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FURTHER TECHNICAL ADDENDUM

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

Cyanuric acid and normative disinfection requirements

Prepared for	Standards Australia public comment process - Technical Committee CS-061
Prepared by	Watertech Services International Pty Ltd / Enviroswim
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Submission status	Focused addendum to Enviroswim comments lodged 19-31 August 2026

REQUESTED DISPOSITION **Amend the normative provisions so that stabilised chlorine is assessed under a cyanuric-acid-aware, organism-specific performance rule. A measured free available chlorine residual alone should not be treated as proof of equivalent disinfection efficacy when cyanuric acid is present.**

1. Purpose and scope

This focused addendum supplements, and should be linked to, Enviroswim's three earlier public-comment portal submissions. It does not repeat the full evidence-parity case. It addresses one issue requiring clearer normative treatment: published research demonstrates that cyanuric acid (CYA) materially changes chlorine disinfection performance, yet DR AS 3633:2026 does not convert that acknowledged effect into a complete normative performance requirement.

CYA is an operationally material condition in Australian outdoor chlorinated pools. The draft expressly permits and regulates CYA use, while Australian public-health guidance prescribes CYA-specific operating limits and contamination-response controls.

2. Published science supporting a CYA-specific rule

The effect is established by controlled, peer-reviewed research. Shields et al. (2009) tested Cryptosporidium parvum under swimming-pool hyperchlorination conditions. With 20 mg/L free chlorine and 50 mg/L CYA, oocyst viability fell by only 0.70 log10 after 10 hours, compared with a 3.7 log10 reduction without CYA. Lowering pH or doubling the free-chlorine residual still did not achieve the required 3 log10 reduction under the tested CYA condition.

Murphy et al. (2015) then demonstrated a strong CYA concentration effect. At 20 mg/L free chlorine, estimated 3 log10 CT values were 17,800 and 31,500 mg.min/L with 8 and 16 mg/L CYA respectively. At 48 mg/L CYA, the estimated CT for only a 1 log10 reduction was 76,500 mg.min/L. These results show why a fixed free-chlorine residual cannot be assumed to represent the same disinfection outcome across the draft's permitted 5-50 mg/L CYA range.

3. What the draft acknowledges - and what remains missing

DR AS 3633:2026 already recognises the central chemistry:

Draft provision	What the draft acknowledges	Remaining normative gap
Clause 3.1.1	Defines minimum efficacy as 1.0 ppm free available chlorine.	A concentration is an operating control, not an organism-specific efficacy endpoint.
Clause 3.1.2 and Table 3.1.2(B)	Prohibits CYA indoors because it reduces chlorine effectiveness; permits 5-50 mg/L outdoors and warns against 100 mg/L or more.	No validated relationship is given across the permitted range linking free chlorine, CYA, organism, temperature and contact time.
Appendix B.3.2	States stabilised chlorine is less effective and requires a higher free-chlorine residual.	The statement is informative; the normative table does not demonstrate equivalent microbial performance.
Appendix D.2.3	States that at 30-50 mg/L CYA, the hypochlorous-acid fraction may be of the order of 1% of measured free chlorine.	The draft does not translate this major change in immediately active chlorine into a normative CYA-aware performance rule.
Appendix D.2.6	Recognises organism-specific CT and that normal	No CYA-specific contamination-response threshold or CT

chlorine residuals do not control Cryptosporidium; cites about 15,300 mg.min/L without a stabiliser-specific protocol.	requirement is stated.

This is not a minor drafting issue. DPD-based free-chlorine testing includes cyanurate-bound available chlorine as well as hypochlorous acid and hypochlorite ion when CYA is present. The draft's own Appendix D states that, at 30-50 mg/L CYA, the immediately active hypochlorous-acid fraction may be of the order of 1% of measured free chlorine. A fixed residual therefore cannot, by itself, establish an equivalent organism-specific outcome across the permitted CYA range.

