



PVC STEWARDSHIP

The Annual Progress Report
for the Australian
PVC Stewardship Program



Vinyl Council Australia

Glossary

AusLCI

Australian Life Cycle Inventory Database

BBP

Butyl benzyl phthalate

DBP

Dibutyl phthalate

DEHP

Diethylhexyl phthalate

DIDP

Diisodecyl phthalate

DINP

Diisononyl Phthalate

EPA

Environment Protection Agency

GHG Emissions

Greenhouse Gas emissions

High molecular weight (HMW)

Phthalate plasticisers with more than 6 carbon atoms in their backbones.
See Table 3

Low molecular weight (LMW)

Phthalate plasticisers with 3 to 6 carbon atoms in their backbones. See Table 3

Phthalates

The most commonly used group of chemicals used as plasticisers including orthophthalates and terephthalates

Plasticisers

Chemical substances used to soften PVC and provide flexibility to end products.

NICNAS

National Industrial Chemicals Notification and Assessment Scheme, the Australian Government regulator of industrial chemicals.

The Program

The PVC Stewardship Program, signed by members of the Australian PVC industry

PVC (Vinyl)

Polyvinyl chloride

Signatories

The Members of the Australian PVC industry who have signed the Program as an indication of their commitment to product stewardship.

Stabiliser

A compound used to improve thermal stability during processing and heat and/or UV stability of the end-use product.

Stakeholders

The PVC industry, its employees, suppliers and customers, the local and wider communities, consumers, government and regulators, and any other groups significantly impacted by the industry.

TSG

Technical Steering Group

UNSW

University of New South Wales

VCA

Vinyl Council of Australia

VCM

Vinyl Chloride Monomer

Contents

02	Glossary
04	The PVC Life Cycle and Value Chain
05	Introduction
06	Summary
08	Commitment 1: Best Practice Manufacturing
08	Vinyl Chloride Monomer [VCM]
09	Environmental and Business Management Systems
10	Mercury
10	Life Cycle Thinking in the Design of New Products
11	Commitment 2: Safe and Sustainable use of Additives
11	Stabilisers and Pigments
12	Plasticisers
12	International Regulatory Developments
13	Open Disclosure
13	Legacy Additives
14	Commitment 3: Energy and Greenhouse Gas Management
14	Energy Efficiency and Greenhouse Gas Emissions
15	Commitment 4: Resource Efficiency
15	Post-Industrial PVC Waste Minimisation
15	recoPVC
16	Vinyl Industry Recycling Strategy
17	Consumer Responsible Care
17	Packaging Waste
18	Commitment 5: Transparency & Engagement
18	Public Reporting
19	Stakeholder Engagement
20	Verification Statement
22	References
23	Signatories

The PVC Life Cycle and Value Chain

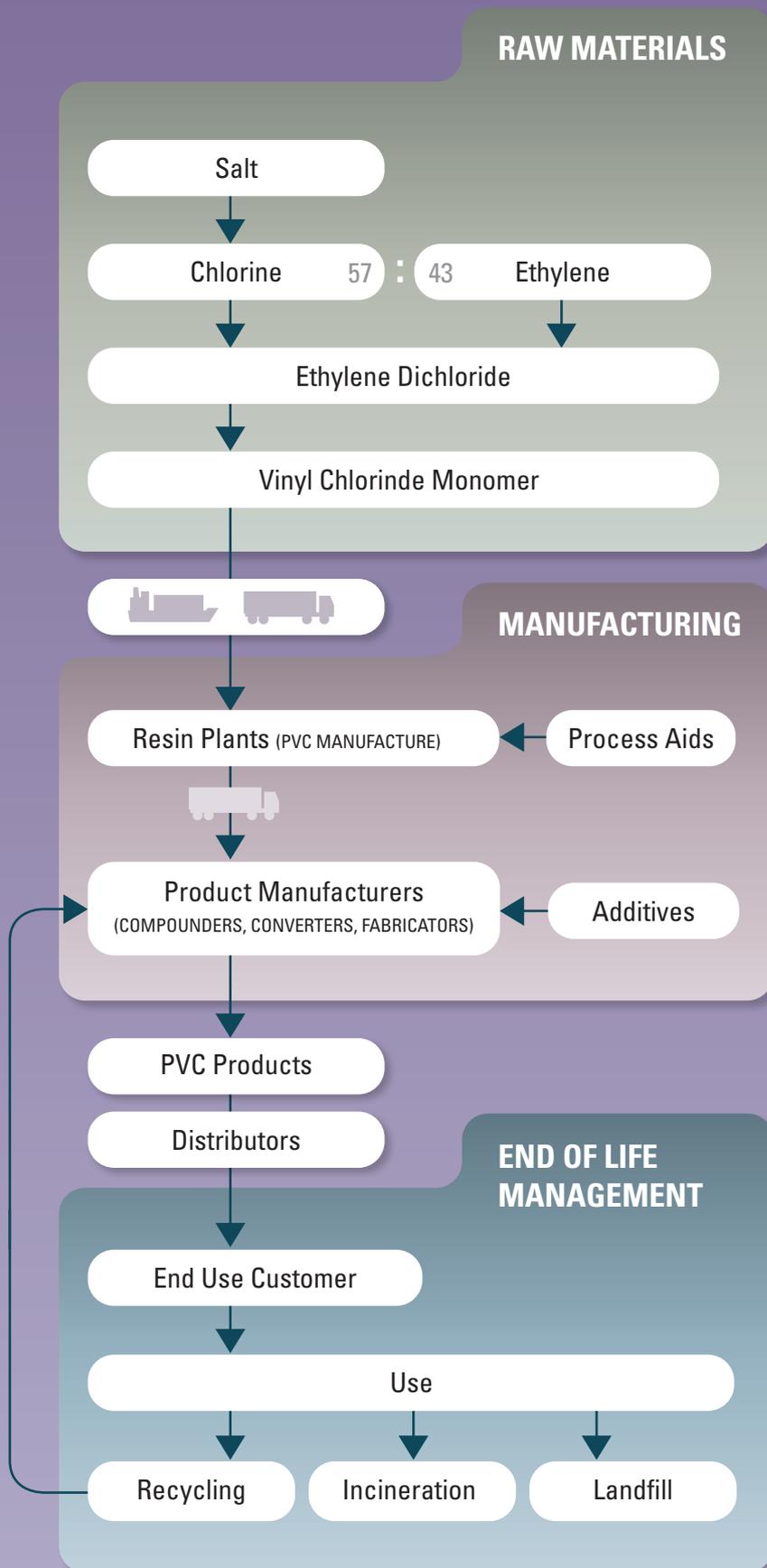


Figure 1: Raw materials are sold by suppliers to manufacturers [also known as converters] who create finished goods for the consumer market and non-finished goods for further processing, before being sold on the market. At the end of its useful life PVC products can be safely landfilled, however recycling the material is the preferred option to replace virgin material in new product.

The Vinyl Council of Australia (VCA), a member-based peak industry body, was formed in 1998 to address concerns being raised about the environmental impacts of the production, use and disposal of polyvinyl chloride (PVC). The VCA engages stakeholders in the PVC supply chain in Australia – those involved in its production, use and disposal – to reduce collectively the life cycle impacts of PVC. Initial concerns in the late 1990s were the use of lead and cadmium during manufacture, the use of certain plasticisers, upstream impacts of chemicals and processes in manufacturing, the long term consequences of PVC in landfill, and recycling uptake.

