as 'Best Practice Guidelines' for PVC for the built environment, are defined in section 7.0 of Literature Review and Best Practice Guidelines for Life Cycle of PVC Building Products (2010) and in accordance with section 7.0 of Background and Outcomes of the PVC Minimisation Credit Review (2010) both published by the Green Building Council of Australia (refer to www.gbca.org.au).

The Appendices define the requirements and, using the established conventions of Australian Standards, state the means of demonstrating compliance.

This companion document is designed to assist both product certification bodies and those submitting product for assessment by providing information related to the verification documentation that underpins the product/manufacture declarations required to demonstrate compliance.

Product/manufacture declarations are necessary elements of the compliance process. Whilst some requirements can be met by testing, there are others that are supported by supplier statements of compliance - for example, confirming the type of chlorine or vinyl chloride monomer manufacturing process employed.

NOTE: If the GBCA requirements are changed in the future, the intention is to amend the Australian PVC pipe standards and this document to reflect those changes.

Background

The GBCA undertook an extensive review of its Green Star building rating tool in relation to PVC. This review involved engagement with stakeholders and industry culminating in the establishment of an Expert Reference Panel (ERP) to complete a scientific review of the available information surrounding the manufacture, use and end-of-life management of PVC. The ERP undertook a rigorous review of the scientific evidence and in late 2009 made a series of recommendations to the GBCA Board. In January of 2010 the GBCA published their revised Green Star PVC materials credit and following a public review period the Green Star rating tool was formally changed in April 2010 to reflect the recommendations.

The revision established criteria defining Best Environmental Practice (BEP) PVC manufacturing. The review process has shown the lifecycle of PVC - from raw materials and production through use to end-of-life, recycling and disposal - has changed considerably in recent years and the GBCA state *“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 BEP requirements have been included in the relevant Australian PVC pipe product standards to allow:

Combined product certification, whereby a Conformity Assessment Body (CAB) can determine compliance with both the traditional elements of the product Standard and Best Environmental Practice PVC (BEP PVC) requirements; and
common product marking to simplify identification of product that meets both plumbing regulator (i.e. AS/NZS3500) and BEP PVC requirements.

ISO/IEC 17050

The Appendices addressing BEP PVC in Australian PVC pipe standards require suppliers/manufacturers to provide and maintain a declaration of conformity as a means of demonstrating compliance with several of the BEP requirements. The purpose of referencing ISO/IEC 17050 is to provide a clearly defined, internationally recognised standard that defines the requirements surrounding a supplier’s declaration of conformity.

ISO/IEC 17050 Conformity Assessment — Supplier's Declaration of Conformity – is a standard that addresses the attestation undertaken by the supplier of a product. ISO/IEC 17050 Part 1 specifies the requirements applicable when an individual or organisation responsible for the fulfilment of specified requirements provides a declaration that a product is in conformity with those requirements. The documentation required to support a declaration is nominated in this document (POP106) – Verification of BEP Requirements.

ISO IEC 17050 Part 1 addresses the contents of the declaration of conformity and the procedures necessary to ensure ongoing compliance. Part 2 addresses the documentation required to support a declaration of conformity including the contents, traceability, availability and retention period.

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 the basis of 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 Guidelines have been achieved. 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

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 for 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 manufacturing process which is termed post industrial recycled content. Internal post-industrial recycled content is treated in the same manner as virgin material.

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:

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.

The compliance certificate issued by the auditor must provide written assurance of compliance to the guidelines and serves as the documentation needed to establish compliance with the credit via the EMS option; or

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.

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:

