26 August 2025

Chemical profile

Lead(2+) salts of carboxylic acids

Summary

- This chemical class comprises 53 lead(2+) carboxylate salts. They are a subset of a broader class of chemicals collectively referred to as metallic soaps.
- Lead(2+) carboxylate salts dissociate in water in the environment to release lead(2+) ions (Pb^{2+}) and fatty acids. The fatty acids (e.g. stearic, palmitic, octanoic) are of low environmental concern.
- The primary environmental hazard arises from the release of Pb^{2+}, which is highly toxic to aquatic organisms. Lead ions are classified under the Globally Harmonized System (GHS) as Aquatic Acute Category 1 and Aquatic Chronic Category 1.
- Anthropogenic emissions of lead into the environment are a recognised concern, both domestically and internationally, due to the bioaccumulative nature and high toxicity of bioavailable lead compounds.
- These compounds were historically used in industrial applications such as lubricants, paints, coatings, and polyvinyl chloride (PVC) plastic stabilisers. Usage has declined significantly since the early 2000s due to health and environmental concerns.
- Current domestic use is low, though lead(2+) carboxylates may still be present in imported finished goods and legacy materials, which can lead to diffuse environmental emissions.
- Lead and lead compounds are regulated under other national frameworks, including the Poisons Standard, which limits lead content in paints to 0.1% of non-volatile content.
- Lead(2+) salts of carboxylic acids are a priority for scheduling to manage their long-term risks to the environment and potential impacts on a safe circular economy.

Chemical identity

The chemicals in this class are lead salts of carboxylic acids. They are part of a larger group of industrially important metal salts known as metallic soaps. The chemicals are assumed to be in the 2+ oxidation state, however, based on the nomenclature of some of the long chain chemicals, some members may be in mixed 2+/4+ oxidation state. For the purposes of scheduling under the IChEMS, lead(2+) salts of carboxylic acids have been divided into two distinct standards based on chain length (long and medium) which also have some distinct industrial end uses.

- **Standard 1 chemical class name:** Lead(2+) salts of medium chain carboxylic acids
- **Standard 2 chemical class name:** Lead(2+) salts of long chain carboxylic acids
- **CAS registry number:** Total of 53 CAS RNs (see CAS RN list)

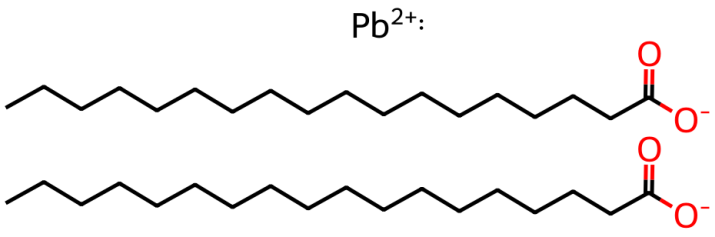

Figure 1. Representative chemical structure for the lead(2+) salts of carboxylic acids class (lead distearate, CAS RN: 1072-35-1).

Hazards and risks to the environment

The Australian Industrial Chemicals Introduction Scheme (AICIS) published environmental risk assessments in 2014 and 2022.

All chemicals in this class are classified under the Globally Harmonized System (GHS) as Aquatic Acute Category 1: Very toxic to aquatic life and Aquatic Chronic Category 1: Very toxic to aquatic life with long-lasting effects.

The chemicals in this class are sparingly soluble in water, but they can dissociate to release lead ions (Pb^{2+}), which are highly toxic to aquatic organisms.

The organic acid components (e.g. stearic, palmitic, octanoic acids) are generally of low environmental concern as they degrade rapidly in the environment. The key environmental risk from industrial uses of this class stems from the release of Pb^{2+} into aquatic environments and soils. These ions exhibit strong soil retention, leading to long-term contamination. They also have a potential to bioaccumulate in organisms.

The contribution to total anthropogenic lead emissions from current industrial uses of lead(2+) salts of carboxylic acids is relatively small and diffuse. It is unlikely to significantly increase overall environmental lead loads.

The AICIS 2022 environmental risk assessment concluded that while current industrial uses of these chemicals are limited and declining, their potential to release bioavailable ionic lead into the environment warrants continued oversight. The evaluation also noted that legacy uses and imported articles may still contribute to diffuse environmental emissions.

Introduction and use of lead(2+) salts of carboxylic acids in Australia

Lead(2+) salts of carboxylic acids were assessed for environmental risk by AICIS for end use in industrial applications, including paints and coating products, lubricants and greases, plastic and polymer products and adhesives and sealants.

Since the early 2000s, use of these compounds in Australia has declined significantly or been partially or completely phased out, largely due to the environmental and health risks associated with lead. Lead(2+) salts of carboxylic acids have been replaced in articles and products domestically through voluntary substitution actions by industry.

These substances may still be present in some imported and legacy articles. Their presence in finished goods pose a potential source of diffuse environmental emissions.

Regulation of lead(2+) salts of carboxylic acids in Australia

Lead and lead compounds are subject to reporting under the Australian National Pollutant Inventory (NPI).

The *Therapeutic Goods (Poisons Standard, February 2025) Instrument 2025* restricts lead and lead compounds to a maximum of 0.1% of the non-volatile content in all paints (including anti-corrosive and anti-fouling types) manufactured and sold in Australia, measured as elemental lead.

References

AICIS (Australian Industrial Chemicals Introduction Scheme) (2022), *Lead soaps: Evaluation Statement*, accessed on 1 March 2025.

NICNAS (National Industrial Chemicals Notification and Assessment Scheme) (2014), *1:2 Lead(2+) salts of medium-chain carboxylic acids: Environment tier II assessment*, accessed on 27 February 2025.

NICNAS (National Industrial Chemicals Notification and Assessment Scheme) (2014), *Lead(2+) salts of medium-chain carboxylic acids: Environment tier II assessment*, accessed on 27 February 2025.

NICNAS (National Industrial Chemicals Notification and Assessment Scheme) (2014), *1:2 Lead(2+) salts of long-chain carboxylic acids: Environment tier II assessment*, accessed on 28 February 2025.

NICNAS (National Industrial Chemicals Notification and Assessment Scheme) (2014), *Lead(2+) salts of long-chain carboxylic acids: Environment tier II assessment*, accessed on 28 February 2025.

More information

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