

SYSTEM OVERVIEW

The **Aqua-5000** is an industrial-grade, highly biosecure Recirculating Aquaculture System (RAS) engineered specifically for early-stage fingerling development and intensive cohort nursing. Optimized to function as a core node within the proprietary *Intelligent Aquaponics System (IAS)* framework, the Aqua-5000 balances robust mechanical water polishing, active biochemical filtration, and autonomous environmental monitoring to ensure maximum survival metrics and precise growth synchronization.

Key Operational Dynamics

The framework provides an ideal biome for intensive pairing, configured for a standard foundational colony of **1 male to 5 females** (1:5 broodstock ratio). This specialized hydrodynamic design stabilizes water columns, segregates suspended solids instantly, and features integrated multi-tier safety contingencies to protect highly sensitive fingerling populations.

INTEGRATED HARDWARE & LIFECYCLE ARCHITECTURE

Subsystem	Engineering Specifications & Capabilities
Biofiltration Array	Fluidized moving bed biofilter (MBBR) utilizing high-surface-area geometric media. Optimizes Nitrosomonas and Nitrobacter bacterial colonies to execute rapid conversion of Total Ammonia Nitrogen (TAN) into inert nitrates.
Solid Separator	Multi-stage mechanical swirl separator alongside a specialized low-velocity settling chamber. Rapidly isolates and evacuates dense biological particulate matters before mineralization occurs, preserving dissolved oxygen levels.
UV Sanitization Unit	High-output inline ultraviolet sterilization chamber delivering a precise germicidal dose ($>30,000 \text{ mJ/cm}^2$). Neutralizes waterborne pathogens, viral vectors, and unwanted single-celled algal blooms continuously.
Lighting & Photoperiod	Integrated overhead industrial LED arrays configured with a fully customizable smart controller. Features automated digital dimming to smoothly simulate dawn/dusk transitions, preventing fish shock.

SYSTEM CAPABILITIES

5,000
FINGERLINGS /
MO

1 : 5
BROODSTOCK
RATIO

TECHNICAL SPECIFICATIONS

Model Reference	AQUA-5000-N3
Target Output	5,000 fingerlings/mo
Recommended Colony	1 Male, 5 Females
Filtration Loops	Mechanical & Bio
UV Sterilization	Inline Germicidal
Control Parameters	pH, DO, Temp, Levels
Photoperiod Control	Integrated Schedule
Frame Construction	Structural Aluminum
Tank Material	Heavy-Duty Acrylic

INTEGRATION VECTOR

The Aqua-5000 is fully compatible with Ag Tech Manufacturing's full lineup of commercial systems, engineered specifically to seed high-density vertical frameworks:

- Intelligent Aquaponics System (IAS1200)
- Vertical Cultivation Towers (TS40 / TS60)
- Hatchery Systems (Aqua-60 Pre-seed Node)

DEPLOYMENT FRAMEWORK

Ag Tech Manufacturing delivers complete end-to-end support including

AUTONOMOUS MONITORING & AUTOMATION CONSOLE

Every Aqua-5000 infrastructure deployment features a dedicated centralized automation controller. Equipped with high-fidelity, marine-grade galvanic and optical probes, the processor polls system vitals continuously to manage automated feedback loops.

- **Real-Time Vitals Assessment:** Instant, unceasing telemetry tracking for **pH**, Dissolved Oxygen (**DO**), Temperature (**T_w**), and structural liquid levels.
- **Programmable Logic Control:** Triggers automated aeration pumps, fresh water top-offs, and localized inline heaters when metric boundaries are breached.
- **Telemetry & Export:** On-board graphical interface displays historical multi-day charts directly on-site, syncing with external smart-farm telemetry networks.

precision industrial **Manufacturing**, site-specific mechanical **Implementation**, and factory commercial **Sale** deployment warranties.