PVC STEWARDSHIP



Figure 2: Five themes of the Australian PVC Stewardship Program

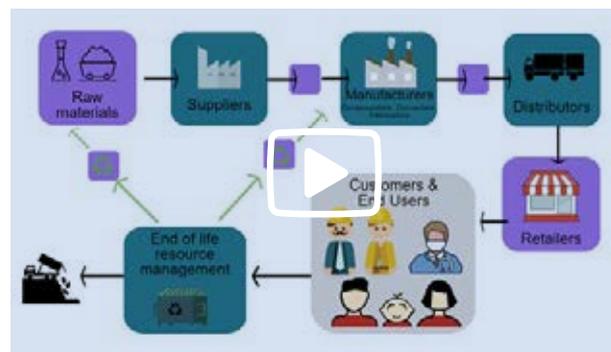
In order to work effectively to address these, in 2002, the PVC Product Stewardship Program was launched as a voluntary initiative. Companies voluntarily signed up to demonstrate their commitment to take actions that would reduce the environmental impacts of PVC.

We define product stewardship as the shared management of health, safety and environmental impacts of our industry’s products and processes throughout the entire life cycle. With the input and feedback from stakeholders, the Program has continued to evolve and 2015 saw the addition of new commitments around waste, recycling and encouraging a market for PVC recycle.

To demonstrate compliance, Signatories annually complete a comprehensive data survey. This report contains the aggregated data from the survey responses received, almost 8,000 data points collectively. A third party, Ernst & Young, conducts site audits to verify the data received from approximately one in four Signatories and verifies the final written report.

All but one Signatory completed the reporting process. This company has been deemed non-compliant for relevant criteria, for failure to prepare evidence for verification by the external auditor, due to resourcing issues. The company has been compliant in previous years. This company is included in the calculation of compliance rates for relevant criteria, displayed in summary tables throughout the report. However, for the purpose of avoiding repetition, this company is excluded from the discussion of non-compliances. The term ‘reporting signatories’ is used instead of ‘relevant signatories’ where a criteria was relevant to this company.

The current Program addresses the life cycle of PVC within five themes (Figure 2), with a number of specific measures within each theme. This report documents progress on each of these by Signatories for 2015 and is structured by theme.



Video clip of the PVC supply chain

Reflecting stakeholder feedback, in order to better describe the PVC value chain and the Program to those not in the industry, we have created a short [video clip](#) about the value chain summarised in Figure 1.

Further information about the life cycle aspects that the Program seeks to address and the commitments to be met by Signatories can be found on our website www.vinyl.org.au

Thirty two companies were Signatories to the Program in 2015 (one less than 2014); two of them were new (see Signatory List). Ten Signatories were fully-compliant with all of the commitments relevant to their business (Figure 3), earning them the VCA's Excellence in PVC Stewardship award (see Signatory List). The average compliance rate was 80%. One company has been deemed non-compliant for failure to prepare evidence for verification by the external auditor, despite the company complying in previous years.

Overall Industry Performance

There were four new or modified commitments this year. This, combined with the two new Signatories and the non-complier, decreased overall compliance compared to last year. Twenty-one Signatories (65%) achieved at or above 80% compliance, short of our key milestone of having 80% of Signatories at or above 80% compliance. The other key milestone: all Signatories at or above 50% compliance, was not maintained from last year with three Signatory companies not reaching this benchmark in 2015 (see Signatory List).

2015 saw the implementation of a number of recommendations arising from energy audits previously conducted. This resulted in an increase in energy efficiency in Signatories' operations and a decrease of greenhouse gas emissions in the realm of hundreds of tonnes.

New Commitments

Implementation of a new Resource Efficiency commitment developed and agreed with industry commenced in 2015. Signatories have committed to:

- minimise post-industrial PVC waste sent to landfill;
- incorporate recoPVC – recycled PVC from externally sourced end of life PVC – into their products, and
- recycle safely and responsibly PVC containing legacy additives.

Almost three quarters of relevant Signatories reported using recoPVC (Figure 4) resulting in tonnes of recoPVC being returned back into new product. As Signatories develop more robust networks and systems, the amount of recoPVC reported should continue to increase, creating demand for waste PVC collectors and reprocessors.

Additionally, all reporting Signatories were safely and responsibly recycling end of life PVC that contains legacy additives.

Finally, a voluntary additional commitment was offered to Signatories related to packaging waste (non-PVC). It allows us to collect baseline categorical data on packaging waste management. Fourteen Signatories have committed to achieve a 70% recycling rate of waste generated from incoming recyclable packaging materials. Initial results reveal that the vast majority of this packaging waste is diverted from landfill (Figure 7).

Stakeholder Engagement

In 2015 the VCA undertook a stakeholder engagement process to provide an opportunity to discuss the progress of the industry so far, as well as seek feedback on how we report and present information. Feedback came from a diverse range of people and organisations. Such feedback is important for helping us to identify where there is common ground, where there remain concerns and to improve how and what we communicate.

We have taken the feedback into consideration in the preparation of this report. Our intention is to provide factual reporting on Signatory progress as well as inform external stakeholders about the PVC life cycle and supply chain, the environmental and health impacts of this polymer and how the organisations within the supply chain are addressing this in a dynamic manner.

The Program has come a long way since its inception in 2002 and it will continue to evolve, taking into consideration regulatory requirements, scientific findings, stakeholder feedback and market forces.

We hope that the end users of PVC products continue to seek products from Signatories to our Program. We will continue to advocate for those companies making great strides in assisting with the delivery of a sustainable PVC industry in Australia.

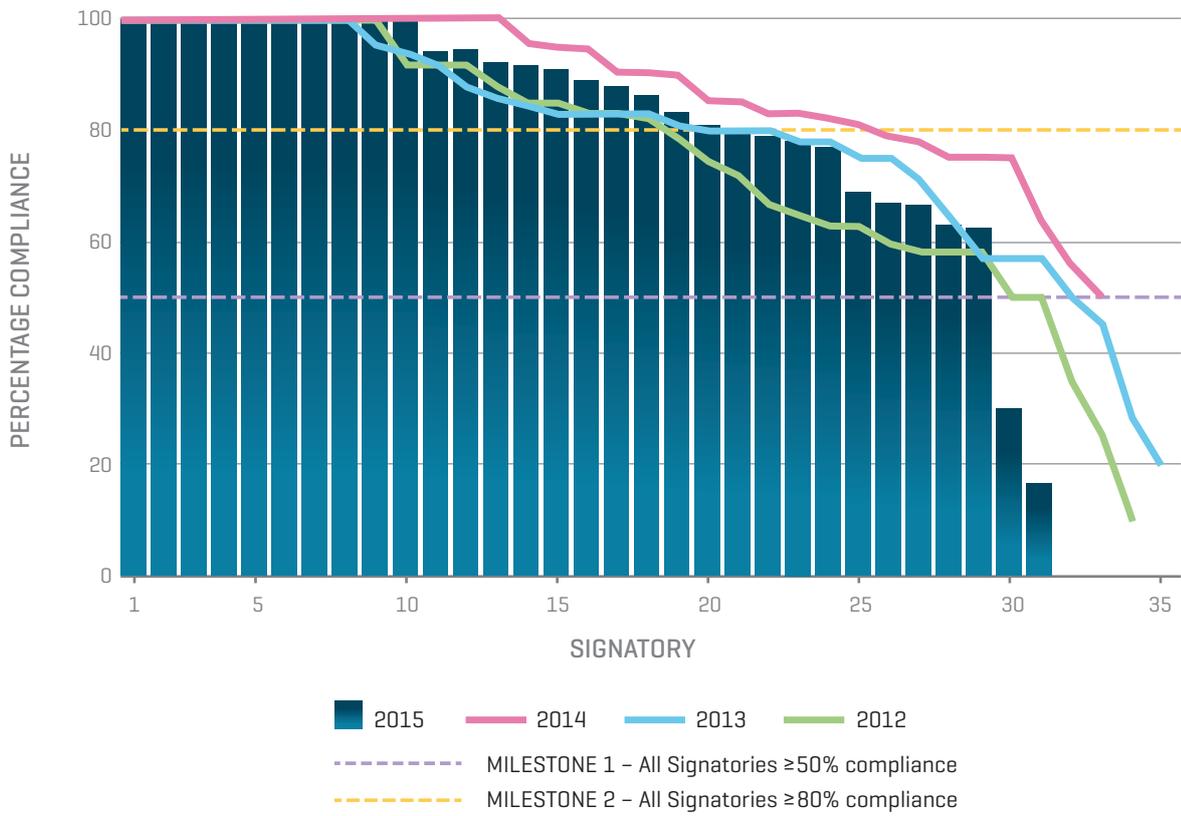


Figure 3: Compliance rate achieved by each of the 32 Signatories, compared to previous years and Milestone 1 [all Signatories at or above 50% compliance] and Milestone 2 [80% of Signatories at or above 80% compliance]



