

Think-tank finds raised lead levels



Robert Huston of Griffith University in Queensland completed a PhD as part of a project originally developed by the Cooperative Research Centre (CRC) for Water Quality and Treatment.

The research project analysed 26 rainwater tanks across Brisbane for chemical contaminants, with a focus on heavy metals including lead.

He believes his study is the largest and most detailed examination of the sources of chemical contaminants in urban rainwater tanks in Australia, and the results are surprising.

"Specifically for lead I was comparing atmospheric deposition sources, which come down in the rain or dust settling on the roof, with other sources such as rooftop and plumbing sources," Robert says.

"I found that most rainwater tanks recorded lead levels below Australian drinking water guidelines most of the time, with around 80% of tanks recording safe readings. However, around 10 to 20% of tanks recorded lead levels above that recommended in the Australian drinking water guidelines – so water in these tanks wouldn't be considered safe to use as the main drinking water source.



"The results are consistent across Australia. I've got data from Adelaide, Sydney, Melbourne and Broken Hill just to name a few."

Contrary to common concern over contamination from air pollution in the city, it was the rooftop sources that were generally responsible for high lead readings in rainwater tanks, with some contribution from plumbing and atmospheric sources, Robert says.

"Plumbing sources are predominantly leaded solder or brass fittings. They ▶

New research conducted by Griffith University has found that up to one fifth of rainwater tanks could have lead levels above drinking water guidelines.

Lead has long been targeted as a potentially harmful water contaminant. As rainwater tanks become increasingly popular, it begs the question: do they harbour elevated lead levels that are dangerous to public health? Angela Tufvesson investigates.

It's a relatively new activity in the private domain that could impact significantly in the public arena.

Increasing consumer reliance on home rainwater tanks, in response to growing water shortages, raises questions of quality control at a domestic level.

Rainwater catchment systems are particularly susceptible to environmental hazards as water quality can vary depending on atmospheric pollution,

harvesting method and storage.

Studies dating back to 1993 have reported concentrations of heavy metals in roof run-off and tankwater samples that exceed Australian drinking water guidelines.

A 2007 CSIRO study found that heavy metal concentrations (including lead) in water samples taken from a rainwater tank can exceed levels recommended by guidelines.

So too a 2008 research project carried out by Monash University that found "rainwater tanks in Melbourne are commonly contaminated with lead and other heavy metals at levels that exceed drinking water guidelines."

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are more important for rainwater than treated water because rainwater is soft and naturally slightly acidic. As such it is corrosive and it will leach metals out of the plumbing system materials.

“However, the most significant source of a high lead concentration in urban rainwater tanks was identified as lead flashing or leaded paint.

“If you have a significant amount of lead flashing on your roof and it’s supplying the tank then your tank is probably going to have lead levels above the drinking water guidelines.”

Robert doesn’t have exact statistics on the proportion of Australian homes with lead flashing on their roof, but anecdotally he believes it is approximately one in three. Lead flashing is most likely to be present on a tile roof.

As of 2006, the Building Code of Australia prohibits lead flashings to any part of the roof that catches potable water, but this is a relatively new regulation aimed at the new homes market.

There is no Australian Standard for treating or distributing rainwater collected in the domestic arena. It is, however, important to note that the level of lead exposure resulting from a contaminated rainwater tank is relatively low.

“Lead exposure from drinking rainwater is relatively low and unlikely to cause serious damage over short periods,” Robert says.

“The most sensitive subpopulation of lead toxicity is children. Low level exposure to lead affects cognitive development leading to lowered IQ, poor concentration and behavioural problems at school – although they may be relatively subtle effects depending on the blood lead levels. Poor nutrition can exacerbate these toxic effects.”

As rainwater tanks become ever more popular it pays for plumbers to keep abreast of new research findings that place them in the best position to offer sound advice to their customers.

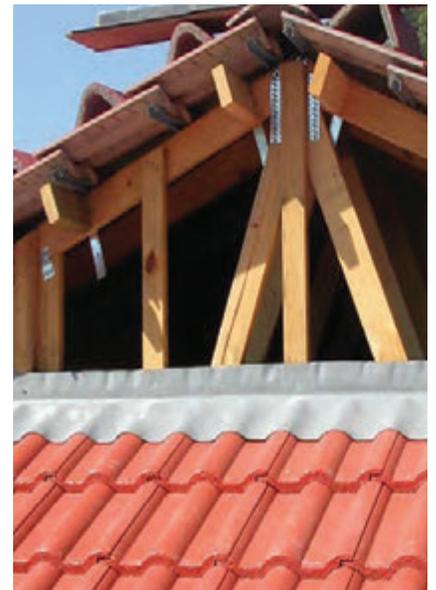


The most obvious solution to the problem is to remove lead flashing from roofs where possible.

“If you can’t remove the lead flashing the next best thing is to seal it over with a lead free paint or polymer membrane. Stop the contact with rainfall and the atmosphere and you will stop the main source contaminating the tank,” Robert says.

“If you have high lead paint it’s a little trickier. Painting over it is a partial solution but over time it will degrade and expose the lead paint, so removing it or stripping it back is really the best option.”

Most of the lead entering a rainwater tank settles to the bottom with the sludge, for which Robert has an innovative solution.



“If you can raise the outlet 500mm from the base you tend to avoid most of the sludge. A ‘floating’ outlet that consists of a flexible tube sitting inside the tank so that the draw off point is about 10-20cm below the surface of the water, which obviously rises and falls depending on the level of the tank, is an even better option.

Additionally, adding lime to the tank to modify its pH level may help, but this has not yet been tested in the field, he says.

“The evidence comes from concrete water tanks. If you can get the pH level above seven the lead will precipitate out and end up in the sludge. As long as you have a draw off point that is avoiding the sludge entering the water at the outlet it should solve the problem.” ■