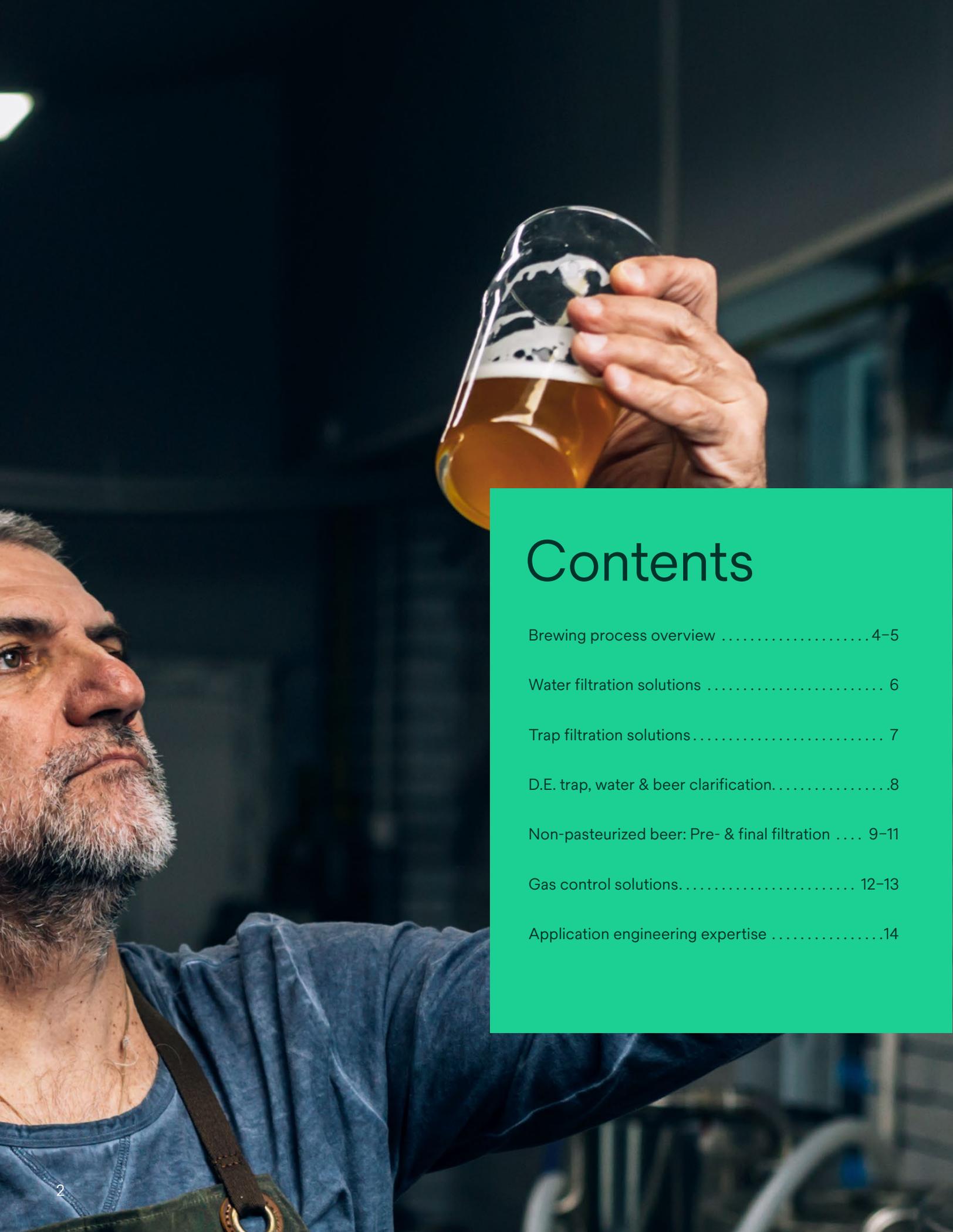




# Smarter brewing starts here

Filtration and gas control for breweries



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# Craft with confidence

Brewing is a craft that demands precision. From your first batch to your hundredth, quality and consistency are essential. Every brewer wants their beer to taste great and look appealing while minimizing spoilage and waste — because every saved drop means more profit to reinvest into your business.

