H2minusO® Technical Specification & Compliance Dossier

Third-Party Potable Water Certifications, Toxicology & Mechanical Endurance Summary GLOBAL MULTI-LAB VERIFIED

Manufacturer: Green4All Energy Solutions Inc. (U.S. EPA WaterSense Partner)
Product Line: H2minusO® Flow Management Devices & Water Valves
Accredited Testing Bodies: 7 Independent Laboratories Across 3 Continents
Wetted Materials: FDA Food-Grade POM-C & 302/304/18-8 Stainless Steel

1. EXECUTIVE COMPLIANCE OVERVIEW

H2minusO® inline flow management devices have undergone comprehensive independent laboratory testing, toxicological screening, factory quality audits, and mechanical endurance evaluations across North America, Europe, and Australia-Pacific. All wetted components are verified 100% lead-free (0.00% by XRF analysis) and certified safe for continuous potable drinking water service.

7 Labs	100,000+	507.6 PSI	0.00% Lead
ACCREDITED GLOBAL BODIES	PRESSURE CYCLES VERIFIED	MIN. BURST PRESSURE RATING	XRF SCREENED WETTED PARTS

2. ACCREDITED THIRD-PARTY CERTIFICATIONS & REGULATORY APPROVALS

Certifying Authority / Lab	Jurisdiction	Standard / Test Protocol	Verified Scope & Outcome
NSF International (Ann Arbor, MI)	United States & Canada	NSF/ANSI 61 & NSF/ANSI 372	Certified Drinking Water System Components (pH 5, 8, and 10 bracketing) and Lead-Free Compliance (≤0.25% threshold).
IAPMO R&T (Ontario, CA)	United States & Canada	NSF/ANSI/CAN 61 & 372; U.S. SDWA; CA AB1953	Independent North American plumbing code listing, ongoing manufacturing facility audits, and zero-lead verification.
WRAS (Water Regulations Advisory Scheme)	United Kingdom	UK Water Supply (Water Fittings) Regulations	Full WRAS Approved Product status confirming zero contamination, backflow safety, and material integrity in UK potable mains.
NSF Wales Ltd. (United Kingdom)	United Kingdom & Europe	BS 6920 (Suitability of Non-Metallic Products)	Passed organoleptic (taste/odor), appearance, aquatic microbial growth, cytotoxicity (non-cytotoxic), and metals extraction tests.
IAPMO R&T Oceana	Australia & New Zealand	WaterMark Level 1 (WMTS-103)	Certified under the Australian Building Codes Board (ABCB) WaterMark Certification Scheme for commercial/ municipal plumbing.
VIPAC Engineers & Scientists	Australia (NATA Accredited)	ATS 5200.103:2004 Mechanical & Hydrostatic	Passed 100,000+ pressure cycles (0–150 PSI), 304.6 PSI sustained hydrostatic hold, and 507.6 PSI minimum burst pressure.
ams Laboratories	Australia (NATA Accredited)	AS/NZS 4020 Potable Water Extraction	Verified zero adverse effect on water quality, taste, color, or microbiological growth under high-temperature extraction.

3. MECHANICAL ENDURANCE & HYDRAULIC PERFORMANCE RATINGS

Independent structural and cyclic fatigue testing conducted by NATA-accredited VIPAC Plumbing Products Laboratory confirms long-term mechanical durability under continuous commercial pressure fluctuations:

- **Cyclic Endurance Fatigue (ATS 5200.103):** Subjected to **100,000+ full pressure cycles** alternating between 0 PSI and 150 PSI with zero structural deformation, seal degradation, or external leakage.
- **Sustained Hydrostatic Pressure Rating:** Verified leak-free performance under continuous static pressure loads of **304.6 PSI (2,100 kPa)**.
- **Minimum Burst Pressure Threshold:** Tested to a minimum burst resistance of **507.6 PSI (3,500 kPa)**, providing a >3x safety margin above standard municipal operating pressures.
- **Dynamic Self-Adjusting Flow Stabilization:** Internal spring-loaded oscillating poppet automatically modulates to compress entrained air/gas bubbles and maintain a dense, laminar water column across peak and off-peak demand without manual recalibration.

4. MATERIAL COMPOSITION, TOXICOLOGY & ENVIRONMENTAL COMPLIANCE

Compliance Category	Applicable Standard / Regulation	Verified Material & Analytical Result
Wetted Polymer Components	FDA 21 CFR 177.2470; NSF/ANSI 61	Virgin food-grade Potable-Water Acetal Copolymer (POM-C); completely insoluble in water, odorless, tasteless, and resistant to chlorine/chloramine disinfection.
Wetted Metallic Components	ASTM A240 / A313 Food-Grade Stainless	Precision-formed AISI Type 302, Type 304, and 18-8 Austenitic Stainless Steel springs and structural retainers.
Zero-Lead Screening	NSF/ANSI 372; U.S. SDWA; CA AB1953	Independent X-Ray Fluorescence (XRF) spectroscopy confirms **0.00% lead** across 100% of wetted surfaces and internal assemblies.
Analytical Toxicology	ICP-MS Metals, VOCs, SVOCs & Formaldehyde	Non-detect / well below strict regulatory limits across pH 5, pH 8, and pH 10 aggressive water extraction profiles.
Cytotoxicity & Microbiology	UK BS 6920 & AS/NZS 4020	Verified non-cytotoxic to mammalian cell cultures; zero support for biofilm or coliform/pathogenic microbial proliferation.
Environmental & ESG Directives	EU RoHS 2 (2011/65/EU), REACH & EPA WaterSense	100% free of restricted heavy metals/phthalates under RoHS 2 and REACH; manufactured by an official **U.S. EPA WaterSense Partner**.

5. PERFORMANCE TESTING & INDEPENDENT FIELD VALIDATION

- **Clemson University Industrial Assessment Center (U.S. DOE Industrial Assessment Program — ARC 2.7142):** Conducted an independent university engineering assessment evaluating H2minusO's 6-inch XL Industrial flow management device. Using a conservative 10% baseline consumption reduction model on a high-volume industrial facility (38,700,400 gal/yr; $159,292/yr baseline spend), Clemson IAC validated **3,870,040 gallons/year** in water savings, **$15,929/year** in total cost savings, and a **2.3-month simple payback period** ($3,050 installed cost).
- **Unified Energy (a Tullett Prebon Company) & THG Energy Solutions, LLC (Independent Utility M&V Audit):** Performed a multi-site Measurement & Verification (M&V) audit collecting 14 to 24 months of historical utility billing records via signed customer Letters of Authorization (LOA) and dual-division verification within their proprietary Unified Data Management System (UDMS). Across audited commercial quick-service restaurant deployments, H2minusO delivered **6% to 13% reductions** in average daily water consumption against trailing 12-month baselines (and up to **34% to 61%** period-over-period drops), generating **$3,600 to $4,107 in projected annual utility savings per location**.