4. Australian public-health controls show why the gap is material

- NSW Health explains that increasing CYA reduces chlorine disinfection effectiveness and oxidation-reduction potential; it prescribes a maximum of 50 mg/L and identifies 30 mg/L as the optimum operating level for public pools.
- For a diarrhoeal incident in a public pool using CYA, NSW Health requires CYA to be reduced to no more than 15 mg/L before treatment with unstabilised chlorine and applies a CT of 31,500 mg.min/L (for example, 20 mg/L for 28 hours).
- For formed stool or vomit, NSW Health prescribes higher chlorine and longer contact where CYA is present (for example, at pH 7.6 or below: 3 mg/L for 50 minutes with CYA, compared with 2 mg/L for 25 minutes without CYA).
- CDC guidance likewise distinguishes pools using CYA and cautions that published chlorine kill times are longer when CYA is present.

These controls demonstrate that the effect is operationally consequential, not merely explanatory chemistry. A national standard should not permit a broad CYA operating range while omitting the CYA-specific performance and contamination-response rules needed to interpret that range safely.

5. Exact amendments requested

1. **Normative CYA-aware performance relationship.** Where CYA or a stabilised chlorine compound is used, require the minimum disinfectant condition to be expressed through independently validated, organism-specific performance across the declared operating range, including free chlorine, CYA, pH, temperature and contact time.
2. **Do not equate residual with efficacy.** Revise Clause 3.1.1 so that 1.0 ppm free available chlorine is not described as 'minimum efficacy'. Define efficacy by a measurable microbial endpoint and use residual concentration as one control variable.
3. **CYA-specific incident response.** Insert normative requirements for faecal/vomit contamination in CYA pools, including when CYA must first be reduced, the applicable CT target, pool closure, verification and return-to-service criteria.
4. **Evidence trace.** Publish the independent evidence supporting the 5-50 mg/L operating range and the minimum free-chlorine values under sunlight, bather load and organic demand, with organism, log reduction, test conditions and limitations identified.
5. **Equivalent proof rule.** Apply the same claim-specific independent laboratory and representative field-evidence requirements to conventional stabilised-chlorine pathways and to alternatives. Registration, historical use and manufacturer literature should not substitute for proof of the complete claimed outcome.
6. **Issue-by-issue disposition.** Record whether each requested amendment is accepted, modified or rejected, and identify the technical evidence relied upon for the decision.

PROPOSED NORMATIVE PRINCIPLE Where cyanuric acid or stabilised chlorine is used, compliance shall require independently validated evidence that the specified free-chlorine and CYA operating envelope achieves the required organism-specific disinfection outcome under the stated pH, temperature, contact-time, hydraulic and organic-load conditions. A free-chlorine residual reading alone shall not constitute evidence of equivalent efficacy.

6. Relationship to Enviroswim's existing public-comment record

This addendum should be linked to Enviroswim's existing DR AS 3633:2026 public-comment record: the Clause-by-Clause Public Comment Submission dated 19 August 2026, the Comparative Risk Assessment Public Submission dated 21 August 2026, and the Further Public Comment dated 31 August 2026. It also builds on the Supplementary Technical Submission dated 23 August 2026, which was circulated directly to Standards Australia as supporting material. This addendum is a focused refinement of the previously raised evidence-parity issue, not a replacement or resubmission of the full evidence package.

Sources

1. Standards Australia, DR AS 3633:2026, Project MC-000342-01, particularly Clauses 3.1.1 and 3.1.2, Table 3.1.2(B), Appendices B.3 and D.2.3-D.2.6.
2. Shields, J.M. et al. (2009), The effect of cyanuric acid on the disinfection rate of Cryptosporidium parvum in 20-ppm free chlorine, Journal of Water and Health 7(1):109-114, doi:10.2166/wh.2009.008.
3. Murphy, J.L. et al. (2015), Effect of Cyanuric Acid on the Inactivation of Cryptosporidium parvum under Hyperchlorination Conditions, Environmental Science & Technology 49(12):7348-7355, doi:10.1021/acs.est.5b00962.
4. NSW Health, Stabiliser (cyanurate) use in outdoor swimming pools.
5. NSW Health, Diarrhoeal incident response protocol for public swimming pools that use chlorine with cyanuric acid.
6. NSW Health, Formed stool and vomit contamination response protocol for public swimming pools and spa pools.
7. US Centers for Disease Control and Prevention, Home Pool and Hot Tub Water Treatment and Testing.
8. US Centers for Disease Control and Prevention, 2024 Model Aquatic Health Code (5th edition), definitions of DPD Free Chlorine and cyanurate-bound available chlorine, and related CYA provisions.

END OF FURTHER TECHNICAL ADDENDUM