

Plan Ahead to Keep Custom Filtration System Projects on Schedule

Custom-designed water filtration systems are often required to ensure reliability and regulatory compliance. Project teams can prevent unnecessary delays and bottlenecks by knowing which factors could affect the timeline.

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WHEN WATER TREATMENT and management are central to a facility's operations, filtration is no small matter. Municipal water and wastewater plants, industrial and manufacturing facilities, agricultural irrigation systems, and stormwater management all depend

on sophisticated filtration to maintain uptime and adhere to federal and state compliance. Because of the potential for plant-specific needs and conditions, such customized systems need detailed planning with significantly long lead times.

There's no off-the-shelf filtration system for these kinds of organizations because

effective filtration depends on many variables. Factors such as performance expectations, flow rates, solids loading, water chemistry, relevant regulations, and footprint constraints all make every application unique.

CAUSES OF LONG LEAD TIMES

Primary reasons for long lead times for custom filtration systems include the following:

- Design engineering
- Component and material sourcing
- Fabrication and assembly
- Controls integration
- Regulatory requirements
- Shipping
- Site preparation
- Installation
- Commissioning

Understanding how each of these factors contributes to overall project duration can help project managers better anticipate delays and take practical steps to prevent them.

Design Engineering. The lead-time clock starts ticking with design engineering and system configuration. Custom filtration systems must be precisely sized to match site-specific loading rates, peak flows,



Photo 1. Filtration projects frequently require extensive engineering review, material procurement, fabrication, and regulatory approvals before equipment reaches the jobsite.

Advanced filtration systems support continuous treatment operations and are tailored to meet site-specific performance and design requirements.



Yardney Water Filtration Systems

backwash volumes, vessel diameters, and media types (photo 1). Each application calls for certain integration requirements such as aligning with existing supervisory control and data acquisition system architectures, supporting custom automation and safety interlocks, following nonstandard layouts, and operating under highly variable seasonal conditions. Engineering teams typically conduct detailed hydraulic modeling to validate flow and pressure assumptions as well as structural reviews to confirm vessel design under operating and backwash conditions. They also develop customized programmable logic controllers tailored to an owner's control philosophy. There's no doubt that these steps are essential; nonetheless, they introduce sequential reviews, iterations, and approvals that extend project timelines.

Component and Material Sourcing.

Many US-based municipal, industrial, and agricultural projects specify domestic valves, actuators, control panels, and pressure vessels to meet regulatory, funding, or quality requirements, which can

narrow the supplier pool and affect procurement timelines. Availability of critical materials (e.g., stainless steel, specialized coatings, proprietary filter media) can fluctuate with broader supply-chain conditions, creating uncertainty even after designs are finalized. Lead times are further extended when components must be manufactured to a project's specifications rather than being pulled from existing inventory, particularly for large-diameter vessels or custom valve assemblies. Delays in sourcing can have ripple effects on fabrication and assembly schedules.

Fabrication and Assembly. Custom filtration systems are built—not just assembled. Pressure vessels, skids, manifolds, and backwash piping must be fabricated to tight tolerances to ensure hydraulic performance, structural integrity, and long-term reliability. This work requires skilled labor, certified welding procedures, and careful sequencing, especially when multiple materials or large-diameter components are involved. Quality assurance such as pressure

testing, nondestructive weld testing, and detailed dimensional inspections is necessary for code compliance, specifications, and safety requirements before equipment can ship. Although these steps rarely create surprises, they can't be rushed without compromising quality or jeopardizing regulatory compliance.

Controls Integration. This is a factor particularly for municipal and highly regulated facilities. Control systems must be configured to match existing automation standards, communication protocols, alarm philosophies, and operational safety requirements. Tailored sequencing for filtration, backwash, and fault conditions requires close coordination between the equipment manufacturer, the owner, and the system integrator. Once programming is complete, factory acceptance testing is typically required to verify functionality, interlocks, and alarm responses before shipment.

