

Strainrite's Filtration Advantage

Solid, liquid, and crystalline particles can contaminate downstream oil and gas applications, including:

- Oil & Gas Production Plants
- Gas Treating Plants
- LNG Plants
- Transmission Stations
- Gas & Liquid Well-Injection Fluids
- Process Fluids
(Crude Oil, Gas, NGL, Amine, Glycol, Water)
- Systems Fluids
(Hydraulic & Lubrication Oil)

These unwanted particulates lead to:

- Increases in operating and maintenance costs
- Decreases in production throughputs
- Production shutdowns
- Equipment failure

Strainrite's effective, reliable and correctly applied filtration and separation technologies can solve these issues.

Strainrite offers valuable knowledge and a thorough understanding of downstream oil and gas applications, providing the most comprehensive filtration solutions for everything from refining to hydrocracking.

Strainrite's Filtration Benefits

MINIMIZE

Foaming
Utility usage
Process upsets
Downtime
Maintenance

MAXIMIZE

Operational efficiency
Equipment life
Product quality
Catalyst performance
Absorber performance

OIL & GAS INDUSTRY

Science and Service: The Strainrite Way

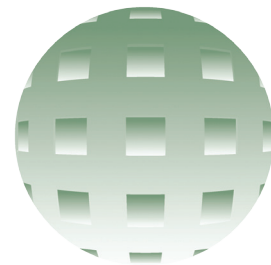
At Strainrite, we are dedicated to the best in Science and Service.

Strainrite offers vessels that are ISO9001:2008 certified and are hydrostatically tested in accordance with industry accepted standards. We also offer special quality assurance tests which include X-ray, Magnetic Particle, Liquid Penetrant, Ultra-sonic and Brinell hardness testing.

Our consultative selling approach focuses on custom solutions to filtration problems. We commit the time and resources to tailor our products to our clients' unique requirements.

By working with us, our clients realize:

- Innovative solutions
- Operational cost savings
- Improved process efficiency
- Enhanced finished product quality
- Reduced waste costs



At Strainrite, we believe in Science and Service.

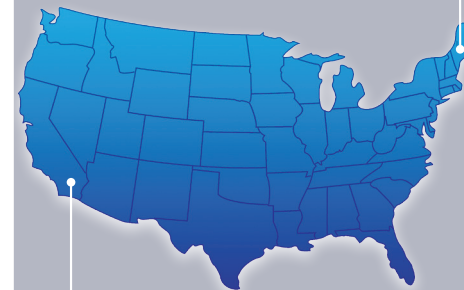
All Clarity™ and Madd MAXX™ cartridges are manufactured in our facility. Our Quality Management System is certified to be ISO 9001:2008 compliant. Our state-of-the-art equipment and highly skilled technicians are able to maintain the highest levels of product reliability and repeatability, from receipt of raw materials to shipment of finished filters.

A few controls that are in-place include:

- All cartridges are manufactured in a Class 10000 clean room
- Raw material performance verification
- Bubble point and air diffusion testing
- Bacteria challenge verifications of performance
- Extractable verification and determination
- Ultra-pure water rinsing with resistivity verification of effectiveness
- Finished validated products are integrity tested by air diffusion

Service Locations

Strainrite Corporate Headquarters
65 First Flight Drive
Auburn, ME 04210
Tel: (207) 376-1600
Fax: (207) 777-3177



Strainrite West
12410 Clark Avenue
Santa Fe Springs, CA 90670
Tel: (562) 941-1203
Fax: (562) 941-1202

The STRAINRITE Companies | World Class Filtration

Clarity™

MADD MAXX

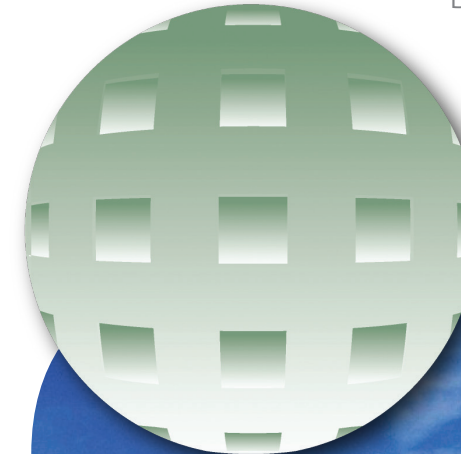
FILTER BAGS

Vessels & Housing



THE STRAINRITE COMPANIES

Designing and Manufacturing
Leading-edge Filtration
Products Since 1978.



