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# SUPPLEMENTARY TECHNICAL SUBMISSION

## DR AS 3633:2026
## Residential and public pools - Water quality

Sanitiser efficacy, cyanuric acid, microbiological outcomes and technology-neutral evidence requirements

**Prepared for: Standards Australia public comment process - Technical Committee CS-061**

**Prepared by: Watertech Services International Pty Ltd / Enviroswim**

**Date: 23 August 2026**

**Status: Public comment submission**

**SUBMISSION REQUEST**
Enviroswim requests that this supplementary technical submission be treated as supporting evidence for its existing general and clause-specific comments on DR AS 3633:2026. Enviroswim requests an issue-by-issue technical disposition before ballot and publication, including reasons for accepting, modifying or rejecting each proposed change.

## Purpose and requested outcome

This submission addresses technical and standards-development issues arising from DR AS 3633:2026. It focuses on sanitiser efficacy, evidence traceability, cyanuric acid, microbiological outcomes, multi-barrier treatment and equal treatment of conventional and alternative technologies.

The submission does not contend that chlorine is ineffective in every pool, that any alternative technology is automatically acceptable, or that registration or certification alone proves every claimed outcome. Its central proposition is narrower: every primary sanitiser pathway should be assessed against the same independent, outcome-based laboratory and full-scale field evidence across the operating conditions represented in the draft.

**PROPOSED RESOLUTION**

Identify the evidence for every preferred or permitted sanitiser pathway; apply the same organisms, log reductions, contact times, safety margins and field-validation requirements; address cyanuric acid and real operating conditions; and correct or reissue the draft where the evidence does not support the present wording.

## Contents

## 1. Executive technical conclusion

DR AS 3633:2026 should not be finalised in a form that contains an incomplete or duplicated microbiological table, contradictory alternative pathways, unequal proof burdens or an insufficiently explained preference for conventional residual-based treatment.

APVMA's published efficacy guidance uses 1 mg/L free chlorine as a comparator and states that its performance characteristics have been demonstrated in scientific literature. The public page does not identify that literature. Where the same comparator shapes an Australian Standard, the underlying sources should be identified and mapped to each organism, log reduction, contact time and operating condition claimed.

Cyanuric acid makes this evidence question material. A routine free-chlorine reading in stabilised outdoor water does not, by itself, establish the same active hypochlorous-acid exposure or rapid disinfection kinetics as a clean, unstabilised laboratory test. A technology-neutral standard must define the relevant operating envelope rather than assume equivalence from the residual number alone.

Enviroswim holds condition-specific laboratory results, NSF/ANSI 50 certification history, long-term operational evidence and two independent reports by Dr Simon Toze. Those materials should be assessed for their defined scope and limitations under the same evidence framework applied to conventional systems. They should not be excluded by drafting that treats an alternative pathway as nominally available while making it contradictory or practically inaccessible.

APVMA's published 2020 findings concerning specified hydrogen-peroxide and polyhexanide products, the later setting aside of the decisions on natural-justice grounds and the non-progression of the 2022 efficacy reform require reconciliation with any continuing reference to PHMB or peroxide-based systems in the draft. The procedural outcome did not itself establish efficacy.

**BOTTOM LINE**
A familiar residual is an operational control measure, not a substitute for a transparent evidence trace. The same microbiological outcomes and proof requirements should apply to chlorine, ionisation, multi-barrier systems, PHMB and every other sanitiser pathway.

## 2. Questions presented

1. What evidence supports each deemed-to-satisfy or preferred sanitiser pathway in DR AS 3633:2026?
2. Does that evidence match the draft's organisms, log reductions, contact times and actual operating conditions?
3. How does the draft account for cyanuric acid, sunlight, pH, temperature, organic demand, bather load, circulation and filtration?
4. Does the alternative pathway remain genuinely operable when all clauses, tables and appendices are read together?
5. Are ionisation and multi-barrier systems being assessed against the same outcome requirements as conventional chlorine systems?
6. How will the draft address Cryptosporidium, Giardia, biofilm and faecal-incident controls that cannot be reduced to routine residual compliance?
7. How has the draft reconciled its PHMB references with APVMA's published 2020 findings and the subsequent procedural history?
8. What independent scientific review will be completed before ballot and publication?