Regulatory Requirements. Along the way, regulatory and documentation requirements include detailed submittals, with the

Asset Management

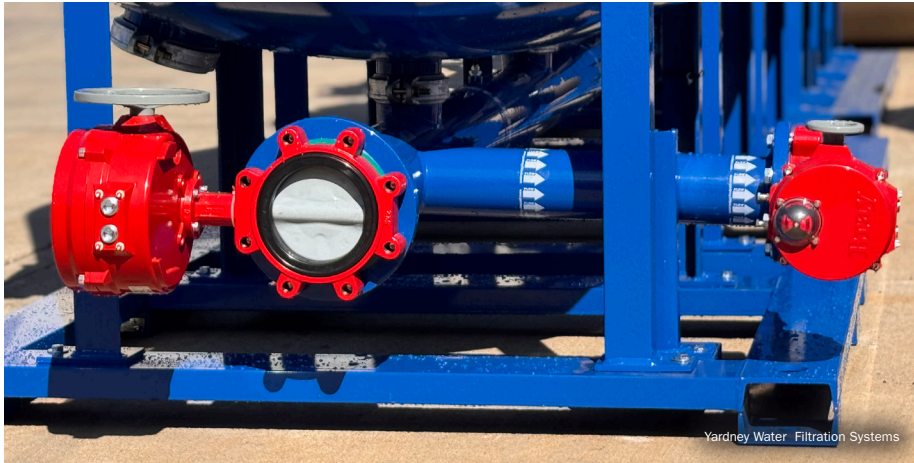


Photo 2. Confirming utility connections, control-system requirements, and physical tie-in points early can help keep filtration projects on schedule.

exact scope varying by jurisdiction. These submittals are typically subject to formal review cycles by city engineers, state environmental agencies, or internal facility safety departments, each with its own timelines and revision processes. In many cases, comments are addressed sequentially rather than in parallel, and this process can take weeks or even months to secure approvals.

Final Steps. Shipping, site preparation, installation, and commissioning add the final layers of lead time before a custom filtration system can go on-line. Even after fabrication and quality assurance are complete, logistics must be carefully coordinated to accommodate the specialized transportation of oversized vessels, skids, and manifolds. At the site, foundation work, utility connections, and integration with existing piping and electrical systems must be completed before installation can begin. Assembly and field hookups are typically followed by thorough commissioning, which includes system flushing, functional testing, calibration of instruments, and operator training. Each step depends on sequential approvals, skilled labor, and sometimes weather or site conditions, all of which can extend schedules.

STRATEGIES TO MINIMIZE DELAYS

Immediate turnaround of a custom

filtration system isn't necessarily a feasible goal. Still, it's possible to make long lead times shorter and less stressful for project managers.

Start Planning Early. Engaging filtration system providers during preliminary design allows design assumptions, flow data, and regulatory constraints to be aligned before drawings are finalized. Providing complete and accurate water quality information (e.g., suspended solids levels, flow variability, influent and effluent targets, site limitations) helps avoid late-stage redesigns that can affect engineering, sourcing, and fabrication schedules.

Be Clear. Identify integration requirements early in the process (photo 2):

- Electrical service specifications
- Control system preferences
- Communication protocols
- Physical tie-in points
- Installation access

Project schedules should account for approval timelines, especially for municipal projects for which regulatory and engineering reviews often require multiple iterations. Building this review time into the schedule reduces pressure later and helps avoid unrealistic delivery expectations.

Prepare Submittals and Respond Quickly. Regulatory delays can be minimized through early preparation of

required documentation such as piping and instrumentation diagrams, stamped drawings, specifications, and media certifications. The completeness and clarity of these submittals figure into approval timelines because gaps can trigger resubmittals that delay fabrication and delivery. Just as important is prompt response to submittal comments and technical questions. Slow communication between owners, engineers, manufacturers, and integrators is a common and avoidable source of delay.

Consider Simpler Alternatives. It's always worth evaluating whether semi-standard configurations for some components, such as common vessel sizes or proven control architectures, can meet performance requirements. This approach can sometimes have a measurable effect on lead time reduction.

Plan for Adjustments. Finally, consider accommodating potential flow increases or tighter regulations, which can reduce the likelihood of costly and time-sensitive retrofits later.

KEEPING LEAD TIMES IN CHECK

With careful, deliberate planning, lead times for projects can be controlled. Custom filtration equipment is inherently complex, combining detailed engineering, specialized components, and rigorous regulatory review. These systems are designed to solve site-specific challenges, which means lead times are driven as much by planning and coordination as they are by actual component fabrication. Projects that account for this reality from the outset are far better positioned to succeed than those that don't. Realistic schedules, early engagement with system providers, and the timely exchange of complete technical and regulatory information are effective tools for managing timelines and avoiding preventable delays, ultimately ensuring systems are delivered, installed, and operational on a schedule that satisfies stakeholder expectations. 