



**Graver Technologies**



**Filtration | Ion Exchange | Adsorption | Solutions**



**Graver Technologies**

**Graver Technologies, LLC** develops and manufactures an array of high performance products for critical trace contaminant removal in a variety of industrial applications. These include power generation & condensate polishing, precious metal catalyst recovery in pharmaceutical API manufacturing, liquid sugar polishing, air, gas and specialty environmental filtration as well as high purity liquid process and cross flow filtration. Graver Technologies is a member company of The Marmon Group (a Berkshire Hathaway Company), an international corporation providing products, services and solutions around the world.





# Filtration | Ion Exchange | Adsorption | Solutions

## Problem Solvers in Diverse Industries

Graver Technologies offers a broad selection of high performance specialty ion exchange resins and services, proprietary adsorbents, and membrane filtration for the most demanding liquid and process application environments. Graver is a leading supplier of filtration media and products to manufacturers of turbines, compressors, medical devices, and consumer and industrial vacuums.

Graver's breadth of technologies, application expertise and depth of our scientific and analytical resources, are often called upon to solve our customers' most challenging problems.

Graver Technologies applications and served industries include:

- Process Water
- Power Generation
- Food & Beverage
- Drinking Water
- Pharmaceutical
- Chemical/Petrochemical

## Registrations and Certifications

Graver has a number of applicable registrations and certifications to ensure we develop and manufacture products to meet the most rigorous global standards, including:

- ISO 9001
- 10CFR50 App.B- Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
- ASME Section VIII, Division I
- PED 97/23/EC
- NSF International

## Global Presence

Exporting on average more than 25% of our products, Graver Technologies is recognized worldwide. Our global presence extends from North and South America, across Europe and into Asia—including the Pacific Rim, Japan, and Australia. We are headquartered in Glasgow, Delaware, with additional manufacturing and marketing facilities in Newark, New Jersey; Honeoye Falls, New York; Singapore, and Shanghai, China.

## Resources

Graver Technologies LLC is part of the Marmon Group, with annual revenues of more than \$7 billion, and a Berkshire Hathaway Company. Around the corner or around the world, Graver Technologies is an innovative technology/application company with the technical resources and financial strength that make us the perfect partner for your business.



# PRODUCTS

## ION EXCHANGE PRODUCTS

Graver Technologies designs, processes and manufactures a wide range of ion exchange products. While these products and services are focused on the power generation market, they are also used for petrochemicals, pharmaceuticals and industrial waters. The primary applications are for trace contaminant removal in high purity applications including power plant condensate (both nuclear & fossil), electronics, pharmaceuticals, drinking water, other power plant streams, and process waters.

Graver Technologies supplies the following product and service categories to these markets: GRAVEX<sup>®</sup> bead resins are used for all ion exchange resin applications; POWDEX<sup>®</sup> and ECODEX<sup>®</sup>, powdered resin products complement the AEGIS<sup>®</sup> Filter product line, forming a synergistic, precoat filter demineralizer system; RADEX<sup>®</sup> bead and powdered products selectively remove radionuclides from liquid radwaste; NANODEX<sup>™</sup> ion exchange filter papers are used for laboratory sampling and analytical testing; Toll Resin Processing and Laboratory Services are offered to all customers; Toll process regeneration and rinsing services attain the highest purity levels for all applications, including Nuclear and Ultra Pure Water (UPW) grade resins.

## ADSORBENT PRODUCTS

### ECOSORB<sup>®</sup> Multi-Functional Media and Cartridges

ECOSORB products are multi-functional purification media that combine adsorption, filtration and ion exchange for innovative process solutions. ECOSORB products are used to remove a wide range of organic and inorganic contaminants from aqueous and solvent based fluids in the food and beverage, pharmaceutical, metal finishing and power generation industries.

ECOSORB E-PAK<sup>®</sup> products are one of Graver's newest innovations. E-PAK cartridges provide high performance adsorption processing for catalyst recovery and purification in active pharmaceutical ingredients (API) and intermediates. Graver Technologies maintains a well-staffed research facility that can provide technical assistance and tailored formulations for unique process requirements.

## METSORB<sup>®</sup>

METSORB HMRG is a highly effective granular adsorbent that removes arsenic III & V, and a wide variety of heavy metals including Lead, Cadmium, Copper, Antimony, and Zinc from aqueous sources. Our METSORB adsorbent powders, including HMRP, STP and STP-Hybrid provide a wide range of heavy metal removal capability, including Lead and Mercury, with excellent capacity and kinetics for application in Carbon Block manufacturing. METSORB utilizes a patented Titanium compound to adsorb both forms of arsenic as well as a wide range of contaminants in water.