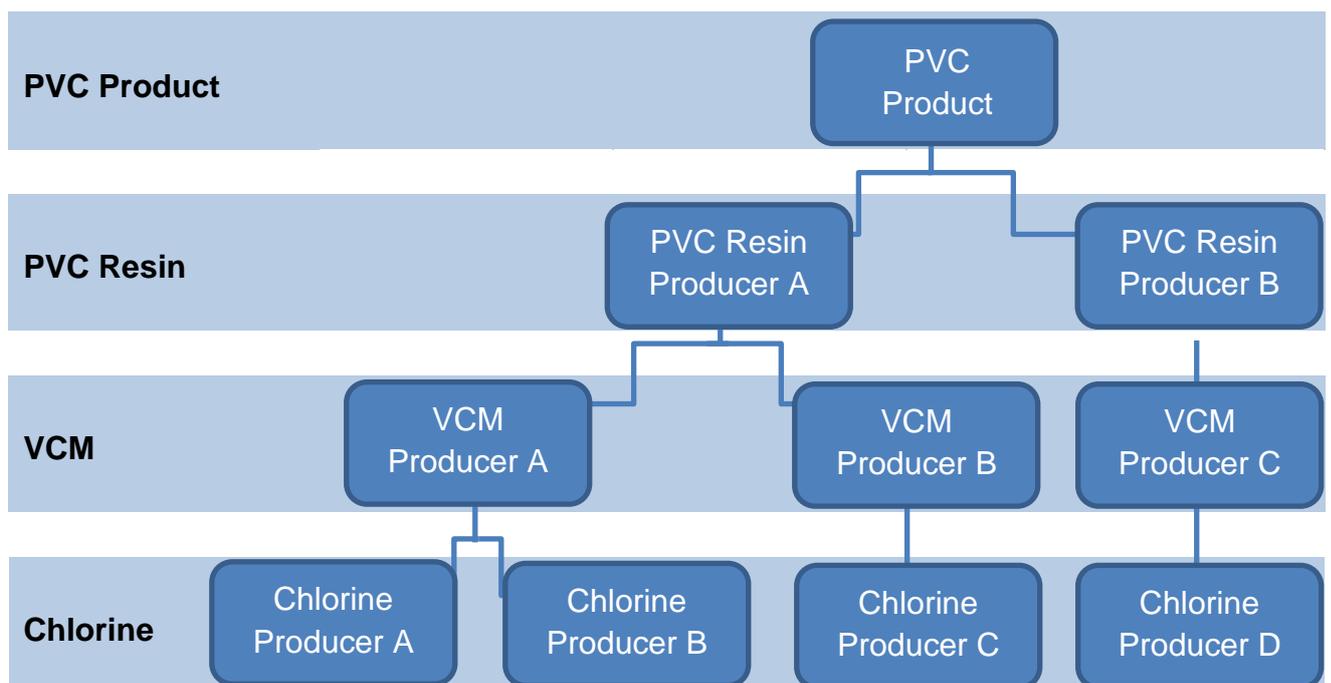
The relevant compliance option (1-3 above) which the certificate relates to;
 Statement that the certificate is in evidence of compliance of specific PVC products (including names, trademark, etc) to requirements of the Guidelines for PVC in the Built Environment detailed as part of the Green Star PVC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

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.

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:



SECTION 1: MANUFACTURE OF PVC RESIN

1.1. Chlorine

Requirement: 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, 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. This shall be assessed against a list of mercury cell plants as recorded by the United Nations Environmental Programme (UNEP) at:

<http://www.unep.org/hazardoussubstances/UNEPsWork/tabid/271/Default.aspx>

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.

1.2. Vinyl Chloride Monomer (VCM)

Requirement: 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 is used in the process.

This shall be assessed against the 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).

1.3. Ethylene Dichloride (EDC) and VCM

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

(a) **Waste:** Hazardous solid waste and sludge, which can contain organohalogenes 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.

(b) **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.

(c) **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 stating:

- 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 and 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.

1.4 PVC RESIN

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

- (a) Air and Water: VCM emissions from PVC manufacturing (both to air and water) shall not exceed 43g/tonne of product produced (measured on an annual basis).
- (b) 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:

- test results stating total VCM emissions to air and water do not exceed 43g/per tonne of PVC produced for the most recent 12 month company reporting period. The test results should confirm the basis of calculations includes licensed and fugitive emissions using the recognised calculation methodology nominated in the European Council of Vinyl Manufacturers (ECVM) - Reference Method - Identification, Measurement and Control of Fugitive Emissions from process equipment and gas holders.
- 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 - 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.

1.5. ENVIRONMENTAL MANAGEMENT SYSTEM

Requirement: 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 encompassing the above waste, water, air and product related requirements.

SECTION 2: MANUFACTURE AND END OF LIFE MANAGEMENT OF PVC PRODUCTS

The following Guidelines represent best environmental practices in risk avoidance and management in the manufacturing of PVC pipes. Post-consumer recycled PVC content that is used in the production of new PVC pipe is excluded from the following criteria, provided appropriate isolation measures are followed.

2.1 STABILISERS

Requirement: Stabilisers - cadmium and lead stabilisers shall not be used in PVC pipe.

Note: Where post consumer recycle is used it shall only be permitted in the core or inner layer of multilayer pipe in accordance with stated requirements in the relevant Australian PVC pipe standards

Demonstration of Compliance: There are normative clauses contained in Australian PVC pipe standards prohibiting the use of cadmium and lead stabilisers. All products complying with the normative clause satisfy this requirement. This requirement shall be supported by suitable process control and purchase documentation relating specifically to stabilisers which will include a technical data sheet for the product and a material safety data sheet (MSDS).

2.2 PLASTICISERS

Requirement: Plasticisers - diethylhexyl phthalate (DEHP), benzylbutyl phthalate (BBP), and diethylbutyl phthalate (DBP) shall not be used in PVC products.

Note: Australian PVC pipe standards apply to unplasticised PVC pipes and fittings and hence all products complying with the normative requirements satisfy this BEP requirement. There is still the need, however, to demonstrate compliance by one of the means defined below.

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.

2.3 SUPPLIER RESPONSIBILITY (PRODUCT STEWARDSHIP)

The following Guidelines pertain to PVC pipe end of life management.

2.3.1 TAKE BACK CONTRACTS

Requirement: 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 product 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 contact details of the take-back service and any relevant website documentation.

AND/OR

2.3.2 WASTE CONTRACTS

Requirement: Suppliers of PVC products have committed to 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.

2.3.3 INNOVATION

Requirement: 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.

SECTION 3: USE OF PVC RECYCLATE IN PVC PRODUCTS

Requirement: 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.