



PVC STEWARDSHIP CASE STUDY

Best practice in PVC additives

✓ safe and sustainable use of additives

“When the Vinyl Council was established in 1998, Chemson Pacific could already see the benefits of phasing out lead additives, thus improving the life cycle of PVC, opening new markets, and being at the forefront of innovative product design.” **Greg Harrison**, Managing Director

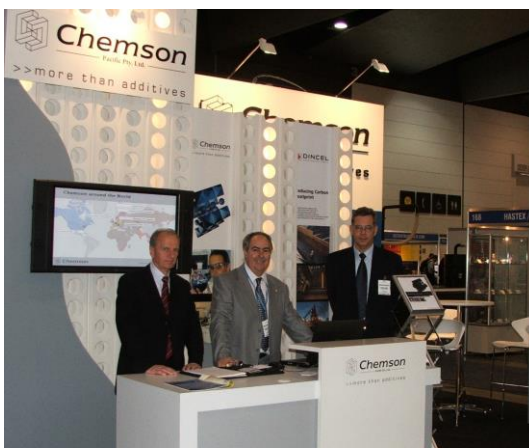


Figure 1: Chemson Pacific introduces newest lead-free formulations at AUSPLAS

Introduction

STABILISERS IN THE PVC INDUSTRY

Additives are essential to the PVC industry. In fact, PVC products as we know them would not exist without the development of appropriate stabilisers, lubricants, plasticisers and pigments. These additives are what allows PVC to be successfully processed, and they give the PVC end products their useful properties – be it stiffness, flexibility, fire resistance, transparency, heat resistance, good weatherability, etc.

Stabilisers/lubricant composites are a key family of additives that maintain the integrity of PVC resin during high temperature extrusion and moulding processes. They also enhance the final product's resistance to daylight, weathering and heat ageing while providing physical property integrity.

THE CHEMSON GROUP

The Chemson Group is one of the world's leading manufacturers of PVC stabiliser-composites. The company produces around 100,000 metric tonnes of additives each year which are used in a wide range of industries, including window and building profiles, pipes, injection moulding and soft PVC applications such as cables, flooring and roof sheets. Headquartered in Arnoldstein, Austria, the Group operates in the United States, Brazil, China, Germany, the United Kingdom and Australia (Chemson Pacific, New South Wales).

A Growing Community Concern

LEAD IN THE PVC INDUSTRY

Historically, lead-based stabilisers were the material of choice for many applications; they were relatively inexpensive and offered good heat and light stability, electrical resistance and mechanical properties.

Goals

- Phase out lead from company activities
- Lead the innovation in PVC additive development and sustainability
- Generate customer added value.

Achievements

- Reopened and secured markets for PVC products
- Replaced manufacture of lead based products
- Launched new additives that offered additional customer benefits.

Member status

- VCA member since its creation in 1998
- Founding member of the Australian PVC industry's Product Stewardship Program
- Fully compliant with the PSP since 2011
- Global production of 100,000 tonnes of additives for the PVC industry.



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Figure 2: Chemson customers' new PVC application of formwork is based on lead-free low-smoke technology



Figure 3: O-PVC pipe extrusion is a delicate process where the stiffness of OBS – stabilised PVC is advantageous



While the risk of consumer exposure to lead from a PVC product is very low (lead additives form a very tight chemical bond with the PVC polymers), community concern, the potential for worker exposure and possible release of lead to the environment from landfill waste led to industry interest in phasing out the use of lead-based stabilisers in PVC applications.

Phasing out lead: an industry wide commitment

THE PVC PRODUCT STEWARDSHIP PROGRAM

In 2002 the Vinyl Council of Australia launched the PVC Product Stewardship Program (PSP), bringing together relevant members of the Australian PVC value chain. This enabled industry agreement on a commitment to phase out lead and cadmium stabilisers voluntarily from products by an agreed date.

With industry agreeing to a common goal, a level playing field for PVC manufacturers and the additive suppliers was created, enabling Chemson Pacific to fulfil its ambition of entirely phasing out manufacture of lead based additives from its operations in 2008.

DEVELOPING ALTERNATIVES

Different substitutes were trialed by the Australian industry. Stabilisers with lower lead concentration were introduced and calcium/zinc (Ca/Zn) stabilisers were imported from Europe. Based on these early results, Chemson developed new Ca/Zn stabiliser formulations to meet local quality standards, and the first organic based stabilisers (OBS) in Australia.

Chemson Pacific's lead-free OBS and Ca/Zn formulations were a true innovation for the Australian market. OBS stabilisers have superior physical properties such as

higher hoop-strength in pressure pipes when compared to other alternatives. They contain no heavy or rare metals and are a good environmental alternative, reducing demand for metal extraction.

CHALLENGES AND OPPORTUNITIES

Developing lead-free stabilisers was a multi-faceted challenge. In addition to the technical challenge of developing new formulations with the same or superior qualities to existing products, there was stiff market competition with established alternatives and general scepticism about the effectiveness of new formulations.

The successful commercialisation of pipes using lead-free stabilisers, and its uptake by some water authorities, was a key milestone for the Australian pipe industry. It proved to be the tipping point in the adoption of the new lead-free alternatives.

During new formulation development, Chemson shared resources with its customers to undertake extensive trials and laboratory work.

Chemson Pacific was the first business in the global Chemson Group to go lead-free. In 2008 it relocated to a new facility producing only Ca/Zn and OBS stabilisers. Relocation to a greenfield site to cut all ties with the company's historical activities. The previous site and machinery were thoroughly decontaminated and the old site is now utilised for other purposes.

Chemson Pacific's new lead-free facility enjoys a higher level of flexibility in its manufacturing processes, avoiding the stringent and costly procedures required to protect workers from lead exposure and eliminates the need to keep lead and non-lead production separate.

Chemson Pacific – an example within the group

The wealth of experience developed by Chemson Pacific during its transition to lead-free operations is now being applied across the Group – Chemson China is starting a similar transition to lead-free manufacturing. Around three quarters of Chemson Group's European operations have been converted to Ca/Zn and OBS stabiliser production. The US branch supplies Ca/Zn flexible PVC stabilisers, as well as a new OBS application.

Future Innovations

Following on from its lead-free success, Chemson Pacific is now addressing another key issue for PVC products – its reaction to fire. While PVC products have inherent fire retardant properties, they will tend smoulder and release significant smoke when burned.

Chemson Pacific's new formulation in rigid PVC has achieved certification as a Group 1 material under the Building Code of Australia. It produces lowest levels of smoke so can be used without limitations in any building type.

The formulation was developed in collaboration with manufacturer of permanent polymer formwork for concrete wall construction, and is testimony to Chemson's innovation and collaboration with its customers.

Chemson Pacific is a perfect example of a Vinyl Council member whose proactive approach to Product Stewardship resulted in significant achievements over the past decade – and will continue to do so into the future.