Figure 4: Compliance against each of the 20 commitments in the PVC Stewardship Program

Commitment 1: Best Practice Manufacturing

Commitments within this theme focus on the upstream production of PVC – the sourcing of materials and manufacturing processes as well as business frameworks and procedures that can support the development of best environmental practice. This includes sourcing of Vinyl Chloride Monomer (VCM) and chlorine.

TABLE 1: BEST PRACTICE MANUFACTURING COMMITMENTS

Percentages are for full compliance [FC] unless otherwise stated. PC: Partial Compliance

Issue	2015 Commitment	Number of Relevant Signatories and their Type	Compliance Rate
VCM emissions from manufacturing	< 30g VCM/ tonne S-PVC	1 Australian manufacturer of S-PVC resin	100%
	< 1000g VCM/ tonne E-PVC	6 Suppliers of E-PVC resin Purchasers of E-PVC resin from a non-Signatory supplier Importers of products made from E-PVC	83%
Residual VCM in finished resin	< 1 part per million (ppm) in 99% of S-PVC batches tested	27 Suppliers of S-PVC resin Purchasers of S-PVC resin from a non-Signatory supplier Importers of products made from S-PVC	89%
	< 1 ppm in 99% of E-PVC batches tested	6 Suppliers of E-PVC resin Purchasers of E-PVC resin from a non-Signatory supplier Importers of products made from E-PVC	83%
Environmental management systems (EMS)	Compliance with the PVC industry's Minimum Acceptable Standard for environmental management	28 All manufacturing facilities in Australia Have operational control over Australian distribution or storage operations	75% FC 11% PC
Mercury avoidance	Verify via suppliers that imported VCM, PVC resin or PVC product is sourced from mercury-free processes.	25 Importer of VCM Users of imported PVC resin Importers of PVC finished or semi-finished products	64%
Embed Program Commitments in BMS	Program commitments embedded into company Business Management Systems.	32 All Signatories	72% FC 3% PC
Life cycle thinking	Consider whole-of-life in the development of new PVC products.	9 Developers of new PVC products during reporting year	100%

Vinyl Chloride Monomer (VCM)

Vinyl Chloride Monomer (VCM), the precursor to PVC, is a known carcinogen. The Program seeks to reduce VCM emissions during the manufacture of PVC and to minimise VCM as a residual in the final PVC resin supplied. Significant progress has been made in reducing emissions to air and water since the 1970s when the toxicity of VCM was realised and PVC production was an 'open' process, exposing workers to VCM. Closed production systems have largely been in place since then and there has been no reported

case of the angiosarcoma associated with VCM exposure in workers joining the PVC industry since then.

The reaction of VCM to produce long chains of molecules as PVC, is an efficient process; nevertheless it is not a complete conversion. Unreacted monomer must therefore be 'stripped' from the PVC, captured and recycled in the process. A very small amount may be emitted by manufacturing plants up licensed stacks under strictly controlled regulatory limits or as fugitive emissions.

2015 RESULT

In 2015, the commitment to emit less than 30g VCM per tonne of suspension PVC (S-PVC) manufactured in Australia was met. In fact, the local manufacturer, Australian Vinyls reported a result of less than 20g/tonne. This manufacturer historically met approximately 75% of local PVC resin consumption. However, it ceased production in 2016 and all S-PVC will be imported going forward.

E-PVC, or emulsion PVC is a different type of resin to S-PVC and the manufacturing process is very different. To provide the properties required of E-PVC, the process to strip unreacted VCM from the emulsion resin is less severe than that used for S-PVC due to the more delicate structure of E-PVC resin. As a consequence, more VCM is emitted to the atmosphere under plant licences than for S-PVC. Under the Program, a separate commitment relates to sourcing of E-PVC by Signatories.

2015 RESULT

Six companies reported using E-PVC in their products. Five confirmed that their suppliers met the commitment of less than 1000g VCM emitted per tonne E-PVC manufactured.

One company which supplies imported finished products in Australia reported being unable to obtain the detailed information required from upstream suppliers via product manufacturers.

This commitment for E-PVC was introduced in 2011. In view of industry improvements, it is to be reviewed in 2016 with consideration of an update to the target.

A minute amount of unreacted VCM may remain in the resin produced. The Program requires this residual to be less than one part per million (ppm) in both S-PVC and E-PVC to ensure downstream workers are not at risk from exposure to VCM when handling PVC resin. Data is collected from Signatories who supply the market with resin and any importers of products or local manufacturers who source resin from non-Signatory suppliers.

2015 RESULT

S-PVC: Of 26 reporting Signatories, two were non-compliant. One importer of PVC products reported using resin that had residual monomer of 5ppm, the industry standard in Europe. One product importer was unable to obtain evidence from suppliers.

E-PVC: Of six reporting Signatories, one product importer was non-compliant as they were unable to obtain evidence from suppliers.

2016 ACTION

- [1] Agree a new commitment to source S-PVC from manufacturers with best practice, low VCM emissions.
- [2] Consider revision of the VCM emissions limit for E-PVC.
- [3] Work with Signatories on improving the sourcing of information from upstream suppliers.

Environmental and Business Management Systems

Documented Environmental Management Systems (EMS) provide the internal governance for processes and activities to monitor and reduce environmental impacts at manufacturing sites.

2015 RESULT

There has been a continual improvement in Signatories implementing EMS's in their businesses: 21 [75%] relevant Signatories had an appropriate environmental management system (EMS) in place [69% in 2014] of which 15 were ISO 14001 certified [16 in 2014].

Three reporting companies were deemed partially compliant as they provided evidence that their overseas factories had appropriate EMSs in place. One has begun to create the necessary EMS documents for its local operation. Of the three reporting companies that did not have any form of EMS, one had procedures in place but needs to formalise the paperwork and one was a small business yet to develop an EMS.

In order to ensure a Signatory's commitment to the PVC Stewardship Program is properly integrated into the company's business operations, particularly in view of the requirements for responsible sourcing of raw materials and intermediates, the Program contains a commitment to embed the Program targets into company Business Management Systems (BMS). In 2015, the VCA provided Signatories information on the types of actions and documentation that can assist in the integration of the Program commitments into the BMS, in order to improve compliance with the commitment.

2015 RESULT

Seventy-two percent of relevant Signatories had the Program commitments embedded into their business management systems [2014: 82%]. Some of the smaller companies struggle to put resources into developing such systems. Nonetheless, two companies plan to reach compliance in 2016.

2016 ACTION

Continue to support smaller companies by providing examples and / or mentors that will assist with integrating the commitments into their BMS.

Mercury

There is international recognition that mercury has adverse effects on human health and the environment. Traditionally, mercury has been used upstream in the PVC supply chain in some regions, for the production of chlorine via electrolysis of salt using mercury cells ([see supply chain video](#)). It is also used in a few countries, particularly China, where PVC is produced using an acetylene carbide process which requires mercury catalysts.