## 3. Evidence parity and traceability

The technically defensible approach is an evidence-parity and traceability framework. Registration, listing, certification, historic use and standards preference are relevant, but none is identical to publicly demonstrated compliance with a contemporary, condition-specific efficacy protocol.

| Proposition | Present status | Standards implication |
|---|---|---|
| APVMA publishes organism-specific efficacy outcomes | Established | Use the same endpoints and independent evidence expectations for every sanitiser pathway. |
| APVMA says 1 mg/L free chlorine performance is demonstrated in scientific literature | Established | Identify and map the literature before using the comparator as a preferred benchmark. |
| The relied-on literature is identified on APVMA's public page | Not established | The draft should not reproduce an unqualified comparator without an auditable source trace. |
| Cyanuric acid can slow chlorine disinfection | Established scientific issue | Specify stabiliser-aware operating limits and pathogen-specific performance. |
| DR AS 3633:2026 expressly makes chlorine the only lawful treatment | Not established | Assess whether contradictory clauses and unequal burdens create a de facto preference. |
| Enviroswim has condition-specific independent evidence | Established | Assess the full reports within their defined methods, scope and limitations. |
| Peroxide efficacy was judicially validated | Not established | Reconcile the draft with APVMA's scientific findings; do not treat a procedural court outcome as a merits finding. |

### Analytical discipline

Established fact: supported by a document, published source or complete report identified in the evidence schedule.
Condition-specific evidence: a result that supports a proposition only within the tested organism, method, concentration, contact time and operating conditions.
Inference requiring review: a reasonable technical question that is not yet proved and requires the committee's evidence register or further testing.
Proposed change: precise drafting or process action capable of resolving the identified issue.

## 4. The chlorine comparator and the unidentified evidence foundation

### 4.1 The published comparator

APVMA's published pool and spa sanitiser efficacy guidance states that the performance characteristics of 1 mg/L free chlorine have been demonstrated in scientific literature. The same guidance identifies target organisms, log-reduction outcomes, contact times, laboratory requirements and field evidence expectations.

Where a standards committee relies directly or indirectly on that comparator, the comparator's evidence is part of the technical foundation of the draft. A bibliographic schedule and endpoint map are therefore necessary to determine exactly what has been demonstrated.

### 4.2 Questions the evidence trace must answer

Were the same organisms and strains tested at the same log-reduction endpoints?
Was 1 mg/L free chlorine maintained throughout exposure or measured only at the start?
What pH, temperature and chlorine-demand conditions were used?
Was chlorine stabilised or unstabilised, and what cyanuric-acid concentration applied?
Were the tests conducted in clean laboratory water or under realistic organic and bather load?
Did the evidence address outdoor sunlight, circulation, filtration and local or transient risk?
Does the evidence support an active constituent, a product class or the actual formulated products used in Australia?

### 4.3 The 2014 FOI record

The APVMA FOI response dated 15 August 2014, G11233/LEX3979, concerned documents requested for three named registered products and the cited efficacy requirement. Its proper use is limited: it indicates that responsive compliance records were not located or did not exist within the defined request and search scope. It does not prove that no chlorine science exists or that every chlorine registration is invalid.

The stronger standards question combines that narrow record with APVMA's later public claim of scientific literature and the presently unresolved request for identification of that literature. If the draft prefers or deems a pathway satisfactory, CS-061 should identify the evidence on which that treatment rests.

**REQUIRED STANDARDS RESPONSE**
Publish or identify the technical bibliography supporting each primary sanitiser pathway and map the evidence to the relevant organism, endpoint, contact time and operating condition. If the evidence does not cover stabilised or real-world conditions, qualify the clause accordingly.