That's where Solventum's filtration and gas control solutions come in. With systems designed to protect flavor, reduce waste and safeguard every pint, we help you maintain a smooth, reliable brewing process. Trusted by brewers worldwide, our solutions help deliver consistent, dependable results batch after batch.



## Performance

Efficient, adaptable filtration systems tailored to your needs.



## Ease of use

Intuitive, low-maintenance solutions to save you time.

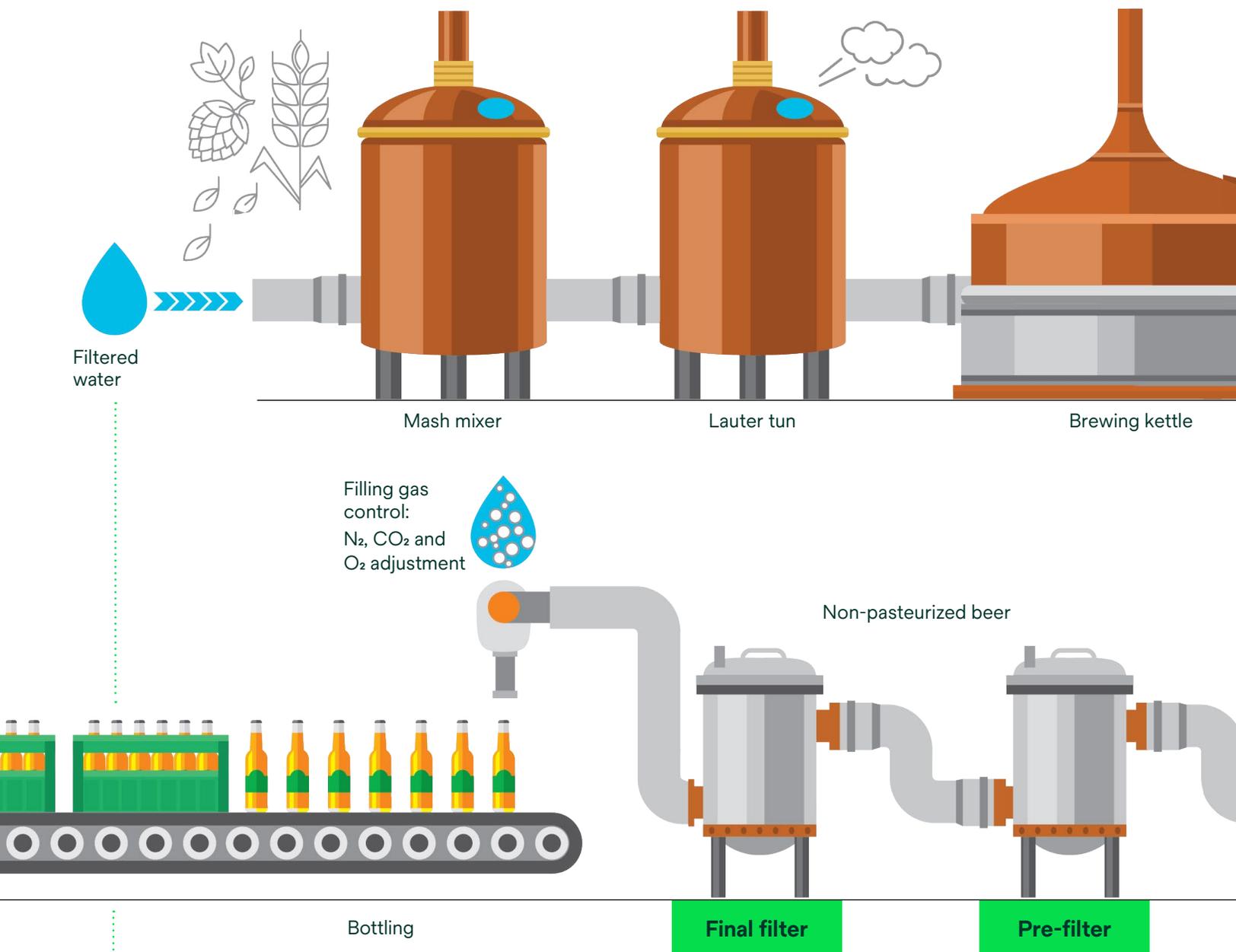


## Quality

Dependable systems for reliable, high-quality results every time.

