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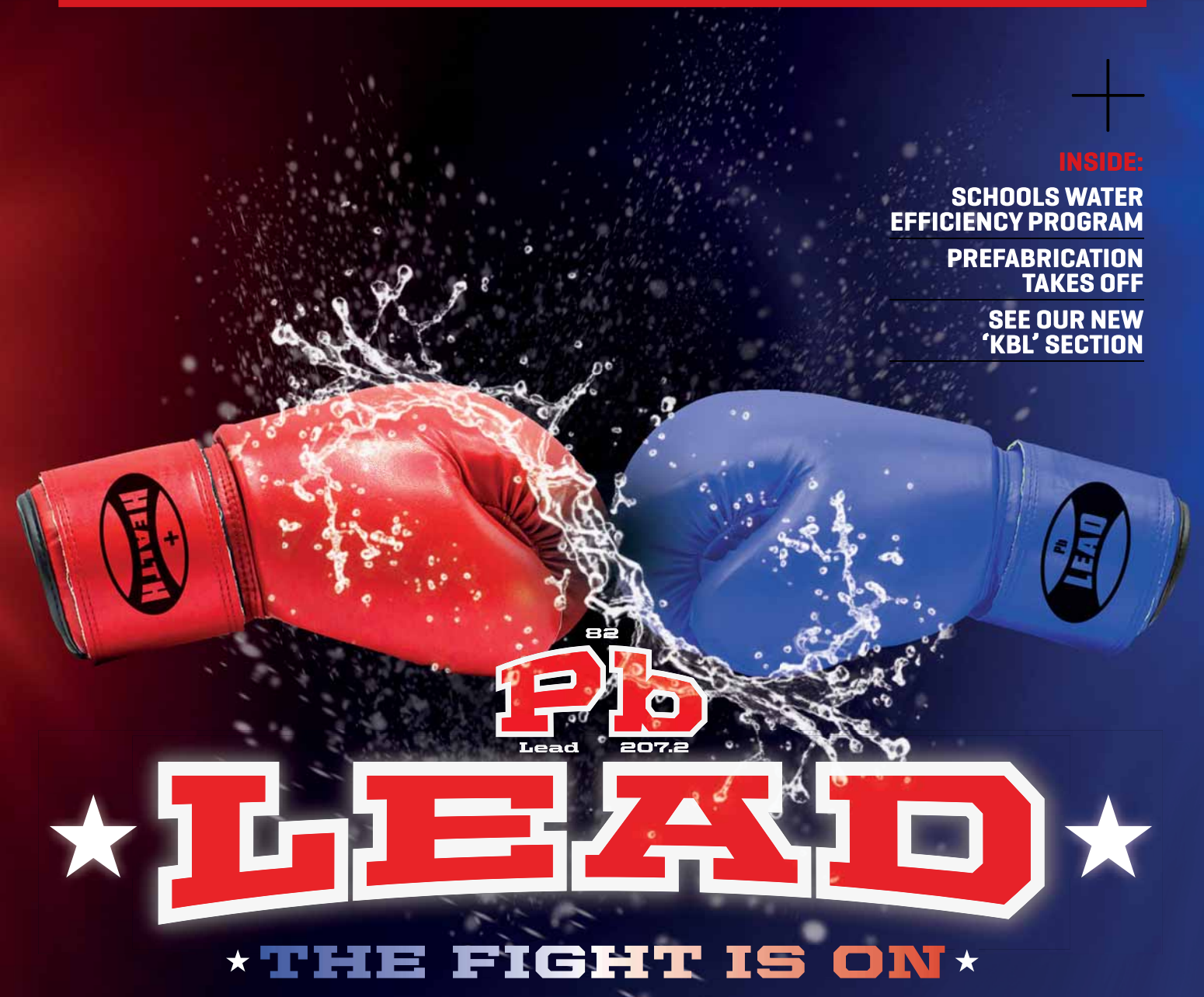

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LEAD

THE FIGHT IS ON

LEAD IN DRINKING WATER: THE FIGHT IS ON

THE HEALTH HAZARDS ASSOCIATED WITH LEAD IN DRINKING WATER, SPECIFICALLY LEAD CONTAMINATION DERIVED FROM TAPWARE AND ASSOCIATED FITTINGS, HAVE BEEN A MAJOR CAUSE OF CONCERN THROUGHOUT THE RECENT HISTORY OF PLUMBING. AT LAST, REGULATORY REFORM IS UNDERWAY – BUT WILL IT BE ENOUGH TO FIX THE PROBLEM? JOHN POWER INVESTIGATES.

Lead ingestion from drinking water is dangerous – international literature on the subject spanning many decades is perfectly clear and unanimous: elevated levels of lead can cause cognitive and behavioral impairment, organ damage, and a range of other chronic conditions, with children being particularly susceptible to harm.

