



Industrial Water and Filtration Systems

Sigma Design Company has deep experience in design, engineering and manufacturing systems for industrial water and filtration.

Since 1999, our work within this industry has encompassed filtration device and media selection for solid/liquid separation, flow analysis and modeling, industrial filtration systems and water treatment systems, filter component design and commercialization, filter housings (ASME VIII), and more.

Our experienced filtration engineers have expertise in filtration separation solutions and also understand process limitations. Using advanced design tools and 3D visualization of fluid flow profiles, we are able to uncover and remedy non-obvious, counter-intuitive design flaws.

SERVICES

Sigma's comprehensive services encompass the entire product development cycle. They include design and advanced engineering, design and cost analysis, prototyping, photo-realistic simulation, electronics, low volume (100s) highly specialized manufacturing and testing, and larger manufacturing runs plus build to print services.

We bring to our clients decades of collective design, engineering and manufacturing knowledge and experience that helps streamline the process. All work is done in our state-of-the-art 20,000 square foot Technology Commercialization and New Product Manufacturing Center in New Jersey.

We employ advanced engineering, simulation and rapid prototyping technology to speed time to market while helping clients reduce risks and costs associated with product development. In addition to engineering new solutions, our team also evaluates products and systems under development, using advanced engineering analysis including Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD), structural stress, deflection, fluid flow and heat transfer simulation. These computer-aided engineering (CAE) tools allow us to uncover and detect non-obvious, counter-intuitive design flaws early in the process.

CASE STUDY

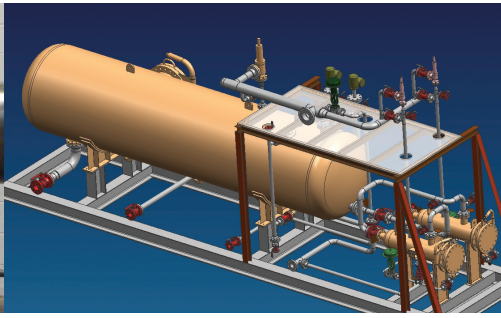
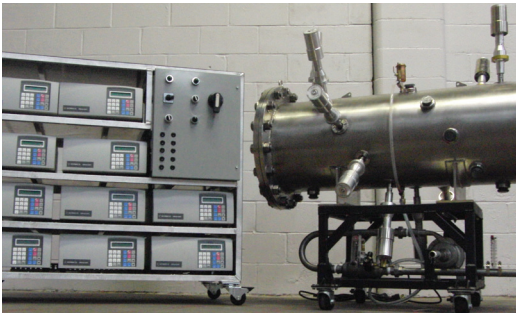
Turnkey Water Treatment System for Water Recovery and Reuse



The HSWR System is a turnkey high solids filtration system that can receive high solids loaded process water with TSS greater than 15,000 ppm. Depending on the process, the HSWR using a Spiral Water 20 micron automatic filter significantly reduces the TSS and BOD 50%-75%. The system is controlled and monitored by a single control panel with an enhanced user interface HMI. The HSWR System utilizes a combination of high solids separation equipment matched with standard T-1000 filters from Spiral Water Technologies (also developed by SIGMA for Spiral Water). The Spiral Water filters high solids application enables end-users to obtain TSS solids removal below 75um.

Services Performed:

Concept development, water purification system design, testing protocol, controls, sensors, electronics, complete fabrication including all controls, PLC/HMI, pipe and filter vessel welding, machining, validation and testing.



PROVEN RESULTS

Since 1999, Sigma Design Company has been trusted by hundreds of customers to transform smart ideas into successful products and machinery. Since then, we have delivered more than 1,000 successful design and design/build projects, on time and on budget, and saving our clients hundreds of thousands of dollars in manufacturing. We employ advanced engineering, simulation and rapid prototyping technology to speed time to market while helping clients reduce risks and costs associated with product development.

Our experience in industrial filtration and water treatment includes:

- Design/build arsenic removal pump and treat system – MEI
- Design/build in-situ water analysis system – Well Tech Environmental
- Design/build pilot automatic filtration system on CVNX Desalination Systems – U.S. Navy
- Design/build complete automatic filtration and separation product line – Spiral Water Technologies
- Designed Hoover and Parker Dam cooling water filters for zebra mussel control – U.S. Bureau of Reclamation

CASE STUDIES

Mobile Filtration Laboratory

To support the development of improved U.S. Navy shipboard desalination systems, several filtration devices were selected for evaluation and testing. Sigma Design Company developed a portable filtration test system needed to complete the evaluation., it included a contaminate injection system, contaminate mixing tank, seawater supply pump, filtrate headers with baseline filters for comparison, backwash/underflow headers, backwash/underflow cleanup filters, all piping, sample lines, valves, hoses, couplings, filtration component foundations, flow meters, and thermometers.



Phase 1 of the testing evaluated and ranked the filtration components in a controlled laboratory environment. Phase 2 was an endurance-type test performed on filtration components at selected coastal sites. Sigma then provided the test results to the U.S. Navy, furnishing essential data for the program.

Services Performed: Water purification system development, testing protocol, detail design, controls, sensors, electronics, welding services, machining and fabrication, validation and testing.

An Environmentally Sustainable Solution

Working with the University of Maryland's Center for Environmental Sciences, Sigma developed a new, and now patented centrifugal separator and ultraviolet disinfection system. The separator removes invasive aquatic species from ships' ballast water, therefore preventing the introduction of destructive organisms into US waters. The system was developed and manufactured in NJ and installed aboard the M/V CAPE MAY at South Locust Point Marine Terminal in Baltimore, MD.



Services Performed: Product development services, concepts, FEA analysis, CFD flow simulation, fabrication design, electronics design, PLC programming, pilot & test.