2015 RESULT

Sixteen of the relevant Signatories [64%] reported that they source materials from mercury-free processes. Those that were non-compliant source resin from Europe where producers comply with the European Council of Vinyl Manufacturers' [ECVM] Charter. That Charter involves a commitment to phase out the use of mercury in chlorine plants by 2017 (1). To the best of our knowledge no resin was sourced by Signatories from acetylene carbide processes.

2016 ACTION

Ensure new Signatories are aware of the resources available to them to fulfil the commitment.

Life Cycle Thinking in the Design of New Products

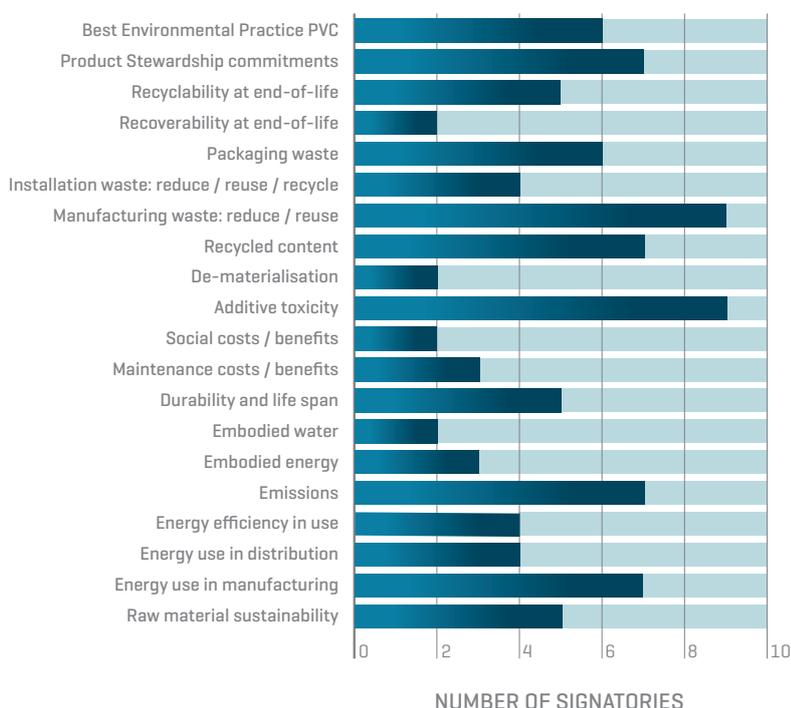
Consideration of the environmental impacts of a product through every stage of its life cycle from raw material extraction and supply, manufacture, transport, use and end of life, maximises opportunities to reduce that impact.

2015 RESULT

All nine Signatories that released a new product onto the Australian market in 2015 confirmed life cycle thinking was adopted in the design of the product. Initiatives reported include increasing the amount of recycled material in the product, design for recyclability at the end of life of the product, and decreasing maintenance requirements of the product (Figure 5).

Building rating tools and ecolabels are giving increasing recognition to product manufacturers or groups of manufacturers that have completed life cycle assessments of their products and published Environmental Product Declarations (EPDs). Following the updating of the life cycle inventory for PVC and its inclusion in AusLCI, the VCA has shared educational information with Signatories to encourage development of EPDs. In 2015, a specialist consultant in conjunction with the Green Building Council of Australia gave a webinar to the Signatories to explain the benefits of EPDs and assist those interested in developing EPDs. Two pipe producers who are Program Signatories, Vinidex and Iplex, have recently published EPDs for their PVC pipe products.

Figure 5: Types of life cycle impacts considered by Signatories in the design of new products in 2015.



Commitment 2: Safe and Sustainable Use of Additives

Commitments within this theme focus on the materials added to PVC resin that engender the desirable properties of the end product. Many different types of additives may be used in PVC products safely. However, stakeholders have raised concerns about the use of lead and cadmium stabilisers and low molecular weight orthophthalate plasticisers such as DEHP. The Program has commitments in place to address these concerns.

TABLE 2: SAFE AND SUSTAINABLE ADDITIVES COMMITMENTS

Percentages are for full compliance [FC] unless otherwise stated. PC: Partial Compliance.

Issue	2015 Commitment	Number of Relevant Signatories and their Type		Compliance Rate
Stabilisers and pigments	Avoid use of lead, cadmium and hexavalent chromium additives. New Signatories using these additives agree on specific phase out dates upon joining the Program. Any use is reported annually.	5	Currently use or have used or supplied lead / cadmium / hexavalent chromium based additives in the past 3 years.	Lead stabilisers 1 Signatory partially compliant Lead Pigments 1 Signatory non-compliant Cadmium Stabilisers & Pigments Zero use Hexavalent Chromium Pigment Zero use
Plasticisers	Cooperate with regulatory authorities and agencies regarding any issues associated with the use of plasticisers. Report the use of low molecular weight orthophthalates.	19	Manufacturers and suppliers of flexible PVC products and compounds.	95% FC
Open disclosure	Disclose the additives used in PVC products to stakeholders upon request	27	Manufacturers and suppliers of PVC products.	74% FC
Legacy additives	Meet relevant regulatory health and safety obligations with respect to workers and customers. Avoid use in inappropriate applications (eg. children's toys, medical devices, food contact products).	20	All Signatories with product containing recycle.	90% FC

Stabilisers and Pigments

Lead, cadmium and hexavalent chromium are heavy metals that have historically been used as stabilisers and/or pigments in PVC products. In recognition of the adverse health and environmental effects of these heavy metals in the environment, Signatories committed to cease their use and new Signatories commit to establishing a phase out date. The phase out of cadmium and hexavalent chromium has been maintained since 2010. For lead stabilisers and pigments, over 99.98% of use has been phased out including all use in pipes, cables and profiles. None of the heavy metals have been used in vinyl flooring for many years.

2015 RESULT

In 2015, one Signatory reported using pigment containing lead. It was technically required for the product being made and the Signatory committed to phase it out in 2016. A different signatory reported using stabilisers containing lead. This was a new Signatory in their first reporting year, and they have established a phase out date in 2016 (this was deemed partially-compliant rather than non-compliant).

Three other Signatories who used these additives in the past three years confirmed no use in 2015.