## 5. Cyanuric acid and the laboratory-to-field mismatch

### 5.1 Chemistry and measurement

Cyanuric acid is used to protect chlorine from ultraviolet degradation in outdoor pools. It reversibly complexes chlorine and reduces the immediately available unbound hypochlorous-acid fraction, slowing disinfection kinetics compared with unstabilised water at the same routine free-chlorine reading. The effect varies with pH, temperature, cyanuric-acid concentration and test method.

A DPD free-chlorine result is therefore not, by itself, a direct measurement of the instantaneous unbound hypochlorous-acid concentration responsible for rapid disinfection. A standard that relies on a residual number must also address the conditions that determine the active fraction and the time required to reach the represented microbial outcome.

### 5.2 Independent public-health recognition

United States Centers for Disease Control and Prevention guidance recommends higher minimum free-chlorine levels where cyanuric acid or stabilised chlorine is used and states that disinfection times are longer in its presence. World Health Organization guidance recognises cyanuric-acid accumulation and the need for concentration control. These sources do not determine Australian law, but they establish that stabiliser is a material efficacy variable.

| Variable | Why it is measured | Why residual compliance is not the whole efficacy case |
|---|---|---|
| Free chlorine | Routine operational control | Does not alone disclose the unbound active fraction when stabiliser is present. |
| pH | Controls HOCl/OCl- speciation | Changes can materially affect rapid disinfection. |
| Cyanuric acid | UV protection and chlorine reservoir | Can slow kill kinetics; concentration and chlorine ratio matter. |
| Temperature | Affects reaction kinetics and volatilisation | Heated pools and spas require separate attention. |
| Organic demand / bather load | Consumes or shields disinfectant | Clean-water performance may not predict peak-use conditions. |
| Circulation and filtration | Transport and physical removal | A compliant sample point can coexist with local or transient risk. |
| Pathogen | Resistance differs substantially | Cryptosporidium is highly chlorine tolerant; bacteria and viruses vary. |

### 5.3 Required operating envelope

For every sanitiser pathway, efficacy evidence should address the represented operating envelope: cyanuric-acid range, pH, temperature, sunlight or photolysis, organic load, bather load, circulation, filtration and realistic

residual control. The same organisms, log reductions, contact times, independent-laboratory expectations, safety margins and field-validation rules should be applied across technologies.

## 6. Enviroswim's independent laboratory and scientific evidence

Enviroswim's evidence is relevant to the operability of an alternative pathway and to whether the draft applies equivalent proof requirements. Each item should be considered within its defined scope rather than treated as proof of every possible pool, pathogen or operating condition.

### 6.1 Tweed Laboratory ES1 and ES3

In the condition-specific ES1 work held by the company, chlorine-only samples at 0.5, 1.0 and 2.0 mg/L were reported at less than 1.87-log reduction at 30 seconds, while ionised water combined with chlorine was reported at 2.47, 4.39 and 4.87-log reduction respectively. The result is relevant as contrary, condition-specific evidence requiring comparison with the assumed comparator.

The ES3 record reports total chlorine below 0.01 mg/L and 4.895- and 4.96-log reductions at 30 seconds in defined Enviroswim conditions, including a test at 35 degrees Celsius, pH 7.0, oxidation-reduction potential of 590 mV and copper at 648 micrograms per litre. The full organism, method, controls, accreditation, replication and report wording determine the precise endpoint supported.

### 6.2 NSF/ANSI 50 and operating history

Company records state that the Enviroswim ES3 achieved NSF/ANSI 50 certification in May 2009 following efficacy, reliability, safety and staining assessments. The evidentiary weight depends on the confirmed model, certification scope, test edition, underlying reports and surveillance history. Long-term operation and field records add practical evidence but do not replace pathogen-specific testing.

### 6.3 Dr Simon Toze's independent reports

Dr Simon Toze, through Urban Water Futures, prepared two reports for Enviroswim in June 2023. The reports provide an independent scientific literature review and technical opinion concerning swimming-pool disinfection processes and the Enviroswim ES3 multi-barrier system.

