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By Armstrong Fluid Technology®

SYSTEM ENVELOPE FLUID MANAGEMENT STATION (SE-FMS) | FAQ

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1. GENERAL OVERVIEW & POSITIONING

Q1 What is SE-FMS?

A1 SE-FMS (System Envelope – Fluid Management Station) is a factory-built, modular pumping station with pump optimization control for HVAC hydronic systems. It integrates Tango pumps, headers, valves, controls, power distribution, and digital tools into a single, performance-validated system.

It is designed to replace field-built or loosely assembled pump systems with a predictable, repeatable, and digitally verified solution, from selection through commissioning and operation.

Key distinction: **SE-FMS is a system solution**, not a pump package.

Q2 What problem is SE-FMS actually solving?

A2 SE-FMS addresses four persistent problems in hydronic projects:

- Installation variability (quality depends on who built it)
- Commissioning uncertainty (design ≠ reality)
- Rising labor and coordination risk
- Lack of performance verification after handover

SE-FMS shifts risk out of the field and into factory-verified design, while keeping the system digitally connected over its lifecycle.

Q3 How is SE-FMS different from packaged pump skids or off-site assemblies?

A3 Most **packaged skids** are physical bundles.

SE-FMS is a digitally defined system.

TYPICAL PACKAGED SKID	SE-FMS
Assembled parts	Engineered system
Static selection	Performance envelope
Startup = tuning	Startup = validation through Wrench
No lifecycle link	Cloud-connected through Envelope CORE
One-off builds	Repeatable architecture

SE-FMS includes Performance Mapping, envelope-based controls, and digital verification, not just pre-assembled hardware.

Q4 Is SE-FMS replacing the BAS?

A4 No. SE-FMS integrates with the BAS using open protocols (BACnet, Modbus).

- BAS remains the supervisory layer
- SE-FMS handles stable, performance-map-based hydronic execution
- Envelope CORE adds performance verification and analytics

Think division of responsibility, not replacement.

2. PERFORMANCE MAPPING & ENVELOPE LOGIC

Q5 What is a **Performance Envelope** in SE-FMS?

A5 The Performance Envelope is the validated operating zone for a specific SE-FMS configuration, defined by:

- Flow
- Head
- Power
- Control limits
- Verified Tango pump data
- Factory testing boundaries

It defines where the system can operate safely, efficiently, and repeatedly, and not just a single duty point.

Q6 How is this different from a traditional pump curve?

A6 A pump curve shows what one pump can theoretically do.
A Performance Envelope shows what the system is allowed to do.

Key difference:

- Pump curves = component capability
- Envelope = system-level constraint and validation

ADEPT enforces this envelope during selection, and commissioning validates against the same limits.

Q7 Why does this matter to consultants and owners?

A7 Because it removes ambiguity:

- No guessing around turndown limits
- No hidden unstable zones
- No **it should work** assumptions

The same envelope governs:

- Design
- Selection
- Commissioning
- Operation

That alignment is rare in hydronics, and valuable.

3. DIGITAL ECOSYSTEM (CORE, WRENCH, ADEPT)

Q8 What digital tools are part of SE-FMS?

A8 SE-FMS is part of the Envelope Ecosystem, which includes:

- **ADEPT / AID:** selection, configuration, envelope enforcement
- **Wrench:** guided startup & commissioning (Bluetooth)
- **Envelope CORE:** provides cloud-based performance analysis, verification, alerts

Each tool supports a specific lifecycle phase. None are gimmicks.

Q9 What does Wrench actually do during commissioning?

A9 Wrench provides:

- Guided startup steps
- Rotation checks
- Parameter validation
- Envelope verification
- Digital commissioning reports

It does not automate commissioning decisions, but it standardizes and documents them, reducing variability and callbacks.

Q10 What does Envelope CORE do, and what does it not do?

A10 Envelope CORE:

- Monitors performance vs the validated envelope
- Flags drift, anomalies, and instability
- Extends warranty coverage and supports long-term lifecycle confidence

Envelope CORE does not:

- Replace BAS analytics
- Perform whole-building optimization
- Automatically rebalance the plant

It focuses on asset-level performance integrity, not enterprise BAS functions.

4. FACTORY-BUILT ARCHITECTURE

Q11 What configurations are available?

A11 SE-FMS is offered in three standardized configurations:

- **Simplex** – lowest cost, compact
- **Duplex** – redundancy and flexibility
- **Triplex** – mission-critical capacity and resilience

All configurations share:

- Tango 4322 / 4332 pumps
- DEPC or SE-F10.1 controls
- Victaulic grooved connections
- Wrench and CORE ecosystem compatibility

Q12 How is installation simplified compared to field-built systems?

Q12 SE-FMS arrives:

- Pre-wired
- Pre-piped
- Hydro-tested
- QA-validated

On site:

- No internal welding
- No internal wiring
- Modules join via Victaulic couplings
- Single power feed per module

This reduces site labor, coordination risk, and schedule exposure.

Q13 Is SE-FMS suitable for retrofit projects?

Q13 Yes, especially retrofits.