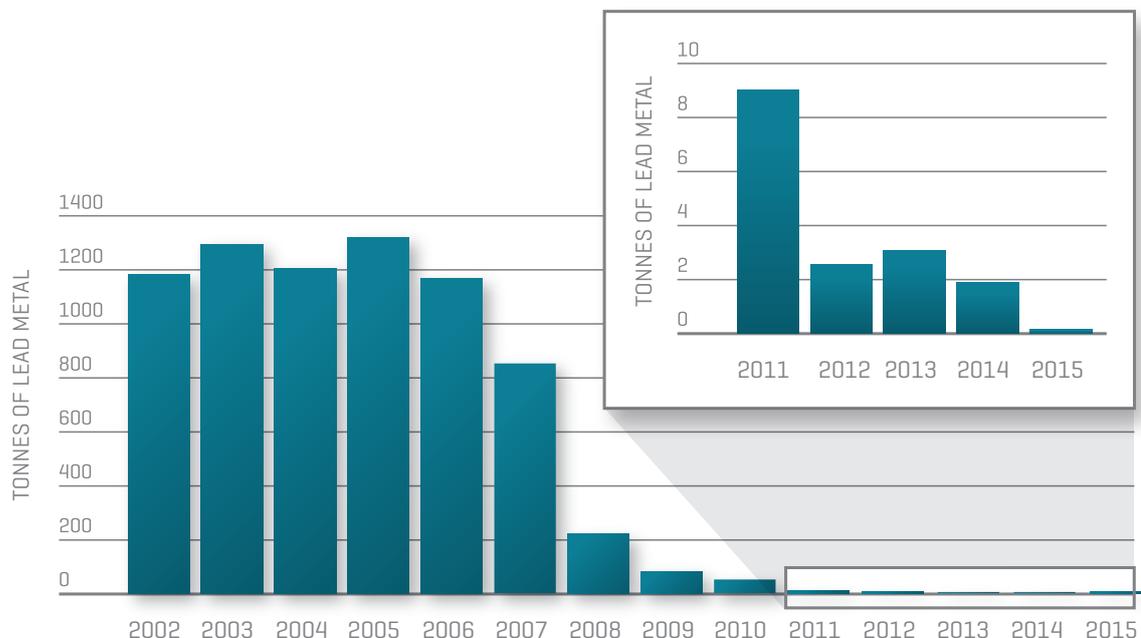


Figure 6: Lead used by PSP Signatories since the inception of the Program

Plasticisers

Plasticisers afford PVC flexibility and thereby increased potential end applications. There are different types of plasticisers that can be used, including orthophthalates, terephthalates and non-phthalates. Orthophthalates are a group consisting of several specific chemicals with varying toxicity profiles, depending on the number of carbon atoms in the molecular backbone. Some low molecular weight orthophthalates have been classified and restricted for use (Table 3).

Following comprehensive risk assessments of the major orthophthalates in use in Australia by the National Industrial Chemical Notification Assessment Scheme (NICNAS – the chemical regulatory body in Australia), Australian regulations prohibit the use of the low molecular weight orthophthalate DEHP (Diethylhexyl phthalate) in toys that are likely to be mouthed by children under the age of three years and in cosmetics (see Table 3).

The PVC industry in Australia, through the PVC Stewardship Program monitors international developments and scientific research into plasticisers to improve understanding of their health and safety. Signatories are committed to supporting Australian regulatory authorities in measures that encourage the market to cease the use of low molecular weight orthophthalate plasticisers in any PVC application where credible scientific authorities show evidence of unacceptable health or environmental impacts.

The current international regulatory status for orthophthalate plasticisers is summarised in Table 3.

2015 RESULT

Fifty nine percent of Program Signatories use plasticisers. All report compliance with Australian regulations on the use of phthalates. Four report use of low molecular weight orthophthalates compared to seven the previous years. The use of high molecular weight orthophthalates and non-phthalate plasticisers continues to grow.

International Regulatory Developments

Since mid 2013, Europe's regulatory system Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) has restricted use of the low molecular weight phthalates DEHP, DBP, BBP and DIBP unless expressly authorised by the regulator for a particular use by specific applicants.

In the US, Proposition (Prop) 65 is an Act intended to inform Californian consumers about the presence of chemicals suspected to cause cancer, birth defects or other reproductive harm in products they come into contact with, through a product labeling requirement. The American Office of Environment Health Hazard Assessment (OEHHA) is the regulator that assesses chemicals under this Act. If the Non-Significant Risk Level (NSRL) is exceeded, then products containing the assessed chemical must be labelled as such. In 2013 DINP was added to the list. In December 2015 the OEHHA issued a safe use determination (SUD) for the use of DINP in single ply PVC roofing applications (2). This means that certain PVC roofing products containing DINP do not need a label declaring the presence of DINP, as the concentration has been determined to be safe.

Open Disclosure

Recognising public concerns around the use of chemicals in products, Signatories to the PVC Stewardship Program commit to disclose ingredients of their products to stakeholders who enquire. Many provide this information more generally through Material Safety Data Sheets.

2015 RESULT

Seventy-four percent of Signatories manufacturing or marketing products in Australia openly disclose information to end users or specifiers on the chemical additives used in their product. Non-compliance with this commitment was largely related to not being able to demonstrate they had a system in place to record stakeholder requests.

2016 ACTION

Continue to support smaller companies by providing examples and / or procedures that will facilitate open disclosure.

Legacy Additives

PVC is recyclable. However due to the long life span of PVC products (indeed the vast majority are designed to last for 15–100 years), recovered PVC may contain additives that are no longer used today, for example lead or cadmium. These are called legacy additives. Although the products containing these additives were safe for use, the granulation and reprocessing of the material may liberate the additives, potentially exposing workers to them.

In order to optimise recovery and recycling of PVC that may contain these legacy additives, rather than landfill the PVC, Signatories commit to recycle such material in a safe and responsible manner. An example is the use of recycle in the middle (sandwich) layer of pipes.

2015 RESULT

Ninety percent of relevant reporting Signatories were fully-compliant with the commitment, taking into consideration all pertinent regulations, occupational health and safety requirements and suitability for end use. One Signatory was deemed non-compliant because it was unable to confirm whether recycle contained legacy additives.

TABLE 3: CURRENT INTERNATIONAL REGULATORY STATUS OF SIX COMMONLY USED ORTHOPHTHALATE PLASTICISERS

	AUSTRALIAN REGULATIONS (3, 4, 5)		OTHER NATIONAL REGULATIONS (6, 7, 8)	
	L (DBP, BBP, DEHP)	H (DIDP, DINP, DNOP)	L (DBP, BBP, DEHP) ¹	H (DIDP, DINP, DNOP)
Flooring	No restrictions	No restrictions	Authorisation would be required [Europe]	No restrictions [Europe]
Cable	No restrictions	No restrictions	Authorisation would be required [Europe]	No restrictions [Europe]
Food Packaging	No restrictions, however chemical migration from food packaging is under review by FSANZ	No restrictions	DBP, BBP, DEHP, DIDP, DINP & DNOP limited to certain migration limits	
Medical Devices	No restrictions	No restrictions	Specific labelling required ²	No restrictions [Europe]
Children's Toys and Mouthable Objects	DEHP restricted to less than 1%	No restrictions	DBP, BBP, DEHP, DIDP & DINP Limited to levels less than 0.1% [USA, Europe]	

¹ DBP, BBP and DEHP were listed as substances of very high concern under the REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) regulation in 2008. The sunset date – after which the substance cannot be used or imported to the European Union without prior authorisation from ECHA, was February 2015. Any company wishing to use any of these chemicals must have made a specific application to ECHA by August 2013. The period for authorized use lasts until February 2019 unless otherwise agreed with ECHA.

² Uses in the immediate packaging of medicinal products covered under Regulation (EC) No 726/2004, Directive 2001/82/EC, and/or Directive 2001/83/EC.

Commitment 3: Energy and Greenhouse Gas Management

Commitments within this theme assist Signatories to improve their energy productivity and reduce the carbon footprint of PVC products.

TABLE 4: ENERGY AND GREENHOUSE GAS

Percentages are for full compliance [FC] unless otherwise stated. PC: Partial Compliance.

Issue	2015 Commitment	Number of Relevant Signatories and their Type	Compliance Rate
Energy and GHG Management	Comply with PSP Charter	32 Manufacturers Those with operational control over Australian distribution or supply operations	69% FC 28% PC

Signatories have committed to improving the energy efficiency of their operations and reducing the carbon footprint of their products by agreeing to the PVC Industry Charter on Energy and Greenhouse Gas Emissions. Through the Charter, Signatories have been encouraged to understand their energy consumption, identify areas for improved energy efficiency within their own operations and their logistic supply chain, and to use recycled PVC to reduce their product's carbon footprint. The VCA supported Signatories through educational webinars, presentations and access to State government programs.

2015 RESULT

All reporting companies were compliant or partially-compliant with the charter. This indicates they had some or all of the following measures in place:

- a policy committing to measure and manage energy and GHG emissions;
- plans to reduce energy consumption and emissions; and
- actions to reduce the company's carbon footprint.

As with previous years, small companies and first time reporters have more to do to achieve full compliance.

Three actions came out of last year's annual report with respect to this commitment. These were all completed in 2015.

