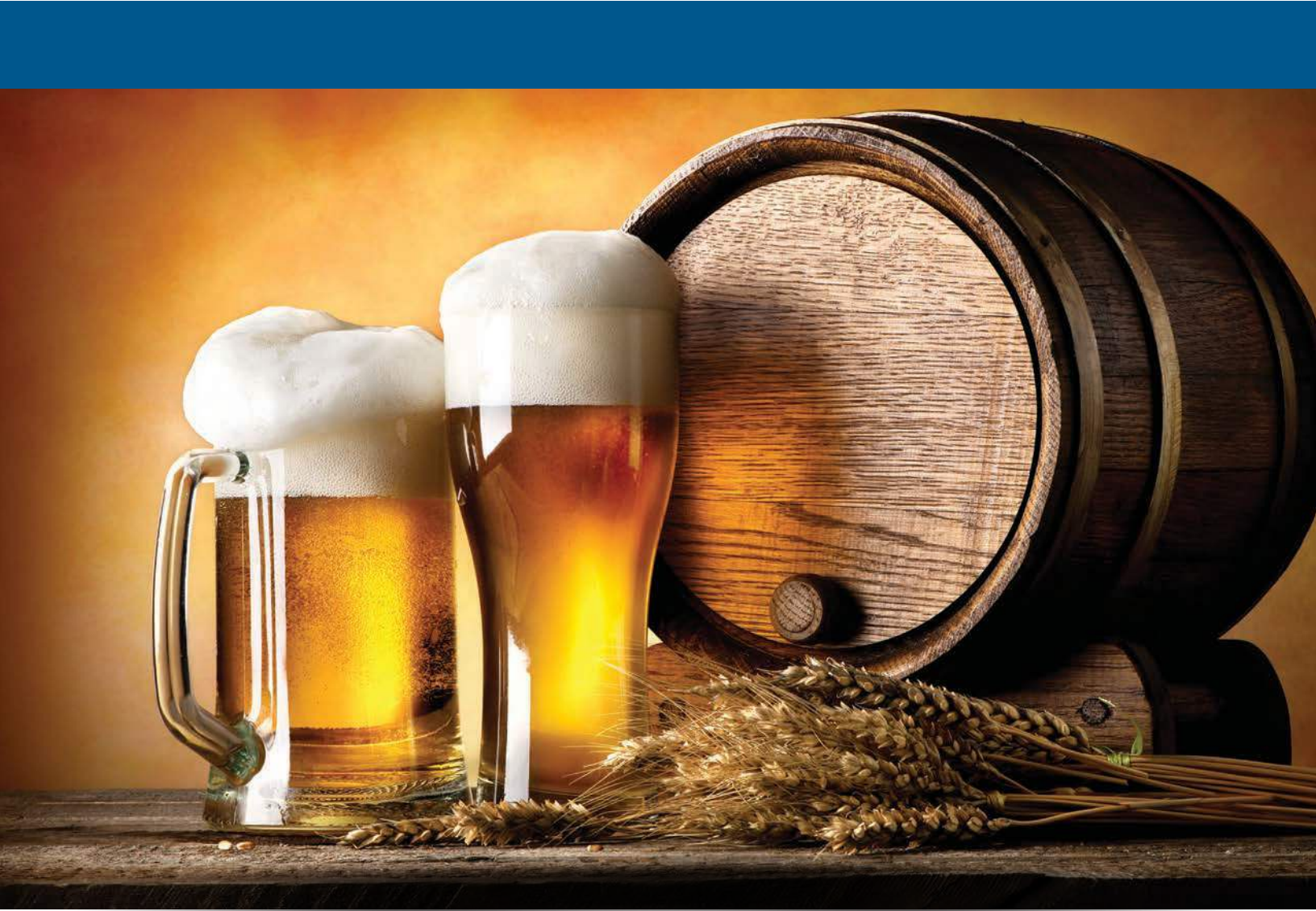


Beer Filtration Solutions

Innovative Technology for High-Quality Beer



 **KOVALUS**
Separation Solutions™

How can KSS help you?

