Lead in Poly Vinyl Chloride (PVC) pipes and fittings

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Introduction

It is a little known fact that lead (Pb) is found in or on the surface of PVC stormwater pipes and fittings. Most new PVC pipes and fittings contain little or no Pb although some new items and many older items contain significant amounts of Pb.

An issue arose in Esperance during sampling for the Esperance Cleanup and Recovery Project, where a sample result taken on a stormwater pipe returned a high Pb loading. The value was above the children's surface Pb guideline and the situation was evaluated for cleaning. Contamination of the pipe by 'Magellan lead' was unlikely due to low results from samples nearby and the issue was investigated further.

Findings

PVC pipe is problematic to sample for Pb due to lead stearate used in the manufacture of the plastic.

Lead stearate is used as a Plastics Stabiliser in the manufacture of PVC products and old PVC pipes which have deteriorated in sunlight can have elevated lead levels on the surface.

Technical details of Lead Stearate:

Name: Lead Stearate , Lead (II) Stearate

Mol Formula	$(C_{17}H_{35}COO)_2Pb$
Mol. Weight	774
CAS Registry No.	7428-48-0, 1072-35-1
Merck Index No	5442 (12tn Edition)
Beilstein Reference:	4-02-00-01206

Lead (Di) Stearate is a lead soap that is insoluble in water & soluble in hot alcohol.

Lead Stearate is available in fine white powder form. Lead Stearate is a PVC Stabiliser manufactured using Spray Drying technology.

This gives high quality free flowing uniform mesh size product, which is the main requirement of PVC and allied industries.

Lead Stearate is highly recommended as an internal lubricant & stabilizer in PVC formulation.

Uses:

- As a drier in varnish; lacquer & paints
- In extreme pressure lubricants
- Stabilizer for vinyl polymers (with D.B.L.S. & T.B.L.S.)
- As a corrosion inhibitor for petroleum
- As a component in greases, waxes and paints
- In PVC extruded, calendered and moulded articles.

In-situ analysis, using the NITON X-Ray Fluorescence Analyser, of a number of PVC stormwater pipes and fittings in homes around Esperance has found a wide range of values of Pb in these pipes. Pipes with Pb concentrations of 3% have been discovered and if the surfaces of these pipes have deteriorated in Ultra-Violet sunlight the decomposition product, a fine white powder, can be removed from the surface.
Surface wipes have returned high surface Pb results in these instances.

Recommendation

Due to the uncertainty of the composition of PVC pipes and fittings, along with the unknown rates of surface deterioration, it is recommended that these items not be sampled using the surface sample wipe method for Pb contamination.

Such items, if necessary, should be analysed in-situ using the NITON X-Ray Fluorescence Analyser.