**Report 1 -** Evaluation of the Effectiveness and Issues of Different Swimming Pool Disinfection Processes (30 June 2023).

This literature review examines chlorine and bromine, ozone, ultraviolet treatment, copper-silver ionisation, microbial hazards, disinfection by-products and the difference between controlled laboratory conditions and actual pool environments.

**Report 2 -** Scientific opinion on efficacy of the copper-silver ion disinfection system used in the Enviroswim ES3 pool disinfection system (24 June 2023).

This report evaluates the literature and the Enviroswim laboratory, certification and field record, and concludes that the ES3 system meets and exceeds the referenced Code of Practice minimum criteria for public-pool operation.

Dr Toze's reports also identify appropriate limitations. Chlorine and bromine are capable disinfectants against many microorganisms but are affected by conditions including pH, temperature, sunlight, organic load and cyanuric acid, and Cryptosporidium is notably resistant. Copper-silver systems have different strengths and gaps, including a need for further research concerning some viruses and protozoan (oo)cysts. This balanced treatment is directly relevant to an outcome-based standard.

| Evidence | Principal contribution | Relevance to DR AS 3633:2026 |
|---|---|---|
| Literature review | Compares principal pool-disinfection processes and real-world variables. | Supports technology-neutral evaluation rather than technology labels alone. |

| Evidence | Principal contribution | Relevance to DR AS 3633:2026 |
|---|---|---|
| ES3 scientific opinion | Assesses literature with Enviroswim testing, NSF evidence and field information. | Supports substantive review of the alternative pathway and full reports. |
| Identified limitations | Records strengths and evidence gaps across chlorine, UV, ozone and copper-silver systems. | Supports equal qualification, research and validation requirements. |

### 6.4 Proper evidentiary use

| Evidence | Proper use | Complete record / limitation |
|---|---|---|
| ES1 full signed report | Condition-specific comparison and contrary evidence | Full method, organism, controls, raw data, accreditation and expert interpretation. |
| ES3 full signed report | Defined Enviroswim performance at very low measured chlorine | Endpoint mapping, replication, method and independent review. |
| NSF/ANSI 50 records | Independent certification and system evaluation | Certified model, scope, edition, reports and surveillance history. |
| Dr Toze reports | Independent literature review and technical opinion | Assumptions, relied-on studies, condition-specific limits and any later evidence. |
| Field record | Practical feasibility and operating history | Facility records, maintenance, bather load, incidents and comparable exposure periods. |

**STANDARDS SIGNIFICANCE**
An alternative pathway should permit a system-level, multi-barrier demonstration using independent laboratory evidence, defined operating controls, safety assessment and full-scale field validation. It should not be made inoperative by a blanket technology exclusion that disregards the combined treatment system.

## 7. Peroxide and PHMB: relevance to the draft

### 7.1 APVMA's published 2020 findings

In the APVMA Gazette of 28 July 2020, APVMA published final decisions to cancel specified hydrogen-peroxide and polyhexanide pool and spa products. APVMA concluded that the products did not satisfy applicable safety and labelling criteria because represented sanitiser performance was inadequate at label concentrations.

For hydrogen peroxide, APVMA referred to published work reporting negligible inactivation at 80 or 150 mg/L peroxide, with or without 24 micrograms per litre of silver, against organisms including Pseudomonas aeruginosa, Escherichia coli and Legionella pneumophila after exposures up to 30 minutes. Those findings are relevant to any draft provision that treats peroxide as a primary sanitiser without identifying contrary evidence or a separately validated system.

### 7.2 The 2021 procedural outcome

APVMA's 2020-21 annual report records that it consented to Federal Court orders setting aside the original and internal-review decisions on natural-justice grounds. The available official account does not record a merits finding that the products met APVMA's efficacy criteria, nor that the scientific material in the Gazette was rejected. The draft should therefore avoid treating the procedural outcome as scientific validation.