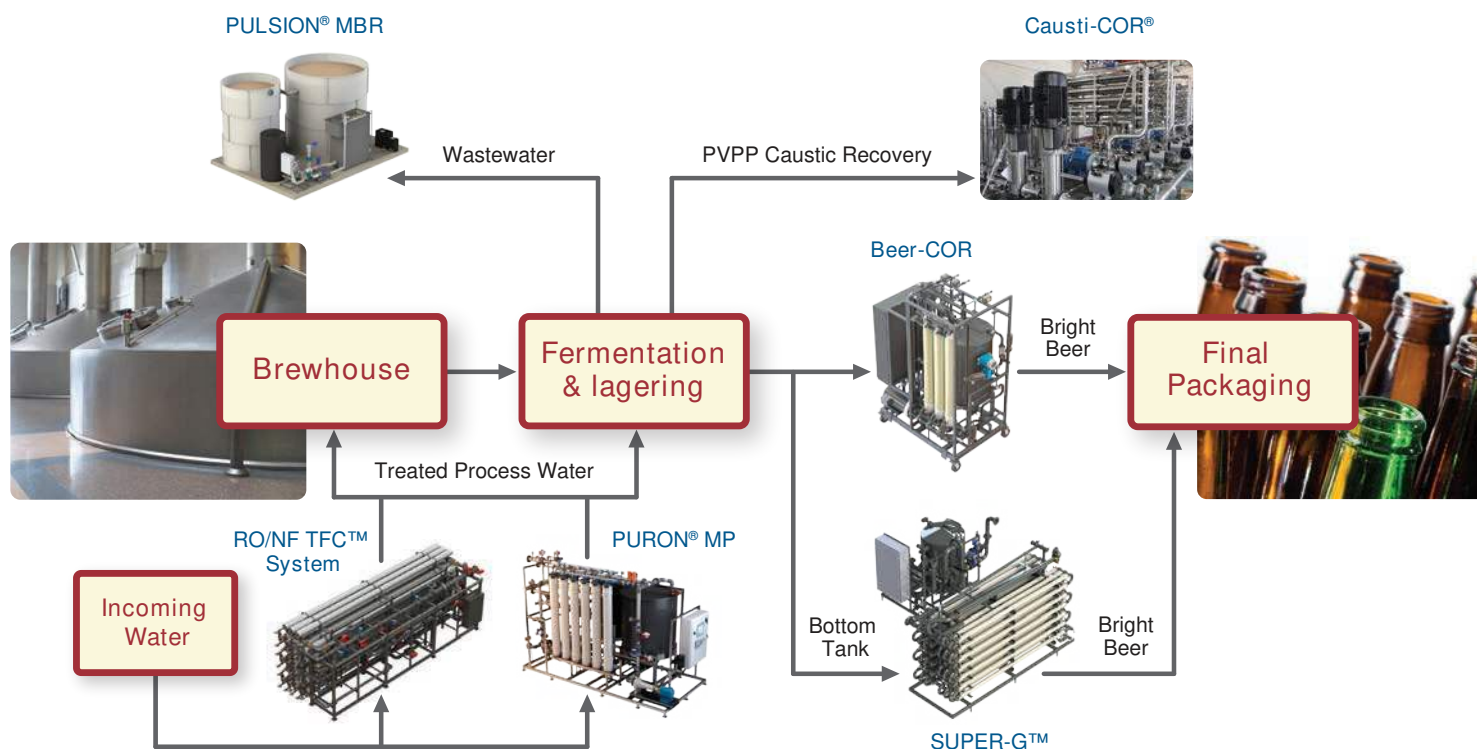
Over 50 Years of Membrane Experience

KOVALUS SEPARATION SOLUTIONS™ (KSS) is a global leader in membrane filtration technologies with over 50 years of membrane experience and thousands of system installations worldwide. We manufacture our membranes in our state of the art facility in the US and we apply them in our systems.

As a complete solution provider, we have applied our experience and expertise to develop our beer crossflow filtration cartridges and the Beer-COR™ system line.

Our broad portfolio includes water filtration solutions to meet the process water demand and wastewater solutions to treat brewery wastewater for discharge or reuse. These filtration solutions are energy efficient and are environmentally friendly to help your company comply with increasing stringent regulatory requirements.

