Filtered for the Future

Specifying Tap Water Solutions for Emerging Contaminant Risks

Understanding which contaminants require specific treatment methods is essential to selecting the right filtration system for your project.

INTRODUCTION

As healthy living becomes a key focus in modern building design, architects are now expected to include systems that do more than just look good, they must also support the health and wellbeing of occupants. In the kitchen, this trend intersects with growing awareness of water quality risks associated with emerging contaminants. Microplastics, asbestos, PFAS and trace levels of pharmaceuticals are now regularly detected in public water supplies. Their presence underscores the need for greater awareness and careful consideration of water quality in user-centred design.

This shift is reflected in the uptake of international sustainability and wellness frameworks such as the **WELL Building Standard** and **Green Star**, which increasingly reference water quality as a performance metric. These rating tools call for advanced filtration technologies capable of addressing both aesthetic parameters (taste, odour, clarity) and health-related thresholds (removal of heavy metals, organic pollutants, pathogens). To meet these standards, architects must understand not only the contaminant classes affecting drinking water but also the capabilities and limitations of integrated filtration systems.

By aligning water delivery systems with a project's overall sustainability and performance goals, architects can play a proactive role in mitigating health risks while delivering measurable occupant benefits. This whitepaper explores water quality in Australia, the rising threat of emerging contaminants, and the key technical and design factors architects and specifiers should consider when choosing filtration systems for health-focused projects.

IS AUSTRALIAN TAP WATER TRULY "SAFE"?

Australia's municipal water supply is considered among the most regulated in the world, with safety benchmarks defined by the **Australian Drinking Water Guidelines (ADWG)** under the National Water Quality Management Strategy. The ADWG, while not mandatory, outline limits for contaminants across microbial, chemical and physical categories. Local water utilities are responsible for applying these standards through ongoing treatment and monitoring programs to ensure public safety.

However, compliance with national guidelines does not always guarantee consistent water quality at the point of use. Variability arises from differences in source water, treatment processes, environmental conditions and infrastructure age. For example, Canberra benefits from high-quality source water and minimal treatment, often resulting in better taste and clarity. In contrast, cities like Sydney and Brisbane, while maintaining safe and monitored supplies, may present mild aesthetic issues, such as chlorine taste or mineral-heavy flavour during seasonal shifts.

Regions like Adelaide, reliant on the River Murray, or smaller towns using bore water or decentralised treatment systems, may experience more pronounced issues such as turbidity or elevated mineral content. Areas near military bases, airports and fire training grounds often have high levels of PFAS in their water due to the extensive use of firefighting foams. In remote and First Nations communities, persistent infrastructure challenges can lead to water that fails to meet even baseline health standards.

WATER FILTRATION: IS IT NECESSARY?

Given this variability, the question is not whether Australian tap water is safe, but whether it consistently meets the expectations of health-focused users. Even when treated to ADWG standards, tap water may still carry sediment, metals and other contaminants. These substances are not always fully removed through conventional treatment and may be introduced downstream via ageing pipes or non-compliant fittings.

The ADWG does not fully cover or regulate all emerging contaminants, such as PFAS and microplastics. This is especially true for substances with uncertain health effects or evolving detection methods. These contaminants may still be present in drinking water due to industrial activity, environmental persistence and limitations in conventional treatment processes.

High-performance filtration systems use multi-stage processes to remove contaminants that may still be present in tap water, improving both its safety and taste at the point of use. In doing so, they promote healthier drinking habits, reduce reliance on bottled water and offer a sustainable alternative to sugary beverages, particularly when paired with sparkling water taps.

EMERGENT CONTAMINANTS OF CONCERN

PFAS (Per- and Polyfluoroalkyl Substances)
Often referred to as "forever chemicals", PFAS are synthetic compounds used in non-stick coatings, waterproof materials and firefighting foams. A recent study by the Australian Bureau of Statistics detected at least three PFAS chemicals in the blood of over 85% of participants tested nationwide.[1]

PFAS are associated with a range of health risks, including endocrine disruption and developmental delays. Studies have also shown associations between long-term PFAS exposure and increased risk of certain cancers.[2]

Microplastics
Widely documented in global and Australian water systems, microplastics are particles smaller than 5 mm originating from plastic packaging, textiles and industrial processes. Over 7,000 published studies confirm their prevalence in aquatic environments and, increasingly, in drinking water.[3]

While not currently included in the ADWG due to limited toxicological data, early findings suggest that nano-sized particles may penetrate cell membranes, raising concerns about long-term ingestion and bioaccumulation. Potential impacts include neurotoxicity, inflammation, oxidative stress, DNA damage and disruption of cellular function.[4]

Asbestos
Despite its well-known carcinogenic properties, asbestos remains a legacy material in Australia's water distribution network. Per government reports, Australia has 40,000km of water mains pipes made from asbestos cement.[5]

While intact pipes pose minimal immediate risk, degradation over time can release asbestos fibres into the water stream. The long-term health effects of ingesting asbestos remain inconclusive, which requires stakeholders to adopt a precautionary approach.

Pharmaceuticals and personal care products (PPCPs)
This broad category includes prescription medications, over-the-counter drugs, hormones and cosmetic residues that enter waterways through wastewater and runoff. Numerous studies have detected PPCPs in surface water, groundwater and even treated drinking water.[6]

These compounds are biologically active at very low concentrations and are known to exert physiological effects on humans and aquatic organisms, including antibiotic resistance, hormonal disruption and behavioural changes. For example, a two-year study found that low-level exposure to the synthetic estrogen EE2 disrupted sexual development in roaches, confirming the reproductive risks of estrogenic contaminants in aquatic environments.[7] This finding is concerning because it demonstrates that even very low concentrations of estrogenic compounds can cause measurable biological effects.