### 7.3 The 2022 efficacy consultation

APVMA opened consultation in 2022 on proposed amendments to the efficacy assessment of certain pool and spa chemicals. The proposed amendments did not proceed. The presently identified public record does not provide a complete technical disposition of the efficacy issues raised. This history reinforces the need for CS-061 to identify its own evidence foundation rather than rely on registration status or historic acceptance alone.

**REQUIRED RECONCILIATION**
Appendix B and every related reference to PHMB or peroxide should identify the current registration and permitted-use position, the independent evidence relied on, the applicable operating conditions and how APVMA's published 2020 findings were addressed.

## 8. Identified defects and ambiguities in DR AS 3633:2026

### 8.1 Table 3.1.4

Table 3.1.4 appears to duplicate supplementary-sanitiser content and omit the microbiological criteria needed to make the alternative pathway operable. If the table is incomplete, misplaced or duplicated, the draft should be corrected and reissued so that commenters can assess the intended normative requirements.

### 8.2 Alternative pathways

The draft refers to alternative pathways while other provisions appear capable of making those pathways contradictory, unclear or practically inaccessible. A standards user should be able to identify, without interpretive guesswork, the evidence and operating controls by which an alternative system can demonstrate compliance.

### 8.3 Ionisation and multi-barrier systems

Ionisation appears to be treated unevenly, including restrictions concerning public pools or standalone use, without a disclosed comparison applying identical outcome criteria to conventional systems. A restriction directed to ionisation alone must also distinguish standalone ionisation from a combined system that integrates ionisation, oxidation and ultrasonics under defined controls.

### 8.4 Appendix I evidence burden

Appendix I appears to impose a multi-tier evidence burden on alternatives without showing an equivalent current laboratory and full-scale field evidence audit for the conventional comparator. The committee should either apply the Appendix I framework to every primary sanitiser pathway or explain, with evidence, why different burdens are justified.

### 8.5 Cyanuric acid

The draft acknowledges that cyanuric acid affects active chlorine but does not transparently map this to pathogen-specific performance across actual operating conditions. CYA control should be integrated with the microbial outcome clauses, not confined to water-balance guidance.

### 8.6 Chlorine-tolerant pathogens, biofilm and incident control

Cryptosporidium, Giardia, biofilm and faecal-incident controls require clearer integration with the residual-focused framework. A compliant routine residual cannot be represented as proof of rapid control for every pathogen or contamination event. The standard should state when filtration, secondary treatment, closure, incident-response procedures or other controls are required.

### 8.7 PHMB and peroxide references

Any PHMB or peroxide reference should be reconciled with current APVMA registration and label status, APVMA's 2020 scientific findings and the evidence supporting the particular system. The standard should not imply sanitiser status merely because a chemical or product has historic industry use.

## 9. Proposed technical changes

| Issue | Proposed change | Verification criterion |
|---|---|---|
| Table 3.1.4 | Correct and complete the table; identify all microbiological criteria and its relationship to primary and supplementary pathways. | A standards user can determine the normative outcomes without relying on missing or duplicated content. |
| Alternative pathway | Create one coherent, outcome-based compliance route covering independent laboratory evidence, operating controls, safety and full-scale field validation. | The route is practically usable by any technology that proves the required outcomes. |
| Evidence parity | Apply the same organisms, log reductions, contact times, safety margins and field evidence requirements to every primary sanitiser pathway. | The evidence register shows equivalent scrutiny or an evidence-based justification for any difference. |
| Chlorine comparator | Publish the bibliography and endpoint map supporting the preferred or deemed-to-satisfy residual framework. | Each claimed outcome is traceable to evidence matching the relevant conditions. |
| Cyanuric acid | Specify CYA-aware chlorine controls and pathogen-specific efficacy requirements across represented concentrations and pH. | Routine readings are not treated as equivalent to unstabilised clean-water exposure without evidence. |
| Multi-barrier systems | Assess the combined treatment system rather than excluding it by the label applied to one component. | Ionisation, oxidation, ultrasonics, UV, ozone and filtration are evaluated within the actual system configuration. |
| Pathogen and incident controls | Integrate Cryptosporidium, Giardia, biofilm and faecal-incident response with residual, filtration and secondary controls. | The standard states when routine residual compliance is insufficient and what additional controls apply. |
| PHMB / peroxide | Reconcile references with current APVMA status and identified independent efficacy evidence. | No chemical is implied to be a primary sanitiser without a current, auditable basis. |