Combined Solution Approach to all your Filtration Challenges



You will find in KSS an experienced partner to all your filtration needs. Your brewery will benefit from our PURON® MP ultrafiltration and FLUID SYSTEMS® reverse osmosis (RO) treatment systems, which will reliably produce high quality water for your brewing needs. Our BEERFILTER™ microfiltration membrane and Beer-COR crossflow filtration systems will clarify your beer, producing bottle ready beer with excellent clarity, head retention, aroma and maximum shelf-life.

KSS has innovative technologies to improve the sustainability of brewery operations by providing solutions for caustic purification and reuse and wastewater treatment. Spent caustic solution from tank cleaning and PVPP stabilization columns can be economically treated using KSS pre-engineered Causti-COR® technology. Lastly, we will help you treat your wastewater using our hollow fiber PULSION MBR systems and the robust KONSOLIDATOR™ systems, utilizing tubular membrane technology for safe discharge or reuse, meeting the most stringent regulations.

Beer Clarification

KSS Beer-COR crossflow microfiltration systems utilize KSS BEERFILTER™ cartridges to consistently produce brilliantly bright beer over long sustained runs. An inert CO₂ blowdown feature minimizes beer loss by recovering filtered beer at the end of each run and an onboard CIP tank reduces system downtime with quick and effective membrane cleaning.

Beer-COR™ systems are skid mounted, have an energy efficient design and a small system footprint. They are available with multiple cartridge configurations and are expandable to meet the requirements of most filtration applications.

BEERFILTER MF Cartridges

KSS BEERFILTER cartridges were designed specifically for beer filtration applications. Their new, inside-out microporous hollow fiber membranes use crossflow microfiltration technology to filter undesirable suspended solids without affecting bitterness, aroma, color, taste or foam stability. The result is a preservative free, shelf-stable product. They eliminate the need for Diatomaceous Earth (DE) reducing disposal costs and creating a safer working environment.

BEERFILTER MF Cartridge Specifications

Cartridge Diameter	6 inch (152 mm)
Cartridge Length	43 inch (1,090 mm)
Membrane Separation Range	Microfiltration, nominal 0.6 micron
Fiber Inside Diameter	52 mil (1.3 mm)
Active Membrane Area	106 ft ² (10 m ²)
Cleaning pH Range	1.5 to 13

Benefits of Beer-COR Systems

- High beer yields
- Fast changeover between styles
- Eliminate the need for DE
- Best flavor and foam stability
- Consistently bright beer
- Easy cleaning without enzymes
- Fully automated operation



Water Solutions

PURON MP Systems for Water Treatment

Achieve the highest water quality standards and regulations for your process water with our innovative hollow fiber ultrafiltration technology. Easily installed and serviced, PURON® MP systems are designed for longevity and performance. These water treatment systems offer robust engineering and reliable operation at low cost of ownership and in a small footprint.

The PURON MP product innovation starts at the membrane; strong fiber, practically unbreakable, with optimal pore size distribution for reliable bacteria and virus removal. Our superior cartridge design, including efficient air scouring and single potting, improves solids management and brings a low maintenance, cost effective and reliable means of water treatment into the brewery.



Our PURON MP systems are available in small, packaged plants to treat up to 200,000 gallons per day (32 m³/hr), and in larger pre-engineered skidded systems for larger demand.

PURON MP Benefits

- Pre-engineered for quick delivery and easy startup
- Robust membrane for extended life & reliability
- Compact design

Applications in a Brewery

- Turbidity and pathogen removal from ingredient water
- Wastewater polishing

High Purity Water Solutions

FLUID SYSTEMS® is a key component of KSS, complementing the MBR, MF and UF technologies to provide municipal and industrial clients with broad expertise in filtration and purification processes. Our RO and NF products are available in standard 8" FRP hard overwrap configuration (8040) in standard and high area construction. All products have drinking water certification under NSF/ANSI Standards 61 and 372. We offer a wide range of reverse osmosis (RO) and nanofiltration (NF) products to serve in potable water and industrial water applications.