First, the Office of Environment and Heritage NSW and VCA signed a Memorandum of Understanding (MOU) which provides NSW-based Signatories priority access to the government's Energy Saver and Sustainability Advantage funding programs which

assist businesses to understand their energy use and implement energy saving opportunities. Three Signatories took advantage of these programs in 2015 and hundreds of tonnes of GHG emissions have been prevented as a result. The MOU remains in place for other Signatories to take up the offer.

Second, to assist Signatories in understanding GHG emissions as a result of transport and freight, the VCA held an information session run by the Supply Chain & Logistics Association of Australia (SCLAA). The presentation focused on practical ways for companies to improve energy efficiency in warehouses and in their freight and pointed Signatories to a freely available tool to quickly determine potential financial savings available.

Finally, case studies have been collated and published on the Vinyl Council website to share information on Signatories' energy efficiency success stories.

These actions were intended to close the gap on full compliance, however the results show there is still work to be done by the VCA to support Signatories striving to achieve compliance.

2016 ACTION

- [1] Continue to support smaller companies by providing examples and / or tools that will assist with measuring energy and implementing an energy efficiency improvement policy.
- [2] Continue to act as a conduit between government and other bodies seeking to assist businesses decrease their energy consumption and GHG emissions.
- [3] Continue to publish case studies to share learnings.

Commitment 4: Resource Efficiency

A new commitment was introduced to the Program in 2016 to encourage resource efficiency and to set measurable targets for improvement. Commitments within this theme aim to reduce the depletion of resources by improving resource efficiency, reducing the quantity of material lost to landfill and by controlling the loop on material, bringing it back into production of quality finished goods.

TABLE 5: RESOURCE EFFICIENCY COMMITMENTS

Percentages are for full compliance [FC] unless otherwise stated. PC: Partial Compliance.

Theme	2015 Commitment	Number of Relevant Signatories and their Type	Compliance Rate
Post-industrial PVC product waste	Collect baseline data and if necessary, put in place an improvement plan to achieve <2% post-industrial PVC waste sent to landfill as a percentage of the total production of saleable PVC product.	13 Manufacturers of resin in Australia, compounders and Australian converters	100%
RecoPVC	Use recoPVC in the PVC products supplied to the Australian market.	26 Local Compound Manufacturers Local Converters Importers / Distributors	62% FC 12% PC
Consumer Responsible Care	Publicly inform consumers on how to and where to reuse, recycle or dispose of PVC product at end-of-life safely.	28 Suppliers of PVC goods, resin or compound in the Australian market	68% FC 4% PC
Packaging waste	70% recycling rate for waste from incoming recyclable packaging materials related to manufacture or supply of PVC products. Undertake actions to encourage recycling of packaging material leaving the facility.	14 Voluntary, relevant to all local resin and compound manufacturers, local converters and manufacturers of intermediates and suppliers of imported PVC products to the Australian market.	93%

Post-Industrial PVC Waste Minimisation

Post industrial waste, such as factory floor waste, cannot always be used as feed stock for reintegration into the manufacturing process. The applicable Signatories commit to measure the amount of post industrial waste and minimise PVC scrap sent to landfill to less than two percent of total production of saleable PVC. If non-compliant, the Signatory agrees to devise an improvement plan.

2015 RESULT

This commitment was relevant to 13 Signatories of which 12 already meet the <2% target. The remaining company has put an improvement plan in place. On average, the amount of post-industrial PVC waste sent to landfill was less than one percent of total production of saleable PVC. This suggests the companies are highly resource efficient.

recoPVC

All local converters, compounders or suppliers of imported PVC products to the Australian market are encouraged to use externally sourced, recycled PVC (recoPVC) where product standards permit to help drive demand for recoPVC.

RecoPVC includes, but is not limited to:

- end-of-life products collected through take-back schemes
- industrial waste collected from another unrelated manufacturer
- installation off-cuts collected via the building industry.

2015 RESULT

Relevant to 26 Program Signatories, 16 confirmed they used recoPVC in the products they supply. Three additional companies confirmed using recoPVC but failed to report the required details.

Local converter Signatories used 770 tonnes of recyclate. Additionally, importers and distributors have confirmed with their international suppliers that recoPVC is contained in products they marketed in Australia.

2016 ACTION

- [1] Continue to collect baseline data in 2016 to prepare for future measurement and target setting.
- [2] Continue actions that create market pull for recycled end of life material through implementation of the Vinyl Industry Recycling Strategy.

Vinyl Industry Recycling Strategy

In 2011 the VCA launched the Vinyl Industry Recycling Strategy after consultation with a wide range of stakeholders. The vision of the strategy was to create a viable long term PVC recycling practice in Australia.

Key outcomes since include:

1. Establishing a database listing the key players, market size and recycling best practice for rigid profiles, pipe, coated fabrics, flooring and medical products;
2. Strengthening networks between stakeholders;
3. Increasing focus on product design;
4. Encouraging market pull for recyclate;
5. Securing grant applications for reprocessing trials;
6. Developing recycling guidelines for cable and
7. New investment and participants in PVC recycling.

In 2015 a second consultation summit was held to bring together stakeholders to reflect on progress to date as well as identify any opportunities, gaps and desired future outcomes. The updated strategy resulting from this second Summit aimed at facilitating growth in sustainable recycling practices in Australia. It is anticipated this will be achieved by:

1. Measuring PVC recycling more accurately;
2. Developing market pull for PVC recyclate by growing end user demand;
3. Supporting and increasing the number of PVC reprocessors in Australia and
4. Encouraging design for recycling by PVC product manufacturers.



PVC Coated Polyester Fabric Recycling Project

An interdisciplinary collaboration between the VCA and Monash University Departments of Design and Chemical Engineering sought methods to reduce the 1,200,000 m² of PVC coated polyester advertising banners landfilled per year. The aim of the project was to discover design opportunities for this end of life material. Students developed two 100% recycled materials from the regrind particulate: a roll-formed skin and a press-formed tile.

Design works stemming from the research were exhibited at the MADA Gallery. Titled 'ReFORM', the show comprised of six installations that represent prototypical process alongside design outcomes.

Students gave feedback that having access industry knowledge and expertise through industry partners in the program was key to the success of the project.

Broadening Research

In late 2015 the NSW Environment Trust as part of the NSW EPA's Waste Less, Recycle More initiative, provided the VCA grants to support two projects:

1. Coated fabric / advertising banners – extending the 2015 project to look for new uses for this recyclate. Partners include UNSW, Monash University, Signatories: Welvic and Rojo Pacific; PMG Engineering, and Outdoor Media Association.
2. Commercial flooring – to find viable methods of collecting and reprocessing flooring waste and end uses for the recycled material. The team includes a research assistant in chemistry at UNSW, reprocessors, a building product manufacturer, and Signatories: Armstrong World Industries, Gerflor, Tarkett and other members of the Australian Resilient Flooring Association.

This funding will enable the VCA to extend its earlier research, continue to strengthen networks, encourage market pull, support reprocessors and encourage design for recycling.

Medical PVC recycling

Initiated by the VCA and Western Health in 2009, this world-first program has continued to grow with the number of participating hospitals nearly doubling from 32 to 60 by the end of 2015. The quantity recovered for recycling rose to 10,000kg /month. Baxter Healthcare and VCA collaborated on creating new explanatory videos, metrics and a dedicated website (to be launched in 2016). The VCA continues to receive enquiries from Australian hospitals, a growing number of local councils, and overseas countries starting their own trials for PVC recycling. The target for this project is over 2,000 tonnes when fully operational.

Consumer Responsible Care

Suppliers of PVC goods, resin or compound recognise that consumers and end users need to understand what options there are for PVC products at the end of their service life. Signatories are encouraged to make information available to the public on how and where to reuse, recycle or dispose of product at end-of-life.