## 10. Independent review and standards-development safeguards

The technical issues cross water microbiology, disinfection chemistry, aquatic engineering, public health and occupational hygiene. An evidence-based disposition requires expertise in each relevant discipline and a transparent record of how contrary evidence was treated.

| Discipline | Required review |
|---|---|
| Water microbiology | Organism selection, log-reduction endpoints, test validity, field translation and pathogen resistance. |
| Disinfection chemistry | HOCl/OCl- chemistry, cyanuric-acid equilibria, DPD interpretation, demand and by-products. |
| Aquatic engineering | Hydraulics, turnover, filtration, dead zones, monitoring and secondary treatment. |
| Occupational hygiene | Chemical handling, airborne contaminants, ventilation and worker exposure. |
| Standards governance | Committee balance, evidence trace, conflict management, public-comment disposition and net benefit. |

### Minimum review safeguards

Provide the complete technical submission and referenced evidence to CS-061 before ballot.
Use independent reviewers who are suitably qualified and are not commercially dependent on a preferred treatment pathway.
Record all assumptions, relied-on sources, unresolved evidence gaps and reasons for technology-specific treatment.
Publish an issue-by-issue disposition of Enviroswim's general, clause-specific and supplementary comments.
Reissue the draft for a meaningful further comment period if material tables, pathways or normative requirements are corrected.

## 11. Formal requests to Standards Australia

1. Confirm that this supplementary submission has been placed before Technical Committee CS-061 and will be considered with Enviroswim's existing public comments.
2. Correct and reissue DR AS 3633:2026 if Table 3.1.4 or related microbiological provisions are incomplete, duplicated or misplaced.
3. Apply a technology-neutral outcome and risk framework using the same independent laboratory, safety-margin and full-scale field evidence expectations for every primary sanitiser pathway.
4. Publish or identify the technical bibliography and endpoint evidence trace for chlorine, cyanuric acid, ionisation, multi-barrier systems, PHMB, Cryptosporidium, Giardia, biofilm and faecal-incident controls.
5. Identify the scientific and technical evidence supporting every technology-specific exclusion, restriction or deemed-to-satisfy provision.
6. Assess Enviroswim as the complete ES3 multi-barrier system, including ionisation, oxidation and ultrasonics, rather than as standalone ionisation.
7. Obtain independent review by suitably qualified water-microbiology, disinfection-chemistry, aquatic-engineering and occupational-hygiene experts who are not commercially dependent on the preferred treatment pathway.
8. Disclose committee balance and conflict-management processes to the extent permitted, and preserve the project, ballot, comment and correspondence record.
9. Respond to each Enviroswim technical proposition with reasons directed to the evidence, rather than a generic statement of consensus or process.
10. Provide a further meaningful public-comment opportunity if the committee makes material changes to the alternative pathway, microbiological tables or technology-specific requirements.

**REQUESTED DISPOSITION**
For each proposed change, identify whether it is accepted, accepted with modification or rejected; set out the resulting clause wording or action; identify the evidence relied on; and give concise technical reasons.