'Safe' levels of lead in drinking water – generally accepted as zero in an 'ideal world' – tend to hover internationally around an upper threshold of 10µg per litre or less in advanced jurisdictions in recognition of the real-world impossibility of eradicating all lead from drinking water, combined with the fact that some traces of lead occur naturally in the environment.

There are many possible causes of lead contamination in drinking water, including paint, dust, and antiquated pipework, but there is an increasing body of international evidence that lead leaching from end-of-line tapware and associated fittings, specifically items made from copper alloys, can be blamed for high concentrations of lead in drinking water.

What are 'high concentrations'? If we look at international standards, there are many different ways to describe acceptable lead levels in water, which can make comparisons difficult. In the US, for instance, NSF/ANSI/CAN 61 recently set a maximum acceptable concentration of just 1µg/L of lead in drinking water. In order to achieve this target, the US has specified a maximum 0.25% weighted average lead content or less in plumbing fittings when measured against wetted surface areas.

How does Australia compare? Australian Drinking Water Guidelines (ADWG) allow for a maximum 10µg/L of lead in drinking water. Meantime, various Australian Standards feature maximum allowable lead contents in plumbing devices and fittings of between 3.5% and 5%, depending on the product class.

In other words, existing allowable lead concentrations in Australian plumbing fittings can be up to *20 times greater* than US thresholds permit. This kind of disparity, along with a number of well publicised domestic scandals involving high lead levels in drinking water (Perth Hospital being the most notorious), have all contributed to the inevitability of the current reform program.

Below we will examine steps being undertaken by the Australian Building Codes Board (ABCB) to lower lead concentrations in Australian plumbing products. The main initiative, quite clearly, is to set a maximum 0.25% weighted average lead content of relevant products measured against wetted surface areas, essentially in line with US guidelines. This reform process, however, is far from straightforward and involves an ideological battle between advocates of strict health-based outcomes, on the one hand, and the pragmatic requirements of manufacturers and their supply chains, on the other.

Below we will provide an overview of the reform processes to date, along with the potential for significant controversies or weaknesses in the program relating to: anomalies in the phase-out of existing products, a proposed three-year timeframe for implementation, unclear definitions of acceptable 'lead-safe' replacement technologies, the dangers of poor enforcement practices leading to a low observance of the new provisions, as well as the apparent absence of the Department of Health in direct deliberations.

THE PROCESS SO FAR

In December 2020 the ABCB issued a public Consultation Regulatory Impact Statement (CRIS) outlining the nature of the problem of lead in drinking water, its health costs to the community, the likely economic impacts of reform, as well as suggested scopes and timelines for remedial actions.

The CRIS also called for public submissions (deadline end of March 2021) in relation to various reform options presented in the report.

Following the close of submissions, the ABCB announced its intention to formalise a range of proposed reforms in the next revision of the National Construction Code (NCC 2022), thereby setting new benchmarks in concrete and creating a blueprint for States and Territories to follow.

This draft NCC 2022, which remains open for public comment at the time of writing, specifies a new upper threshold of 0.25% lead content relating to a broad list of plumbing items, including fittings, valves, fittings on stainless steel braided hoses, taps, mixers, appliances for the delivery of drinking water, water heaters, and water dispensers (boiling and cooling units). The list does not include devices such as toilets, showers for bathing, fire sprinklers, or items that are not made from copper alloy, all of which are deemed to pose few direct health hazards via lead contamination.

Under the terms of the draft NCC 2022, the new threshold of 0.25% lead content in relevant fittings would be verified either in accordance with NSF/ANSI 372 'Drinking Water System Components – Lead Content', or via a national WaterMark license, providing it complies with NSF/ANSI 372.

Lead-safe plumbing products are already gaining popularity in Australia and New Zealand, with schools leading the uptake. (Image courtesy Galvin Engineering.)

WEAKNESSES

If the proposed changes are to result in meaningful and respected outcomes in the marketplace, a number of issues must be addressed.

Three-year Timeline

Perhaps the most controversial feature of the CRIS is a proposed three-year timeline for implementation, which allows for a further three years of sales of existing products with lead contents up to 5%. These products, though technically compliant by today's standards, will shortly become grossly *non-compliant* under NCC 2022.