2015 RESULT

Over two-thirds of relevant Signatories provided public information on ways to dispose and recycle their products.

Packaging Waste

A new, voluntary initiative was introduced in 2015 to which 14 companies have signed. These Signatories aim by end 2016, to achieve a 70% recycling rate of incoming recyclable packaging materials connected to the manufacture or supply of PVC products and to undertake actions to encourage the recycling of packaging material that leaves their facility.

2015 RESULT

Thirteen of the Signatories report recycling more than 70% of incoming packaging waste. The remaining Signatory failed to report relevant information.

Demonstrating the wide spectrum of business types and activities that Signatories represent, over 30 different types of used packaging were identified and actions reported (Figure 7). Signatories categorised each item according to its treatment: reuse, recycle / reprocess, combined, landfill or not applicable. Most items are recycled, reprocessed, reused or a combination of those. Wrap, strapping and tapes are the most frequently landfilled items.

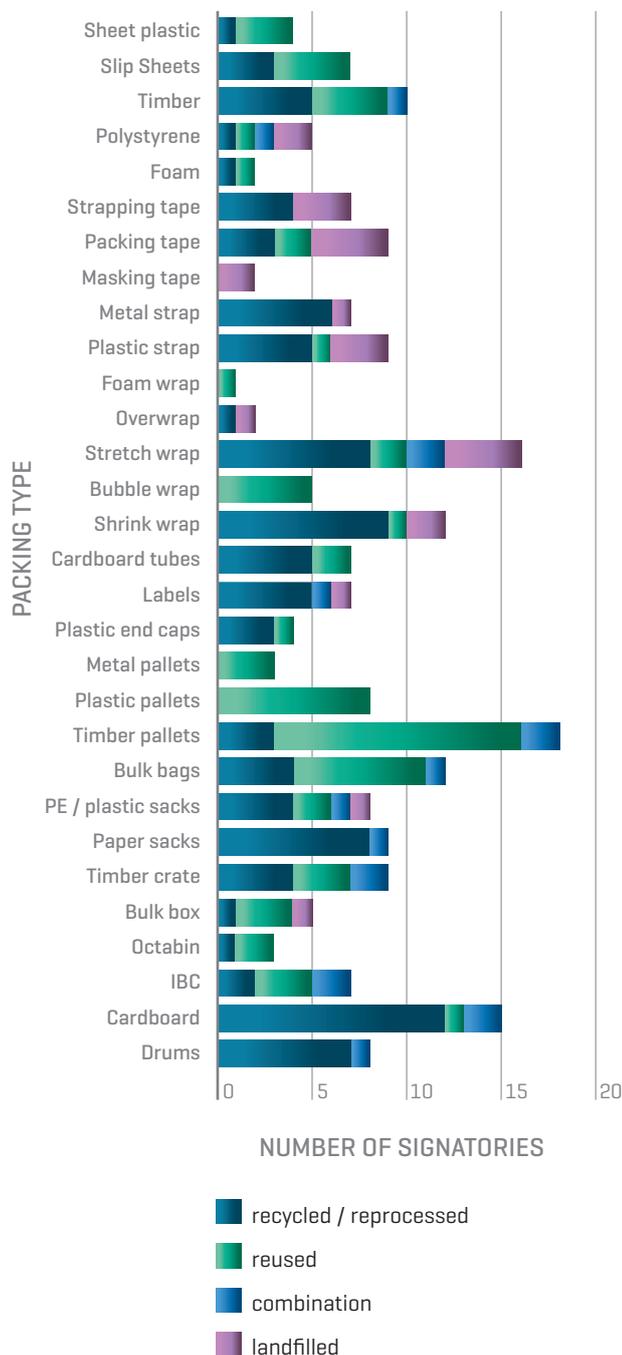


Figure 7: Types of packaging waste recycled by Signatories and number of Signatories undertaking this recycling.

Commitment 5: Transparency and Engagement

The Council and the Program Signatories recognise the importance and value in being transparent about the activities and performance of the industry in Australia.

TABLE 6: TRANSPARENCY AND ENGAGEMENT

Percentages are for full compliance [FC] unless otherwise stated. PC: Partial Compliance.

Theme	2015 Commitment	Applicable to	Compliance Rate
Public Reporting	Publish independently verified annual performance report.	The Vinyl Council of Australia	100%
	Publish an evaluation of the Program every five years, next due in 2018.		
Research Monitoring	Monitor national and international scientific research and share pertinent information with Signatories and stakeholders, including updates on pertinent issues and development related to aspects of the PVC life cycle.		
Stakeholder Engagement	Encourage participation of industry and external stakeholders on the Technical Steering Group responsible for monitoring and reporting on the implementation of the PVC Stewardship Program.		

Public Reporting

The reporting process involves the gathering of data from 32 diverse companies related to different parts of their supply chain and various types of business activity.

2015 RESULT

Seven Signatories were independently audited and this report was verified by a third party, Ernst & Young, to provide an independent opinion on the accuracy of data and the statements in the report. A copy of their Limited Assurance Statement is provided at the end of this report. An eighth company selected for audit failed to gather its evidence together in time for assessment. This company is deemed non-compliant for 2015.

2016 ACTION

- [1] Continue to work closely with Signatories to assist them with the reporting process.
- [2] Publish independently audited annual PSP report by 31 May 2017.
- [3] Publish 5 year review of the effectiveness of the Program by 31 March 2018.

The collection and analysis of data is highly complex, particularly given global manufacturing chains and sourcing of raw materials. In late 2015 a significant change was occurring in the market with the

planned, permanent closure of Australia's only PVC resin manufacturer in early 2016. This will have a significant effect on Signatories' supply chains going forward.

For more information on improvements Signatories have made to their operational activities as a result of the Program, see the [case studies section](#) of our website. More information about the PVC value chain, the Vinyl Council of Australia, and the Program can be found at www.vinyl.org.au

Research Monitoring

The Vinyl Council makes use of various forums and tools to monitor scientific and regulatory developments locally and internationally relevant to the potential health and environmental impacts of the PVC product life cycle. These include TSG meetings, VCA member meetings and events, conferences and seminars, regular emailed news briefings, website, etc. These were used to advise members of scientific developments, particularly on the subject of orthophthalate plasticisers, REACH and other regulatory developments, NICNAS' assessment of chemicals, and tools and techniques available to measure different environmental impacts such as GHG emissions and Environmental Product Declarations.

Stakeholder Engagement

The Technical Steering Group (TSG), made up of stakeholders within the PVC supply chain, as well as representatives from scientific, regulatory and government bodies, meets quarterly. The primary purpose is to oversee the Program's evolution and performance. This forum also provides opportunity for exchange of information on regulatory updates and the latest developments in research and innovation.

In 2015, after the launch of the 2014 annual report, the VCA undertook a stakeholder engagement process to understand and provide an opportunity to discuss the progress of the industry. It also sought feedback on how we report and present information. We used an on-line facilitated platform to make it easier for stakeholders from anywhere in Australia and abroad to participate. Feedback came from a diverse range of people and organisations. A number of stakeholders spoke very favourably about the industry's progress, reporting and transparency. Some provided useful critical perceptions. Such feedback is important for helping us to identify where there is common ground, where there remain concerns and to improve how and what we communicate.

In response to specific requests, a short video has been created to better describe the [PVC value chain](#) to those not in the industry. The video clip can be viewed from on the [Vinyl Council's website](#).

Other stakeholder engagement during 2015 included holding our second PVC ReSource Summit to create further alliances and update the industry strategy for PVC recovery and recycling in Australia. Some outcomes of this forum have been summarized in Figure 8.

We attended relevant conferences both to demonstrate leadership and learn from others. At the New Zealand WasteMINZ conference, we gave a presentation on Life Cycle Thinking and another on developing a successful PSP.