METSORB maintains a higher capacity and a lower level of ion interference than competitive iron and alumina based products. METSORB is long-lasting and upon exhaustion, consistently tests as non-hazardous for ultimate disposal. METSORB is NSF Standard 61 approved, and has received regulatory approval from agencies across the United States and Canada.

## FILTRATION PRODUCTS

Graver Technologies designs, engineers, and manufactures a wide variety of filtration products that address applications ranging from coarse filtration to ultra-filtration. Our filter manufacturing facilities are ISO 9001 registered, assuring you of the quality required to meet your needs.

### Graver Technologies Filters for Liquid Process Applications

Graver Technologies offers an extensive line of filter cartridges and housings to provide high performance and cost effective solutions for liquid process applications. With filters suitable for common industrial, high purity water and other critical process streams, Graver Technologies liquid process filters service a wide array of applications in the beverage, chemical, microelectronics, and biopharmaceutical markets. Our membrane filters are constructed in a state-of-the-art manufacturing facility that includes an ISO Class 7 clean room to meet the most demanding customer requirements.

Graver Technologies liquid process filters are also available in a wide range of media types, cartridge designs, micron ratings, and configurations to optimize filtration efficiency while providing dependable performance and long service life.





## OEM, Private Label, and Custom Filters

Graver Technologies designs and produces custom filters for Original Equipment Manufacturers (OEM), as well as private label products. Our custom products range from pleat packs to filter element assemblies, complete elements, and engineered filtration systems.

We serve various markets, including manufacturers of:

- Ultrapure Water Systems
- Medical and Healthcare Devices
- Consumer and Industrial Vacuum Cleaners
- Print Engines for Commercial and Office Use
- Room Air Purifiers
- High Performance Air Intake and Fuel Delivery Systems

## AEGIS Precoat Septa and Filters for Condensate Polishing Systems

Graver is the leader in precoatable and backwashable septa and filters for condensate polishing applications in power generation including Nuclear and Fossil. AEGIS® wound precoat septa for precoat demineralizers are available with a variety of end fitting designs to fit the different OEM supplied systems. Graver's AEGIS® DualGuard and AFA® pleated polypropylene, backwashable cartridge septa are designed for use in condensate systems with or without resin precoat, and are available in absolute ratings ranging from below 1.0 to above 20 microns. PowerGuard sintered stainless steel elements are available for underdrain strainers and specialty nuclear applications including reactor water clean-up (RWCU) precoatable filter demineralizer systems with a variety of end fittings that can retrofit the septa in existing systems.

## SCEPTER® Stainless Steel Cross-Flow Membranes for Extreme Process Conditions

SCEPTER patented, stainless steel cross-flow membranes feature a patented coating to provide a highly durable filter medium for superior separations and reliable performance under extreme process conditions. SCEPTER's tubular cross-flow design and stainless steel construction make it practically indestructible, thus allowing it to be used on a wide variety of difficult process streams with a broad range of chemical conditions, viscosity, high solids loading, pressures, and temperatures. Scepter membranes are ideal for challenging applications such as sugar and corn syrup, dewatering of clay and algae for biofuels, wine recovery from wine lees, membrane bio-reactors, catalyst recovery, rad waste concentration, oil, alkaline cleaner and caustic recycling and recovery, and fermentation broths.