As the CRIS report notes, "The consensus was a minimum of three years from enactment (to prepare and allow for throughput of remaining stock)."[1]

By accommodating the ongoing sale of products containing up to 5% lead for another three years, and taking into account the ABCB's own estimates[2] of an average lifespan of affected products of up to 20 years, the ABCB may be open to potential criticism that it is either (a) not taking the hazard of lead in drinking water seriously, or (b) is prioritising the commercial interests of manufacturers seeking to transition to lead-safe products over the health requirements of the community. Health advocates might argue: If remedial action concerning lead in plumbing products is warranted at all, then surely the best time to act is 'immediately', not in three years' time. It will be interesting to see if a three-year grace period for ongoing sales of current-technology stock goes unchallenged in the wider marketplace.

Existing 'Lead-safe' Technologies

Another oddity in the CRIS report is its scant recognition of existing lead-safe technologies, which can feature a range of different materials and engineering solutions. It might be argued that the proposed three-year phasing-in period of lead-safe products dramatically *underestimates* the capacity of existing lead-safe manufacturers to meet significant market demand far sooner than three years' time. Indeed, a three-year implementation delay, arguably, might be interpreted as a penalty against progressive companies that have already made the switch to lead-safe product ranges.

Certainly, lead-safe products have been gaining popularity in Australia and New Zealand in recent years, well in advance of proposed ABCB mandates.

For instance, Galvin Engineering, based in Western Australia, produces a range of lead-safe products as part of its GalvinClear® LeadSafe™ range.

Nick Siddle, National Sales & Marketing Manager, says, "The transition from our traditional product range through to our GalvinClear® LeadSafe™ product range was challenging yet rewarding. The transition of all finished items, sub-components, manufacturing processes and raw materials, as well as resourcing required from our Technical & Compliance teams, was a significant change for our business.

"For example, one drinking tap could have multiples of components that need to be LeadSafe™ and these components are used across multiple finished items. This, then, places challenges on our inventory holdings; however, through some innovative thinking, effective project management and a team of experts, we were able to move quickly, with minimal impact to our customers and business."

According to Nick, interest in lead-safe products has been extremely strong, with particularly good sales across health and education sectors in both private and public domains.

"This financial year, we will have manufactured and supplied 10,000+ tap sets using GalvinClear® LeadSafe™ technology," he says.

Would existing lead-safe manufacturing systems able to handle swift upswings in demand?

"In simple terms, yes," Nick says. "We are doing this already and have solutions to meet our partners' and customers' needs immediately. Our commitment to Water Solutions for a Healthier Environment means that we will continue to add to our ranges, offering great choice to our customers. Galvin Engineering has extensive manufacturing capabilities and expertise with the majority of our GalvinClear® LeadSafe™ products being manufactured right here in Australia, and we proudly carry the Australian Made certification. Our 90 years of Australian manufacturing allows us flexibility in meeting the growing demands for these products, and affords us the ability to rapidly develop and reengineer existing and products as needed."

Another leader in lead-safe plumbing technology, Gentec Australia, has been a powerful advocate for lead-safe plumbing products for years.

"Gentec, as a growing leader in this space, believes that drinking water should never put the public's health at risk. This philosophy is even more important in relation to children identified as most vulnerable in the lead-free debate!" says Daniel Gonzalez, Marketing – Technology Manager.

"With a lifetime warranty on the construction of the product, increased durability, corrosion resistance and no lead, Gentec's innovative GPure stainless steel ranges present WaterMark-certified plumbing solutions conforming to the NCC Vol 3 to the Australian market. Additionally, GPure satisfies critical report outcome recommendations such as that from *Lead in Plumbing Products and Materials*, which states, 'Where practical, in line and end of line fittings should be replaced with lead free options.'"

The use of premium-quality stainless steel for tapware in Australia, Daniel says, creates a strong point of differentiation within the market for lead-safe products.

Products like lead-safe drinking fountains are in high demand. (Image courtesy Galvin Engineering.)

"This innovative step in the Australian plumbing fitting market undertaken by Gentec utilises existing approved materials accepted under the National Construction Code[3] which have been a part of nominated approved materials in key Australian Standards such as AS/NZS3718 Water Supply – Tapware for over 20 years."

As newly developed lead-safe products emerge onto the Australian market, Daniel cautions, competition between advocates of different materials and platforms may lead to confusion amongst plumbers and their customers. For example, Daniel points out that there is already plenty of divided scientific opinion on the subject of Opportunistic Premise Plumbing Pathogens (OPPPs), which can arise due to a buildup of bacteria in biofilms in plumbing-related fittings.

"The subject of the influence of materials on biofilm development remains a disputed subject, with some research studies identifying that all materials within a water supply system support biofilm growth to varying degrees.

"A recently published study[4] of subject matter expert perspectives in this space has supported the call for developing evidence-based research guidance, particularly where expert opinions differ. These diverging views concerned matters such as heated water set points, residual levels of disinfectant, flushing frequency, heated water time to tap, as well as the use of thermostatic mixing valves, which demonstrated large knowledge gaps in need of further investigation."