Many filtration products are designed to improve water's taste or clarity, but only advanced systems can remove emerging contaminants, such as PFAS, microplastics and asbestos.

LIMITATIONS OF CONVENTIONAL WATER TREATMENT SYSTEMS

Municipal water treatment plants are engineered to address well-established contaminants such as pathogens (e.g., E. coli), chlorine-resistant organisms and some heavy metals. However, they are not fully equipped to remove many emerging contaminants due to the unique physical and chemical properties of these substances.

These emerging contaminants are often extremely small in particle size, have high chemical stability and are resistant to conventional filtration and disinfection processes. In addition, the absence of binding regulatory thresholds for many of these compounds means they are not routinely targeted for removal. As a result, trace levels of these contaminants can remain in treated water, raising concerns about long-term exposure and highlighting the **need for advanced, point-of-use filtration** in sensitive environments.

CHOOSING THE RIGHT FILTRATION SOLUTIONS

Not all filters are equal
Many filtration products are designed to improve water's taste or clarity, but only advanced systems can remove emerging contaminants, such as PFAS, microplastics and asbestos. Understanding this distinction allows specifiers to make informed choices that align with user health priorities.

Micron size matters
Filtration performance is partly defined by micron rating, which refers to the pore size of the filter:

- **5–10 microns:** Removes large particles (e.g. rust, sand and sediment).
- **1 micron:** Captures finer matter and some protozoa.
- **Sub micron (0.2 microns):** Offers microbiological-grade filtration, capable of removing cysts, asbestos fibres and microplastics.

A sub-micron filter is ideal for health-focused applications where invisible contaminants may be present. However, micron size alone doesn't indicate a filter's full capability.

Targeted contaminant removal
Some contaminants, like lead or chlorine, require chemical adsorption (typically through activated carbon), while others, such as cysts or microplastics, are captured through physical exclusion based on particle size. Understanding which contaminants require specific treatment methods is essential to selecting the right filtration system for your project.

- **Sediment filters:** Best for the first stage of a multi-stage filtration system. Their primary function is to remove coarse particulate matter such as sand, rust and other visible debris suspended in the water.
- **Activated carbon:** Utilising adsorption, which is the process where particles stick to the surface of a material, activated carbon effectively removes chlorine and other chemical pollutants.
- **Reverse osmosis:** These systems use a semi-permeable membrane to remove a wide range of dissolved solids; however, they also strip beneficial minerals such as calcium and magnesium and typically require higher maintenance.
- **Multi-stage systems (e.g., Zip MicroPurity):** These systems combine sediment filtration, activated carbon and sub-micron membranes to remove fine particulates, chemical contaminants and microorganisms, while retaining beneficial minerals like calcium and magnesium.

Check certifications
Third-party certification ensures verified system performance. NSF International is an independent global organisation that, in collaboration with ANSI, develops public health standards and provides third-party certification for products such as water filters, ensuring they meet verified safety and performance criteria for contaminant reduction. Relevant standards for drinking water include:

- **NSF/ANSI 42:** Aesthetic effects (chlorine, taste, odour, particulates)
- **NSF/ANSI 53:** Health effects (PFAS, lead, asbestos, cysts)
- **NSF/ANSI 401:** Emerging/incidental contaminants (e.g., pharmaceuticals, microplastics)

Specifying certified systems supports compliance with WELL, Green Star and broader health-focused design standards.

HOW ZIP MICROPURITY FILTRATION MEETS TOMORROW'S WATER CHALLENGES

As awareness of emerging water contaminants grows, so too does the expectation that building design must respond with practical, future-proof solutions. Zip MicroPurity filtration fitted in a Zip HydroTap meets this challenge with a proven, certified approach to contaminant reduction. Its **0.2-micron filtration technology** is engineered to target both aesthetic and health-related contaminants, **removing up to 99.99% of impurities**, such as cysts, chlorine, sediment, lead, asbestos, microplastics, bacteria and now, **99.4% of PFAS*. Certified to NSF/ANSI Standards 42, 53 and 401**, Zip's filters meet the highest international benchmarks for performance across known and emerging risks.

Unlike many single-purpose filters, Zip's multi-stage system combines mechanical and chemical filtration within a single hygienic cartridge, ensuring comprehensive protection without compromising on water taste or beneficial mineral content. This makes it ideal for health-oriented residential projects, commercial kitchens and workplace environments. The filtration units are seamlessly integrated into every HydroTap system, offering instant access to filtered boiling, chilled or sparkling water, without the bulk, waste or maintenance burden of external filtration setups.

Importantly, Zip MicroPurity filters are designed with ongoing reliability and ease of maintenance in mind. Annual filter replacement ensures consistent performance of a Zip HydroTap to provide clean, great-tasting water whether it's boiling, chilled or sparkling, while certified service plans and simple DIY options provide flexibility to suit various building types and user needs. For specifiers, the combination of certified performance, ease of integration and long-term support makes Zip MicroPurity a smart choice for delivering healthier, cleaner water in both current and future built environments.

*Zip MicroPurity filters sizes 1 and 1.5 (93701 & 93702) are certified to NSF/ANSI Standard 53 to reduce 99.4% of Total PFAS (average reduction).

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