Benefits in retrofit:

- Smaller footprint (up to ~40–70% reduction)
- Modular shipping avoids oversize handling
- Reduced shutdown windows
- Faster commissioning

However, space, access, and electrical constraints must still be evaluated. SE-FMS does not eliminate poor site conditions, but it reduces their impact.

5. ENERGY, COST & SUSTAINABILITY CLAIMS

Q14 Does SE-FMS guarantee energy savings?

A14 No blanket guarantees.

Energy savings depend on:

- System type
- Load profile
- Operating hours
- Control strategy

SE-FMS enables savings through:

- Envelope-based sizing
- Sensorless parallel staging
- Reduced oversizing
- Stable part-load operation

Typical projects may see up to ~30% energy reduction, but this must be contextualized, not promised blindly.

Q15 Where do installed cost savings come from?

A15 Installed cost reduction comes from:

- Reduced site labor
- No internal field wiring
- No field header fabrication
- Faster commissioning
- Fewer rework cycles

Savings are real but vary by market and labor rates.

Q16 How does SE-FMS reduce embodied carbon?

A16 Through:

- Smaller footprint
- Reduced material mass
- Optimized pump sizing
- Fewer redundant components

Embodied carbon reductions of up to ~50% are achievable in many configurations versus traditional assemblies.

6. SPECIFICATION & COMPETITIVE POSITIONING

Q17 How should SE-FMS be specified?

A1 SE-FMS should be specified as a system, not as a pump skid.

Key spec language should reference:

- Performance Envelope
- Factory-assembled modules
- ADEPT-validated selection
- Envelope-based commissioning

Substitutions must demonstrate equivalent system-level performance validation, envelope enforcement, and commissioning alignment.

Q18 Can SE-FMS be **equaled** by competitors?

A18 Physically? Possibly.

Digitally and system-wise? Unlikely.

Most competitors lack:

- Envelope-based validation
- Integrated digital lifecycle tools
- Proven sensorless parallel logic
- Tight integration between selection and commissioning

Equal claims should be evaluated carefully.

Q19 What should sales avoid saying?

A19 Avoid:

- **It optimizes the whole building**
- **It guarantees 30% savings**
- **It replaces the BAS**
- **It commissions itself**

Say instead:

- **It enforces and verifies system performance**
- **It reduces risk and variability**
- **It aligns design, startup, and operation**

7. SYSTEM COVERAGE, APPLICATIONS & PRACTICAL QUESTIONS

Q20 What hydraulic range does SE-FMS cover?

A20 SE-FMS is designed to cover the majority of commercial and institutional HVAC hydronic pumping needs, including:

- **Flow:** up to ~5,000 USgpm
- **Head:** up to ~200 ft
- **Pump range:** Tango 4322 and 4332 (5–40 HP per module)
- **Configurations:** Simplex, Duplex, Triplex
- **Pipe sizes:** up to 14" grooved connections

Coverage is enforced through Performance Mapping, meaning only hydraulically valid configurations can be selected.

This is intentional: SE-FMS prioritizes stable, repeatable system behavior over theoretical edge cases.

Q21 What types of hydronic systems is SE-FMS intended for?

A21 SE-FMS is suitable for:

- Chilled water primary and secondary loops
- Heating hot water systems
- Heat pump distribution systems
- Variable-flow HVAC applications
- Retrofit and new construction projects

It is optimized for closed-loop HVAC systems where predictable flow behavior and part-load efficiency matter. Applications outside this scope require review.

Q22 Is SE-FMS suitable for mission-critical or high-reliability applications?

A22 Yes. All configuration and specifically, Duplex and Triplex configurations support:

- Redundancy needs
- Parallel load sharing
- Envelope-governed staging logic

This makes SE-FMS appropriate for:

- Healthcare
- Data centers (non-process)
- District energy substations
- Institutional buildings

Reliability is achieved through architecture and control logic, not oversized hardware.

Q23 How does SE-FMS handle redundancy and turndown?

A23 Redundancy and turndown are defined during selection, not left to field tuning.

- ADEPT enforces valid redundancy configurations
- Performance Maps define acceptable turndown ranges
- Control logic stages pumps within envelope limits

This prevents:

- Unstable low-load operation
- Excessive cycling
- Field **trial-and-error** tuning

Q24 Can SE-FMS be integrated into an existing BAS strategy?

A24 Yes.

SE-FMS communicates via:

- BACnet
- Modbus

The BAS retains supervisory control, while SE-FMS executes local, envelope-based hydronic control. This division improves system stability and reduces BAS complexity.

Q25 What does SE-FMS replace in a traditional design?

A25 SE-FMS replaces:

- Loose pumps
- Field-fabricated headers
- Field-wired pump panels
- Ad-hoc staging logic
- Manual balancing assumptions

It does not replace:

- The BAS
- Plant-level sequencing
- Non-pumping equipment

This clarity avoids scope confusion in specs and bids.

Q26 Why wouldn't a consultant just design this themselves?

A26 They can, but then they own:

- Coordination risk
- Installation variability
- Commissioning outcomes
- Performance drift

SE-FMS shifts those risks to a factory-validated, repeatable system, while still preserving engineering intent. That's why consultants accept it when it's specified correctly.

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