## APPENDIX A Referenced evidence schedule

| ID | Evidence | Relevance |
|---|---|---|
| A1 | APVMA - Demonstrating efficacy of pool and spa sanitisers | Comparator statement, organisms, endpoints, laboratory and field expectations. |
| A2 | APVMA - Listed chemical products and relevant product standard | Class or conformity pathway and evidentiary basis. |
| A3 | FOI G11233/LEX3979 | Defined product-specific record search and evidentiary limits. |
| A4 | APVMA Gazette, 28 July 2020 | Published peroxide and polyhexanide findings and specified cancellations. |
| A5 | APVMA 2020-21 Annual Report and Federal Court record | Natural-justice outcome and limits of the court disposition. |
| A6 | APVMA 2022 pool and spa efficacy consultation | Proposed efficacy amendments and unresolved technical disposition. |
| E1 | Tweed Laboratory ES1 full signed report | Condition-specific chlorine and combined-system results. |
| E2 | Tweed Laboratory ES3 full signed report | Defined Enviroswim performance under specified test conditions. |
| E3 | NSF/ANSI 50 certification and underlying records | Independent certification scope and system evaluation history. |
| E4 | Dr Simon Toze - Evaluation of the Effectiveness and Issues of Different Swimming Pool Disinfection Processes | Independent scientific literature review dated 30 June 2023. |
| E5 | Dr Simon Toze - Scientific opinion on efficacy of the Enviroswim ES3 copper-silver ion disinfection system | Independent technical opinion dated 24 June 2023. |
| E6 | Representative public-pool and field records | Operating envelope, feasibility, maintenance and microbiological history. |
| S1 | DR AS 3633:2026 | Draft clauses, tables, appendices and alternative pathway. |
| S2 | Enviroswim clause-by-clause public comment | Detailed notice of drafting, efficacy, CYA and evidence-parity issues. |
| P1 | CDC and WHO pool-water guidance | Independent recognition of stabiliser, pathogen and operational variables. |

## APPENDIX B Primary sources


**1.** APVMA - Demonstrating efficacy of pool and spa sanitisers. Comparator statement, test organisms, contact times and evidence expectations.

**2.** APVMA - Listed chemical products. Listed-product conformity pathway.

**3.** APVMA - Efficacy and crop safety general guideline (Part 8). General approach to satisfying efficacy criteria.

**4.** APVMA Gazette, 28 July 2020. Published decisions and scientific findings concerning specified peroxide and polyhexanide products.

**5.** APVMA Annual Report 2020-21 - judicial decisions and outside review. Records the February 2021 consent orders on natural-justice grounds.

**6.** APVMA - 2022 consultation on efficacy of pool and spa chemicals (archived). Consultation dates and proposed amendments.

**7.** CDC - Home pool and hot-tub water treatment and testing. Free-chlorine advice with and without cyanuric acid and longer disinfection-time warning.

**8.** CDC - Operating public pools, hot tubs and splash pads. Operational public-pool risk controls.

**9.** WHO - Guidelines for safe recreational water environments, Volume 2. International pool-water guidance concerning hazards, disinfectants and cyanuric acid.

**10.** Standards Australia - Standards development process. Project, committee, public-comment, ballot and publication stages.

**11.** Standards Australia - What is a Standard?. Purpose and general status of standards.

**12.** US EPA - OCSPP 810.2600: Disinfectants and Sanitizers for Use in Water. Efficacy test guideline for products intended as swimming-pool sanitisers or disinfectants.

**13.** Council for the Model Aquatic Health Code - Other Sanitizers, Disinfectants and Chemical Systems. Hydrogen peroxide, oxidising uses and recreational-water disinfectant registration context.

**14.** Dr Simon Toze - Evaluation of the Effectiveness and Issues of Different Swimming Pool Disinfection Processes. Independent scientific literature review dated 30 June 2023.

**15.** Dr Simon Toze - Scientific opinion on efficacy of the Enviroswim ES3 copper-silver ion disinfection system. Independent technical opinion dated 24 June 2023.

**16.** Enviroswim - Accreditation and technical evidence. Public access to certification, Dr Toze reports and Tweed Laboratory material.


**CLOSING TECHNICAL POSITION**

The decisive standards question is whether every sanitiser representation and technology preference can be traced to evidence matching the claimed organisms, endpoints and actual operating conditions. DR AS 3633:2026 should provide an operable, transparent and equal route by which any complete treatment system can demonstrate those outcomes.