## Industrial Filtration Products

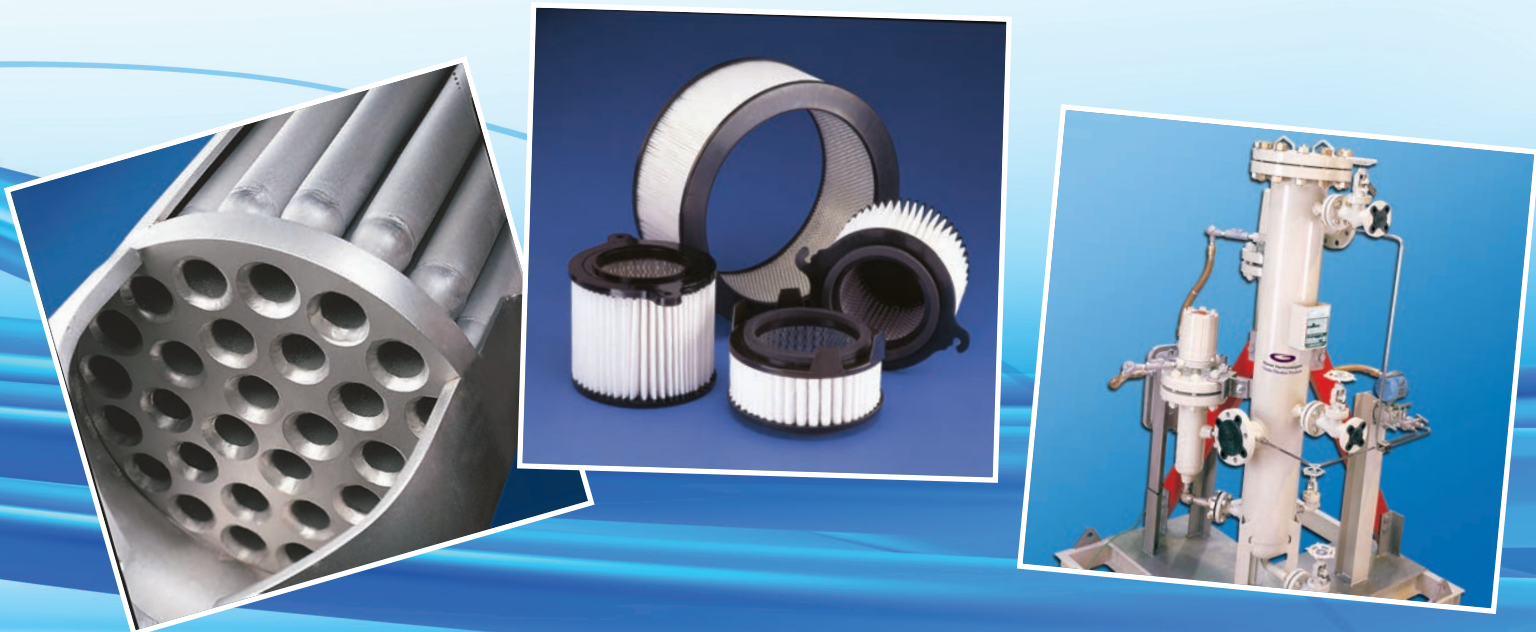
Industrial filters systems and elements are found in a wide range of chemical and petrochemical processing applications, industrial gas production, power generation, vacuum and compressor equipment, and environmental and military applications. All products are manufactured to industry standard specifications with particular attention to quality and performance. Graver Technologies produces filter elements and cartridges, as well as pressure vessel systems to both ASME code, Section VIII, Division I and PED 97/23/EC.

## Engineered Projects

Graver Technologies designs filtration systems for various applications, including power generating turbines, vacuum pumps, precious metal catalyst recovery, pneumatic conveying, industrial gas production, and chemical processing. Numerous manufacturers of turbines, pumps, and compressors depend on products from Graver Technologies to meet their OEM requirements for coalescing and particulate filtration.

## Environmental

Graver Technologies is a leader in the development of environmental and personal protection filtration products. PLEKX® is a patented carbon or other active media based product designed for adsorption of nuisance and hazardous gases in a user-friendly composite form. PleKX is available as both rolled goods and in final pleated configurations. In addition to PLEKX®, Graver has introduced HEPA<sup>fine</sup>® and ULPA<sup>fine</sup>® filters, industry leading certified HEPA and ULPA product lines that can filter to 99.999% + removal for 0.1-0.2 µm particles. When combined with PLEKX®, Graver's air filters offer a unique combination of filtration in a reduced footprint, highly beneficial in many size restrictive applications.



# MARKETS

*Graver Technologies provides products and services that meet stringent application requirements in a variety of markets, including Process Water, Power Generation, Food & Beverage, Drinking Water, Pharmaceutical, Microelectronics, Chemicals, Personal Protection, and Environmental. Graver Technologies' products can be found in many OEM applications where products are custom designed to meet the exacting requirements of the equipment manufacturer.*

## Process Water

Aqueous streams are common to many industrial processes. The selective removal of a broad range of contaminants enables the process fluid to be reused to increase operating efficiency and improve finished product quality. In addition, more strictly enforced environmental regulations are requiring industry to lower contaminant levels of discharge streams.

Products from Graver Technologies filter particulate matter in the process stream and reduce trace levels of contaminants. Our prefilters and final membrane filters are used to produce ultra pure DI water for semiconductor plants. Membrane products are used for clarification or concentration of high solids in waste streams. Our ion exchange and adsorbent products are ideal for heavy metals removal and recovery. Graver's industrial products are designed for applications where high dirt loading and flow rates make standard filter cartridges ineffective.

## Food and Beverage

The purification of ingredients and final products by the food and beverage industry is essential to meet consumer demand for consistent, high quality goods.

