

FSGR Solutions Intake Form – WATER QUALITY TESTING SPECIFICATION

ANNEX A — WATER QUALITY TESTING AND ACCEPTANCE SPECIFICATION (Applicable to HOGEN 530 Lagoon Treatment System)

1. Purpose and Scope

This annex defines the mandatory testing protocol for lagoon water purification systems employing the HOGEN 530 platform. It establishes legally binding water-quality acceptance limits for treated effluent measured immediately at the outlet of each operating unit (“Processed Water”). Lagoon-wide sampling is performed for trend validation only and does not affect contractual acceptance.

2. Sampling Requirements

2.1 Locations

- P1 – Processed Water: Outlet port of each operational unit, before re-entry to lagoon.
- L1 – Near-Shore Lagoon Sample (10 m from discharge).
- L2 – Mid-Lagoon Sample (central reference point).

2.2 Frequency

- Commissioning phase: Daily for 30 days.
- Routine operation: Weekly.
- Lagoon validation (L1 / L2): Weekly for 12 weeks, then monthly.

2.3 Sampling Control

All samples shall be taken by a qualified technician under chain-of-custody (COC) control and analyzed by an ISO/IEC 17025- or NELAP-accredited laboratory. Field duplicates (1 per 10 samples), trip blanks (for VOC/PFAS), and equipment blanks are required.

3. Legally Defined Acceptance Criteria (Processed Water at P1)

Parameter Acceptance Limit Reference Method (EPA/SM) E. coli < 100 CFU/100 mL (or ND)

EPA 1603 / SM 9222 D BOD₅ ≤ 10 mg/L EPA 405.1 COD ≤ 30 mg/L EPA 410.4 Total Suspended

Solids (TSS) ≤ 10 mg/L EPA 160.2 Turbidity ≤ 5 NTU EPA 180.1 Oil & Grease (HEM) ≤ 5 mg/L

EPA 1664 B pH 6.5 – 8.5 (S.U.) Field Meter

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Ammonia-N (NH₃-N) ≤ 1 mg/L EPA 350.1 Nitrate + Nitrite-N ≤ 3 mg/L EPA

353.2 Total Kjeldahl Nitrogen (TKN) ≤ 3 mg/L EPA 351.2 Total Phosphorus

(as P) ≤ 1.0 mg/L EPA 365.1

Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn) As ≤10 µg/L, Cd ≤1, Cr ≤50, ≤20, Zn ≤3000 µg/L
Cu ≤1000, Pb ≤5, Hg ≤1, Ni EPA 200.8 (ICP-MS)

Semi-Volatile Organics (PAHs / SVOCs)
ND at MDL EPA 524.2 / 8260 ND at MDL

PFAS Compounds PFOA ≤4 ng/L; PFOS
≤4 ng/L; others ≤10 ng/L each
EPA 537.1 + 533
EPA 8270 / 610

Volatile Organics (BTEX / Chlorinated
solvents)

All results must simultaneously meet the above limits for a batch to be declared “Compliant.”

4. Preservation and Holding Times

Procedures shall follow 40 CFR Part 136 Table II.

Examples:

- E. coli: Sterile bottle, ≤ 6 °C, analyze ≤ 8 h.
- Metals: HNO₃ to pH < 2, ≤ 6 months (≤ 28 d for Hg).
- Oil & Grease: Glass bottle, H₂SO₄ pH < 2, ≤ 28 d.
- PFAS: HDPE/PP containers only, no fluoropolymer caps/tubing, analyze ≤ 14

d. 5. Quality Assurance / Quality Control

- Calibration R² ≥ 0.995 for instrument curves.
- Duplicate RPD ≤ 20 % (> 5× MDL) or ≤ 2× MDL absolute.
- Matrix spike recovery 70 – 130 %.
- Method blanks ND at MDL.
- Any QC failure → re-sampling within 72 h; two consecutive passes

required. 6. Reporting

Laboratory shall issue an electronic Certificate of Analysis (COA) for each sample set, including: • Sample ID, location, date/time, method, units, MDL/LOQ, QC results, and uncertainties. • Non-detects reported as “< MDL (value).”

- Deviations or flagged data fully explained.
- Signed by responsible analyst and QA officer.

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7. Decision Rule

Processed Water is deemed “Compliant” only if all analytes meet limits in Section 3. Any exceedance constitutes non-conformance requiring process review and repeat testing. Lagoon wide data serve for trend validation only.

8. Predictive Lagoon Verification (Model-Based)

Long-term lagoon quality is modeled as:

$$C(t) = C_p + (C_0 - C_p)e^{-Q/V(t-t_0)}$$

where C_p is post-treatment concentration, Q/V the turnover rate, and C_0 the initial lagoon level. Periodic L1/L2 sampling confirms model accuracy.

9. PFAS Handling and Contamination Control

No PTFE or fluoropolymer materials permitted in sampling path; use HDPE or polypropylene only. All PFAS samples shall be chilled and handled per EPA 533/537.1 guidance.

10. Amendment and Hierarchy

This Annex forms an integral part of the contract. If conflict arises with other documents, the numerical limits herein govern. Any regulatory update that imposes stricter limits automatically supersedes these values.

11. Signatures

Party	Authorized Signatory	Date
Supplier (FSGR LLC.)		
Client / Contracting Entity		