TFC™ HR

Robust high rejection and low fouling brackish water RO products for consistent operation treating industrial streams and wastewater effluents.

TFC SR

Low energy NF products for water softening and removal of organics.



High Recovery RO Packaged Systems

At KSS we understand that high recovery and reliable RO solutions can make your operations efficient and cost effective. We will provide you with innovative and complete solutions using our pre-engineered or custom design systems.

Brewery Applications

- Demineralized water for brewing liquor or dilution water
- Steam boiler feed water
- Cooling tower make-up, blow down treatment

KSS High Recovery RO Systems Benefits

- Proven performance in the most demanding applications
- Simple to operate, reliable and dependable
- High recovery, up to 95%
- Compact design

Wastewater Solutions

KSS understands the specific wastewater challenges associated with the brewing industry. We have the knowledge and expertise to provide you with a comprehensive solution to treat your wastewater economically, while complying with discharge or water reuse limits.

MBR treatment is an effective method for organics and solids removal from brewery wastewater, allowing for discharge while avoiding expensive disposal surcharges. Because KSS MBR systems utilize an ultrafiltration membrane, the effluent water quality is suitable for further treatment with FLUID SYSTEMS® NF/RO for reuse within the brewery. KSS offers both immersed hollow fiber and tubular crossflow MBR, ensuring the optimal system configuration for your wastewater needs. For smaller wastewater flowrates, our tubular KONSOLIDATOR™ ultrafiltration crossflow membrane system will effectively clarify activated sludge to produce high quality effluent. For larger wastewater flow rate, our PURON submerged technology will provide the optimal solution.



Our PURON® PLUS MBR systems are available as small, packaged plants and as larger modular pre-engineered systems. Due to the innovative membrane, module design, and operation practices, the PURON MBR product has quickly become the technology of choice for companies looking to reduce energy, minimize downtime, and increase flux, all within a small footprint.

MBR Technology Benefits

- High quality ultrafiltration product
- Minimal footprint
- Efficient and reliable removal of solids & organics from wastewater
- Low maintenance
- Wastewater reuse



Caustic Recovery

How Much Is Your Caustic Really Costing You?

The KSS Causti-COR® nanofiltration membrane systems offer a cost effective, environmentally friendly way to recover the expensive caustic solutions used in brewing. Causti-COR systems utilize our patented SelRO® nanofiltration membranes to recover up to 95% of caustic for reuse by removing organic and inorganic contaminants.

The Causti-COR system family offers six pre-engineered models, including three batch systems for small and medium flow rates between 1 and 15 m³/hr (10,000 gpd - 100,000 gpd) and three larger continuously operated systems for medium and large feed flow rates between 4 and 32 m³/hr (25,000 – 200,000 gpd). Custom systems can be prepared for smaller or larger demands.



Brewery Applications

- Recovery and reuse of brewery caustic CIP waste
- Recovery and reuse of caustic from regenerable PVPP stabilization columns

Benefits of Recycling Caustic

- Lower spending on caustic and acid materials
- Reduced effluent volume
- Reduced waste treatment costs
- Energy recovery

SelRO Membrane

The SelRO® family of spiral wound elements utilize a proprietary membrane developed by KSS using a highly crosslinked polymeric chemistry. They demonstrate long membrane life while treating acids and bases with temperatures up to 160°F (70°C) and concentrations including:

- Sodium and potassium hydroxide up to 20%
- Sulfuric, nitric, hydrochloric, phosphoric acids or blends up to 35%



KOVALUS SEPARATION SOLUTIONS

KOVALUS SEPARATION SOLUTIONS™ (KSS) is a global leader in separation technologies.

With best-in-class domain expertise, technologies and systems, KSS is uniquely positioned to help customers purify and recover valuable process streams and achieve sustainability goals across food and beverage, life science, and general industrial markets.

Services & Support

After-Sales Services & Maintenance Programs • SepTrac™ Smart System



www.kovalus.com • getinfo@kss-sep.com

KOVALUS
Separation Solutions™

For complete contact information and listing of our global locations, visit www.kovalus.com
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