ONSHORE AND OFFSHORE DRILLING

Oil and gas production often takes place in extremely harsh environments. Typical filtration challenges include heavy fog, salt, spray, air pollution from other sources or very high dust concentrations. These conditions are also frequently impacted by the by-products of drilling and industrial contaminants like hydrocarbons.



For filtration of surface water used in make-up water, Strainrite offers multiple options including the [EVP](#), [Hi-Pro Micro](#) or [Madd-Maxx GF](#)

With produced water and onsite filtration, Micro-glass pleated elements at 2 micron efficiency helps prevent formation plugging. Strainrite’s [Hi Pro Micro 9900](#) series or [Glass-Pleat](#) cartridge excels.

AMINE SWEETENING / GLYCOL DEHYDRATION

Amine Sweetening removes toxic and corrosive components, primarily hydrogen sulfide and carbon dioxide, from a hydrocarbon gas stream. Glycol Dehydration removes water to prevent corrosion or freezing of processing equipment. Sour gas is fed into the absorber where lean amine absorbs hydrogen sulfide and carbon dioxide contaminants from the process stream creating sweet gas free, or gas free of carbon dioxide and hydrogen sulfide and rich amine (amine containing hydrogen sulfide and carbon dioxide). The amine is then fed through a carbon bed to absorb heavy metal contaminants and eventually into the regenerator or stripper where heat and pressure are used to remove remaining hydrogen sulfide and carbon dioxide. After the amine stream has been regenerated, it is blended with make-up amine and re-fed into the absorber treating new sour gas. Glycol dehydration uses an absorber and contactor to remove water from gas, preventing excessive corrosion and equipment damage.

Part of the Amine/Glycol filtration process involves critical filtration steps such as:

- Make-up Amine/Glycol Filtration:** to protect downstream equipment from particulates that settle in storage tanks, to maximize operational efficiency and to minimize energy costs and foaming
- Carbon Bed Pre-Filtration:** to minimize large particulates that can foul the carbon beds and to improve operational efficiency and carbon resin life
- Carbon Bed Post-Filtration:** to prevent carbon particles from migrating down stream, to reduce unnecessary maintenance due to plugging and equipment damage and to maximize absorber performance
- Sour Water Filtration:** to protect water treatment equipment from contaminants caused by highly corrosive hydrogen sulfide and ammonia

Proper filtration is critical to these processes. Contamination from particulate matter, foaming and other unwanted byproduct effects hampers operational efficiency when left unchecked by a poor filtration system.

For amine filtration requirements that are 10 microns and higher, Strainrite offers the polypropylene [EVP](#) with patented enhanced vertical pleat technology. For higher solids loading applications, the [Madd-Maxx XL](#) exceeds expectations. For 1 - 5 micron applications, Strainrite recommends the [Madd-Maxx MF](#).

Glycol filtration is full flow, typically using 10 micron nominal filtration. Strainrite’s [Visc-Maxx](#) element easily replaces the majority of competitor brands. One P1 size element replaces 40 competitor 10” equivalent resin bonded cartridges.

Madd-Maxx Series Hybrid Elements

- Available in Microglass (GF), Polypropylene (MF) and Polypropylene Felt (XL)
- Combines the most advantageous features of both bag and cartridge technologies
- Flanges to fit Competitors nominal filter bag vessels, and Strainrite zero-bypass filter bag housings.
- 7” diameter pleated elements
- Maximum utilizable surface area
- Lower pressure drops
- Lower capital costs
- Reduced labor and disposal costs realized through dramatically longer filter runs
- Reduced employee exposure to chemicals
- Available from 200 µm nominal to 0.5 µm absolute efficiency



EVP Series - Enhanced Vertical Pleat Elements

- Polypropylene offers graded density design (co-pleated)
- Polypropylene offers 19 ft.² of surface area
- Polyester offers single layer design with polymeric flow support
- Polyester offers 13 ft.² of surface area
- Thermally set pleat design (increases surface area utilization)
- Easily customized to application specifics
- 8-10 times longer life compared to single layer bags
- Reduced cost per gallon filtered.