Graver Technologies develops products that are used extensively in food and beverage processing including purification and clarification of sugars, syrups, juices, fermented beverages and distilled spirits. You can turn to Graver Technologies when you need to reduce color or undesirable tastes, odors and turbidity.

Graver Technologies also supplies products that keep processing plants operating at top efficiency. Liquid filters are used to treat process water and clarify bottled water, wine, beer and other beverages. Membrane filters remove harmful microbes. Air and gas filters ensure clean make-up air, and self cleaning filters keep pneumatic conveying systems operating at peak efficiency.

## Power Generation

Today, new challenges exist in the power generation industry. Demands for higher levels of purity in condensate, reactor water cleanup and other critical applications have elevated product performance requirements to new levels. As the world leader in condensate polishing technology, Graver's ion exchange and septa products are ready to meet these challenges.

Graver Technologies is the premier supplier of kinetically superior and high purity ion exchange resins to meet the demanding needs of the nuclear power industry. Our condensate polishing septa technology is the leader in both precoat and CRUD removal applications for both nuclear and super critical fossil plants including natural gas combined cycle plants. Our industrial filter products address the fuel gas issues required for gas turbines to meet today's stringent exhaust gas regulations.

For nuclear, fossil, gas or liquid fuel turbines, and centralized or distributed power generation, Graver Technologies has the products to ensure efficient, economical, and environmentally friendly operation.

For Gas Turbine applications, Graver Technologies designs, develops and manufactures filtration equipment for coalescing and purification of gas and liquid fuel, as well as skid mounted oil filtration to assure optimal operational efficiencies.





### Drinking Water

Drinking water, whether sourced from an aquifer, seawater, surface water or produced by a municipal treatment plant, needs to meet government mandated and customer requirements for purity. Recently, the U.S. Environmental Protection Agency mandated by law that all drinking water systems meet the new arsenic standard of 10 parts per billion. Our patented METSORB® adsorbent products have been specifically engineered to provide excellent Arsenic, Lead and other heavy metal contaminant removal for the purification of drinking water, process water and other critical purification applications.

In water purified by reverse osmosis (RO), Graver offers proprietary melt blown filters with outstanding dirt holding capacity for long service life. The STRATUM, MBC and CRYSTAL MBF melt blown filters feature a true graded pore structure to capture a wide range of particle sizes and provide the SDI (silt density index) reduction required to protect the RO membrane.

Graver's filter housings provides years of service in many high volume drinking water plants around the world.

### Pharmaceutical

Graver Technologies offers numerous options to address various processing needs for pharmaceutical manufacturers. These include the use of adsorbents and adsorbent cartridges to remove organic and inorganic contaminants, including precious metal catalysts, in pharmaceutical API's and intermediates, and the use of cross flow membranes to remove suspended cells and solids from feedstock solutions in cell harvesting, or clarification of fermentation broths. In addition our cartridge filters can provide bioburden reduction and sterilizing grade filtration for water and process fluids.

Graver Technologies can custom formulate adsorbent media and ion exchange resins to meet specific process requirements. Our filtration products are designed to provide high performance particulate retention while maintaining desired flow rates and low pressure drop. Our liquid filters allow for cost effective prefiltration and filtration of process grade water. Self-cleaning filter systems set the industry standard for efficiency in pneumatic conveyance systems that transport high value products and intermediaries.

### Chemical

The chemical processing industry faces a wide range of purification challenges. These problems include feedstock quality improvement, re-cycle of costly ingredients, by-product quality upgrade, final product quality improvement and recovery of precious metal catalysts.

Graver Technologies has a host of products that keep chemical processing facilities operating efficiently. From air intake and process filter applications to industrial gas production and wastewater treatment, Graver has products that meet your needs.

Our industrial filtration products include ASME/PED code pressure vessels that can be custom designed to meet your space and piping requirements. Our stainless steel cross-flow membranes and filters are compatible for use in most process streams. And we have products that help keep your plant operating in an environmentally friendly manner.





### Superior Products & Global Reach

Whether your business is around the corner or around the world, Graver Technologies can support you with superior products and services. Our ion exchange, adsorbent, filtration, and membrane products deliver exceptional performance in some of the harshest process environments in North America, Europe, Asia, the Pacific Rim, South America, and Africa.

Graver Technologies is a member of The Marmon Group (a Berkshire Hathaway Company), an international group with more than \$7 billion in annual sales. Around the corner or around the world, Graver Technologies is a fast growing company with the technical resources and financial strength that make us the perfect partner for your business.

### Corporate Headquarters

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### Manufacturing/Distribution Sales Centers

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Newark, New Jersey  
Shanghai, China  
Singapore



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