Figure 8: Summary of the activities and outcomes of the 2015 ReSource Summit a forum for creating alliance and plans for PVC recovery and recycling.



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Independent Limited Assurance Statement to the Board of Directors of the Vinyl Council of Australia

The Vinyl Council of Australia (the 'VCA') has commissioned Ernst and Young ('EY') to provide independent limited assurance in order to state whether anything has come to our attention to suggest the subject matter detailed below as presented in the 2015 PVC Stewardship Program Annual Progress Report (the 'PSP Report'), has not been reported, in all material respects, in accordance with the criteria below.

Subject Matter

The Subject Matter for our assurance engagement for the year ended 31 December 2015 is the extraction of 53 selected statements and their inclusion in the PSP Report. The statements present data and activities which indicate performance of the VCA – refer to Appendix A for a list of the 53 statements.

Criteria

The VCA has set out the Criteria for reporting against the Subject Matter for each commitment as part of the Australian PVC industry's PVC Stewardship Program in the form of a 'Commitment Guide' and 'Reporting and Verification Guide'.

The Responsibility of Management

The management of the VCA is responsible for the preparation and presentation of the Subject Matter in the PSP Report in accordance with the above Criteria, and is also responsible for the selection of methods included in the Criteria. No conclusion is expressed as to whether the selected methods used are appropriate for the purpose described above. Further, the VCA's management is responsible for establishing and maintaining internal controls relevant to the preparation and presentation of the Subject Matter that is free from material misstatement, whether due to fraud or error; selecting and applying appropriate criteria; maintaining adequate records and making estimates that are reasonable in the circumstances.

Assurance Practitioner's Responsibility

Our responsibility is to express a limited assurance conclusion on the extraction of data presented in the PSP Report based on our assurance engagement, in accordance with ASAE3000 'Assurance Engagements other than Audits or Reviews of Historical Financial Information' and in accordance with the terms of reference for this engagement as agreed with the VCA.

Summary of Procedures Undertaken

Our procedures, undertaken between March to June 2016, included but were not limited to:

- ▶ Checking the factual accuracy of the information presented in the PSP Report by examining the data and information contributing to the 53 statements (covering all commitments presented in the Criteria) and checking that it has been extracted correctly from the VCA's internal systems
- ▶ Reading the PSP Report for any significant anomalies, particularly in relation to VCA activities and trends in data
- ▶ Obtaining an understanding of the VCA's key systems and processes used for managing, analysing and reporting Signatory performance information
- ▶ Interviews with key personnel responsible for collating and writing sections of the PSP Report to understand the reporting process.

In addition, as part of our engagement we conducted site visits and agreed information submitted by the following seven Signatories to supporting documentation:

- ▶ Altro APAC Pty Ltd
- ▶ Baxter Healthcare Pty Ltd
- ▶ Berry Plastics (Australia) Pty Ltd
- ▶ CMS Electracom Pty Ltd
- ▶ Pegulan Floor Floor Coverings Pty Ltd
- ▶ Primpalas Pty Ltd
- ▶ Rehau Pty Ltd

Use of our Report

Our limited assurance report has been prepared for distribution to the management and directors of the VCA. We disclaim any assumption of responsibility for any reliance on this assurance statement or on the Subject Matter to which it relates, to any person other than management and directors of the VCA, or for any purpose other than that for which it was prepared.



Independence, Competence and Experience

In conducting this assurance engagement, EY has met the requirements of our Independence Policy. EY confirms that we are not aware of any issues that could impair our objectivity in relation to this assurance engagement. EY has not had any part in collecting and calculating data, or in preparing any part of the Report.

Limitations

The scope of work covered the Subject Matter referred to above as included in the Report. EY did not provide assurance over the data. Specifically excluded from our scope was source data presented to the VCA from Signatories, other than for those Signatories listed above, which were assessed by undertaking site visits and documentation reviews.

Matters Relating to Electronic Presentation of Information

Our limited assurance engagement included web-based information that was available via web links as of the date of this statement. We provide no assurance over changes to the content of this web-based information after the date of this limited assurance statement.

Conclusion

Based on our limited assurance procedures, nothing has come to our attention to indicate that the Subject Matter (as described above), as presented in the PSP Report, is not prepared fairly in all material respects, in accordance with the above mentioned criteria.

Recommendations

Based on our limited assurance engagement a number of recommendations are highlighted below for VCA Executive's benefit:

- ▶ Recommendation one: Continue progress in developing the commitments and reporting requirements.
- ▶ Recommendation two: Continue to develop and document internal quality check procedures to improve accuracy and reliability of reporting.
- ▶ Recommendation Three: Continue to strengthen communication between VCA and Signatories for better understanding of evidence requirements of Signatories.
- ▶ Recommendation four: Continue to promote templates and other resources to support Signatories to be compliant.

Emphasis of Matter

Without qualifying our opinion, we draw attention to the Limitations paragraph above which states that, with the exception of the seven signatories listed above, we did not provide limited assurance over the data provided by the signatories. Our procedures in respect of the information provided by the seven signatories identified data discrepancies which have been corrected in the PSP Report. We recommend that going forward the VCA improves its internal controls in place, relevant to the preparation and presentation of the Subject Matter.

Ernst & Young
Melbourne, Australia
26th October 2016

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2015-16 EXCELLENCE AWARD RECIPIENTS

Gold Compliance: 100%

Armstrong World Industries Pty Ltd	http://www.armstrong-aust.com.au/
Australian Plastic Profiles Pty Ltd	http://www.app.net.au/
Australian Vinyls Corporation Pty Ltd	http://www.av.com.au/
Chemson Pacific Pty Ltd	http://www.chemson.com/
Integrated Packaging Pty Ltd	http://www.ipstretch.com/
Iplex Pipelines Australia Pty Ltd	http://www.iplax.com.au/
Karndean International Pty Ltd	http://www.karndean.com/en-au/floors
Pipemakers Pty Ltd	http://www.pipemakers.com.au/
Plastral Pty Ltd	http://www.plastral.com.au/
Sun Ace Australia Pty Ltd	http://sunace.com.au/

Silver Compliance: 80-99%

Baxter Healthcare Pty Ltd	http://www.baxterhealthcare.com.au/
CMS Electracom	http://cmselectra.com/anz/
Cryogrind Australia Pty Ltd	
Deceuninck Pty Ltd	http://deceuninck.com.au/
Gerflor Australasia Pty Ltd	http://www.gerflor.com.au/
Profine International Profile Group GmbH	http://www.profine-group.com/en/
Signature Floorcoverings Pty Ltd	http://www.signaturefloors.com.au/
Stormtech Pty Ltd	http://www.stormtech.com.au/
Tarkett Australia Pty Ltd	http://www.tarkett.com.au/
Vinidex Pty Ltd	http://www.vinidex.com.au/
Welvic Australia Pty Ltd	http://www.welvic.com

Bronze Compliance: 50-79%

Altro APAC Pty Ltd	http://www.asf.com.au
APN Compounding **	http://www.apncompounding.com/
Berry Plastics (Australia) Pty Ltd	http://www.berryplastics.com.au/
Plustec Pty Ltd	http://www.plustec.com.au/
Primaplas Pty Ltd	http://www.primaplas.com.au/
Rojo Pacific Pty Ltd	http://www.rojopacific.com.au/
TechPlas Extrusions Pty Ltd	http://techplas.com.au/
Veka **	http://vekainc.com/

Compliance: < 50%

Pegulan Floor Coverings Pty Ltd	http://www.pegulan.com.au/index2.asp
Rehau Pty Ltd	https://www.rehau.com/au-en/

Not assessed

Kenbrock Flooring (Aust) Pty Ltd	http://www.kenbrockflooring.com.au/
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** First year reporting to the PSP



PVC STEWARDSHIP

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