Rigid Fiber Technology - BRB resin bonded filter bags

- Non-compressible rigid fibers maintain uniformity under high pressure high viscosity applications
- Dual density depth design (superior gel removal)
- Treated fiber is both Hydrophobic and Oleophobic
- Long staple polyester fibers, chemically locked into place (resulting in zero fiber migration)
- One BRB #1 size replaces approximately 10 ten-inch resin bonded cartridges
- Single layer bag available where prefiltration is not required.



Depth and Resin-Bonded Cartridge Elements

- CRB-Pleat resin-bonded cartridges contain more than 3.5 ft² of surface area per 10” segment, as compared to ~0.5 ft² surface area per 10” segment in a typical molded or wound resin bonded cartridge.
- CRB-Pleat utilizes a proprietary resin coating process
- Glass-Pleat nominally rated microglass depth filter cartridges utilize a high surface area and high void volume media, incorporating microglass fibers in a uniform matrix that optimizes element flow rate and service life unattainable by other traditional microfiber technologies.

Hi-Pro Micro Series

- Unique graduated layering of media starting with a built-in pre-filter inner layer, progressing to tighter outer layers.
- Up to 99% Efficiency
- Graduation aids in the prevention of premature blinding
- Superior dirt holding
- Effective removal of gel-like particles



Visc-Maxx Rigid Fiber Hybrid Element



- Non-compressible rigid fiber technology maintains uniformity under high pressure and high viscosity applications
- Approximately 27 ft.² of surface area in a 7” X 26” element (single layer version). Results in higher fluid processing rates, reduced initial pressure drop, and superior gel removal performance
- Treated textile is both hydrophobic, and oleophobic
- Long staple polyester fibers, chemically locked into place result in zero fiber migration
- One #2 size element replaces approximately 35 – 40 ten inch resin bonded cartridges
- Depth media available from 0.5 µm to 200 µm nominal efficiency
- Hygienically superior inside-out flow (contaminants remain captured inside the element)

HYDROTREATING

Filtration is essential in the hydrotreating process to remove contaminant sources resulting from catalytic reactions and feedstock impurities.

Refineries use the hydrotreating process to remove sulfur from petrochemical feed stock through a catalytic conversion. These feed stocks are combined with hydrogen and fed into the fixed-bed catalyst hydrotreater at high temperatures and pressures. Contaminant sources include sulfide from the catalytic reaction and feedstock impurities which would significantly reduce productivity.

Strainrite’s products will effectively filter out contaminants from feedstocks, lubrication oil, make-up hydrogen, desulfurized hydrocarbon and sour water sources.

HYDROCRACKING

Filtration and coalescing play a significant role in improving the fluid quality of the hydrocracking process fluids by removing contaminants from sour water, reactor feeds, and hydrocracker feeds.



Refineries use hydrocracking to breakdown heavy hydrocarbon molecules into light, shorter-chain hydrocarbons to produce valuable fuel products. Hydrogen is used to purify the hydrocarbon stream, removing sulfur and nitrogen.

Feed stream filtration helps retain particles caused by corrosion in upstream process equipment. This prevents damage to pumps and equipment, optimizes heat exchanger and reactor efficiency, and protects expensive catalysts

Cracked product filtration minimizes contaminants in blending and storage tanks and maximizes coalescer performance and product quality.

STORAGE, TRANSFER, AND FINAL PRODUCT FILTRATION

For amine, diesel, gasoline, heating oils, heavy fuel oils, jet fuel, kerosene, naphtha and many other products, final filtration occurs both during and after processing, refining, storage and transfer. Through the network of pipelines and storage systems, water, dirt and other contaminants belie the need for the highest quality microfiltration systems to meet customer specifications.

Strainrite’s products will ensure the highest quality microfiltration to ensure fluids are free of contaminants during the storage and transfer process.

Frac Tanks are key to portable water storage solutions. Sometimes called fixed-axle storage tanks, frac tanks provide safe and secure water storage. Frac tank filtration and salt water disposal wells require versatile solutions. Strainrite delivers solutions. If no oil is present Strainrite’s [EVP](#) bags (10 micron is standard) will do. When oil is present Strainrite offers the [BRB](#) or [Visc-Maxx](#) (10 or 25 micron). No need to replace cartridge housing already on site. Strainrite offers the [CRB-Pleat](#) resin-bonded cartridge.

For rail car and tank loading /offloading of oil based streams, Strainrite’s [BRB](#) bags are recommended, provided polyester fibers are chemically compatible