Plumbing Connection looks forward to furthering the discussion about biofilm development in different lead-safe materials in future issues.

Enforcement

A regulation without adequate enforcement is little more than a mission statement.

As mentioned above, the CRIS proposed that the WaterMark product certification scheme could be a valid instrument for ensuring compliance with future lead content thresholds of 0.25% in relevant products.

However, as discussed in the cover story of this magazine's last issue, WaterMark is far from a failsafe program, particularly when it comes to generic, small, portable products like tapware. Consider the following points:

1. Compliant tapware is visually indistinguishable from non-compliant tapware, which means plumbers (the upholders of WaterMark compliance in the field) would be unlikely to tell the difference between authentic and bogus product.
2. Tapware is easy to transport, allowing for the direct importation of potentially non-compliant product by end users via standard postal services.
3. Lead levels in fittings can vary widely, meaning compliance might vary from one batch to another.
4. Small product runs of non-compliant product, particularly items released under different labels, are virtually impossible to police.

In their submission to the CRIS, the Plumbing Products Industry Group (PPIG) made a clear appeal for more stringent measures to ensure lead-safe regulations achieve meaningful ends.

"Without effective and efficient compliance and enforcement of WaterMark, under which plumbing products containing lead are regulated, a change in lead content [thresholds] may not adequately meet any threat from non-compliant product," the PPIG submission states. "In a situation of higher costs and market price increases for compliant product, the tendency for product substitution by non-compliant product will only be exacerbated.

"PPIG therefore wishes to see a renewed effort to improve the national administration and State and Territory monitoring, surveillance and enforcement of WaterMark, especially as it relates to lead in plumbing products.

"At the national level, under the WaterMark Scheme the checks and balances required by the ABCB Administrator need review. A manufacturer or supplier, having made an initial application for WaterMark certification, may provide a 'sample' product from a production run for testing, which, if successful, is issued with a WaterMark license, and then may only be subject to a desk top (paper) audit until the term of the WaterMark license expires.

"An audit regime is needed that balances costs and benefits, preferably involving one factory visit per annum. It would help counter the increased use of recycled materials, particularly lead, sometimes sourced from old car batteries, leading to lead content in brass being extremely variable."

It is worth noting, as discussed in the cover story of our last issue, that PPIG is a long-term supporter of national Point of Sale accountability for non-WaterMark-compliant or non-conforming fittings and products, instead of placing such burdens on Conformity Assessment Bodies, in the first instance, or subsequently on plumbers in the field.

Decision-Making Processes

Where is the Commonwealth Department of Health in all these proceedings? After all, the whole point of defining and establishing safe lead thresholds in plumbing products is to overcome a perceived health hazard. Despite the word 'health' featuring 149 times in the CRIS, the Department of Health appears to be missing in action. *Plumbing Connection* asked the department to reveal whether it had a participatory role in the formulation or implementation of the proposed new NCC 2022 provisions relating to lead in plumbing products affecting drinking water. No response.

MISSED OPPORTUNITIES?

In summary, at present the issue of lead in drinking water is either a health matter or a product non-compliance matter, depending on your point of view.

As a health matter, it is hard to see how a slow three-year phase-in of new 0.25% thresholds can be justified, particularly in relation to children. By making such a generous concession to the manufacturing sector, the ABCB risks alienating segments of the market that demand more urgent attention. This is happening in Victoria, for example, where bodies like the Victorian Schools Building Authority have already mandated lead-safe plumbing products in all facilities.

As a product non-compliance issue, surely there could have been provision for more immediate high-priority works, such as the testing of relevant plumbing fittings in schools, preschools, kindergartens, childcare centres, pediatric hospitals, and crèches, along with guidelines for the immediate replacement of non-lead-safe products with lead-safe alternatives, plus tips like 30-second siphoning of stale water from taps at the beginning of the day.

As mentioned above, there are existing manufacturers of lead-safe equipment in the market right now, all ready and willing to service the needs of high-priority groups and facilities. This kind of targeted approach to child-focused customer bases, in particular, could have been embraced alongside a slower, more pragmatic rollout of lead-safe products in the broader community. The fight against lead goes on. ■

Footnotes:
1. Lead in Plumbing Products in Contact with Drinking Water, Consultation Regulation Impact Statement (CRIS), ABCB, page 70.
2. Lead in Plumbing Products in Contact with Drinking Water, Consultation Regulation Impact Statement (CRIS), ABCB, page 57.
3. National Construction Code – BCA Vol. 3. (ABCB – 2019)
4. Managing Water Quality in Premise Plumbing: Subject Matter Experts' Perspectives and a Systematic Review of Guidance Documents. (Rajveer Singh et al – 26th January 2020).