



LEAD-SAFE: THE PLASTIC OPTION

The pursuit of lead-free materials in plumbing has ramped up in recent months to meet the September 2025 deadline, when new regulation will be enforced. **Terry Nguyen** from PROVE Standards and Engineering examines lead-safe material options, including new-age plastics.

The most common source for lead in plumbing exists in products made from, or containing, copper alloy [e.g., brass]. The new 'lead-free' regulations do not prohibit the use of copper alloys, but they will require them to have stricter allowances for their composition.

New markings will exist on products to assist in highlighting which products are certified as having met the new lead-free requirements. However, there are other things that plumbers may need to consider as the changes begin to take effect. Aiming to reduce the lead content in materials has had engineers looking at two major avenues for compliance: either utilising the latest copper alloys that will meet the new requirements, or changing from copper alloy entirely to alternate materials.

Using the approach of removing copper alloy contact with drinking water entirely has engineers looking towards lead-free alloys, with stainless steel being the favoured choice. Stainless steel is strong, corrosion-resistant, and, apart from additional costs from manufacturing, is a relatively simple lead-free option for products such as taps. Putting a stainless steel tap through the paces of the Australian Standards for mechanical performance rarely sees any issues. In a world where cost was not an issue taps made of stainless steel could be seen as the silver bullet. However, cost factors *do* exist, and stainless steel taps are typically much more expensive to manufacture.

THE RISE OF PLASTIC

To remain cost-competitive numerous manufacturers are looking to other non-metallic material options. New-age engineering plastics are emerging in many products used in the plumbing and

waterworks industries. With material cost increases combined with lead-free requirements, the plastic options are becoming much more viable. If made correctly the material is strong and able to withstand a lifetime of use when installed and used within the limitations of the manufacturer. For the most part, the mechanical performance tests are the same between metallic and non-metallic 'equivalent' products to ensure they are fit for purpose. Some products are so well designed that it takes a keen eye to notice that some taps are in fact not as metallic as they appear.

Plastic-bodied taps sometimes are sheathed with a chrome-plated exterior metal casing to maintain the traditional look and feel of a brass metal tap. The look and feel of such products are intended to hide its plastic interior, which could be susceptible to cracking if not handled correctly. Dropping from height, overzealous installation, or bouncing around in the back of a plumber's ute are not failure modes captured in the tests required by the Australian Standards for taps. Historically, this hasn't been an issue because metallic tap bodies are strong enough to endure some knocks and bumps. This is one of many other day-to-day adjustments a plumber may need to make as the industry begins to transition to lead-free alternatives.

Plastic threaded end connections are not new to the industry and have always posed a threat of cross-threading. However, ruining a thread on

a \$10 toilet inlet valve doesn't have the same consequence of giving the same mistreatment to a specially ordered \$500 electronic valve. Plastic threaded ends [where allowed] are not tested to the same installation torques as metallic threads for obvious reasons. It takes additional care to create a proper joint without risking damage to the connection threads.

Thread sealant selection will also be a factor for cross-threading, or even thread jumping. Applying too much thread tape/cord increases the likelihood of missing correct thread engagement. Some liquid sealant types that work for all metals are also unable to stick to some particular plastics.

And there are further things to consider when looking to begin installing plastic products, or products that contain plastic components. Environmental temperature changes, UV from sunlight, frost, or mechanical damage [inadvertent or intentional] are

factors that weren't much of an issue with metallic-bodied products. Manufacturers will have specific limitations supplied with their products to ensure that they are not used outside the scope for which they were designed and certified. Products that have not been properly UV-stabilised should have information about protecting them from direct sunlight. There should also be temperature limitations supplied for products that are susceptible to high heat or frost conditions. Metallic products were by design immune to

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most environmental considerations, allowing plumbers to ignore most of the product information. With plastic products emerging everywhere [taps, fittings, solenoids, backflow prevention valves, water meters, etc.] the manufacturer-supplied documents, often termed the 'destruction manual', may need to be treated with a little more care than was needed in the past.

LESS RECYCLING

There is also another possible future challenge due to material changes for some plumbing contractors when visualising some years ahead. Traditional taps, valves, fittings, etc, made of copper or copper alloys are always removed and taken to a local metal recycling yard. The old products removed from a previous installation have significant scrap value, where the issue of recycling is usually an integral part of the end-of-year Christmas party fund. As we move ahead with alternative materials there

will be far fewer products being taken to appropriate recycling centres, with most plastic products likely to become landfill.

There is a global focus for a cradle-to-grave approach to how a product will be disposed of at the end of its useable life. Companies looking to reduce their environmental footprint need to also understand how waste disposal is managed – and plumbing contractors are no different. Those that maintain certification to ISO 14001 are required to document their environmental aspect and are constantly seeking opportunities to improve their processes. As such, plumbing contractors will be challenged to find innovative ways to encourage recycling amongst their practitioners in lieu of a tangible financial benefit.

Moving to lead-free material options will see new challenges arise for the plumbing and waterworks industries. Some of those challenges are already known, and other unintended

consequences will only be discovered once the transition proceeds further to the deadline of September 2025. In the interim, there are many resources available from all stakeholders involved in the plumbing industry including the Australian Building Codes Board. There is a transition period to enable industry to adapt to the new requirements and it is important to stay up to date with any information that is available.

The changes to lead-free plumbing design have obvious challenges to the manufacturers and plumbing suppliers, but there are also many important factors that will also change the way plumbers will need to practice. ■

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