# Brewing process

See how our filtration and gas control solution support each stage of your brewing process



## Water pretreatment solutions:

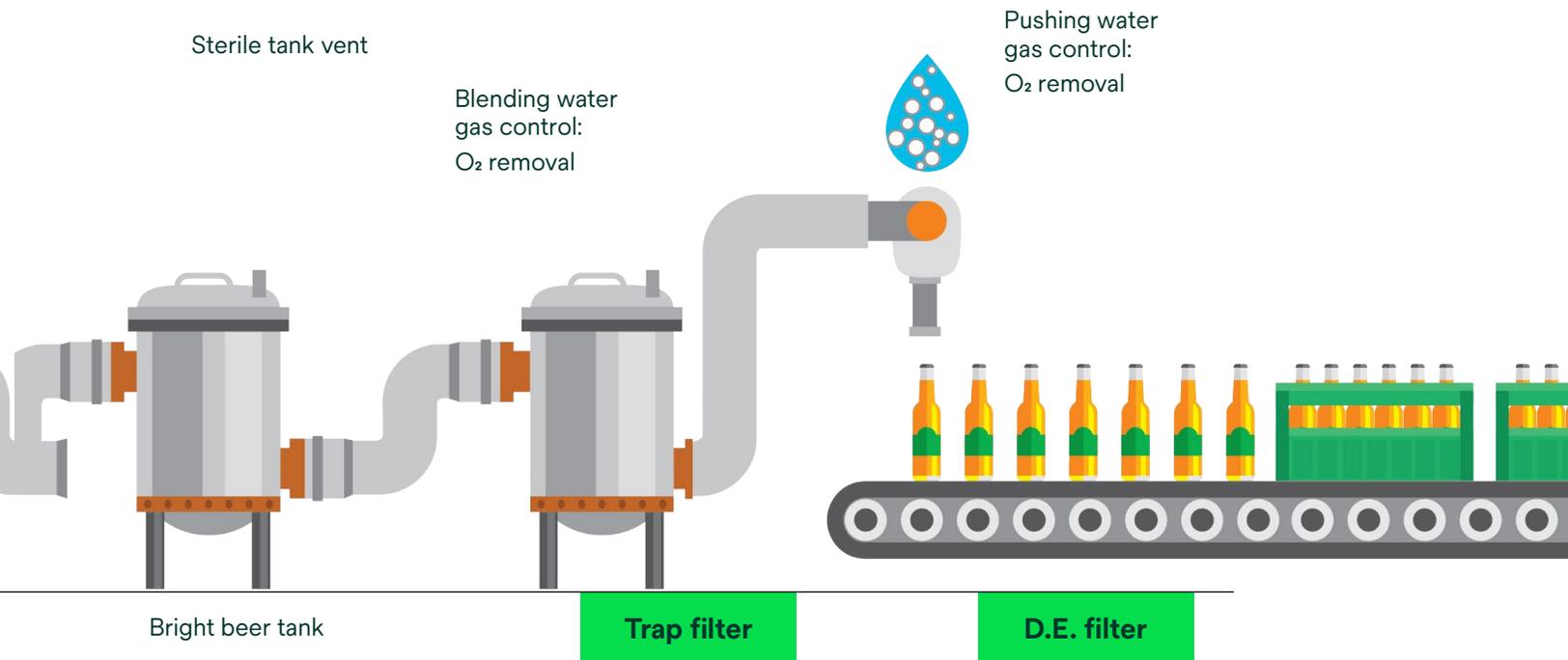
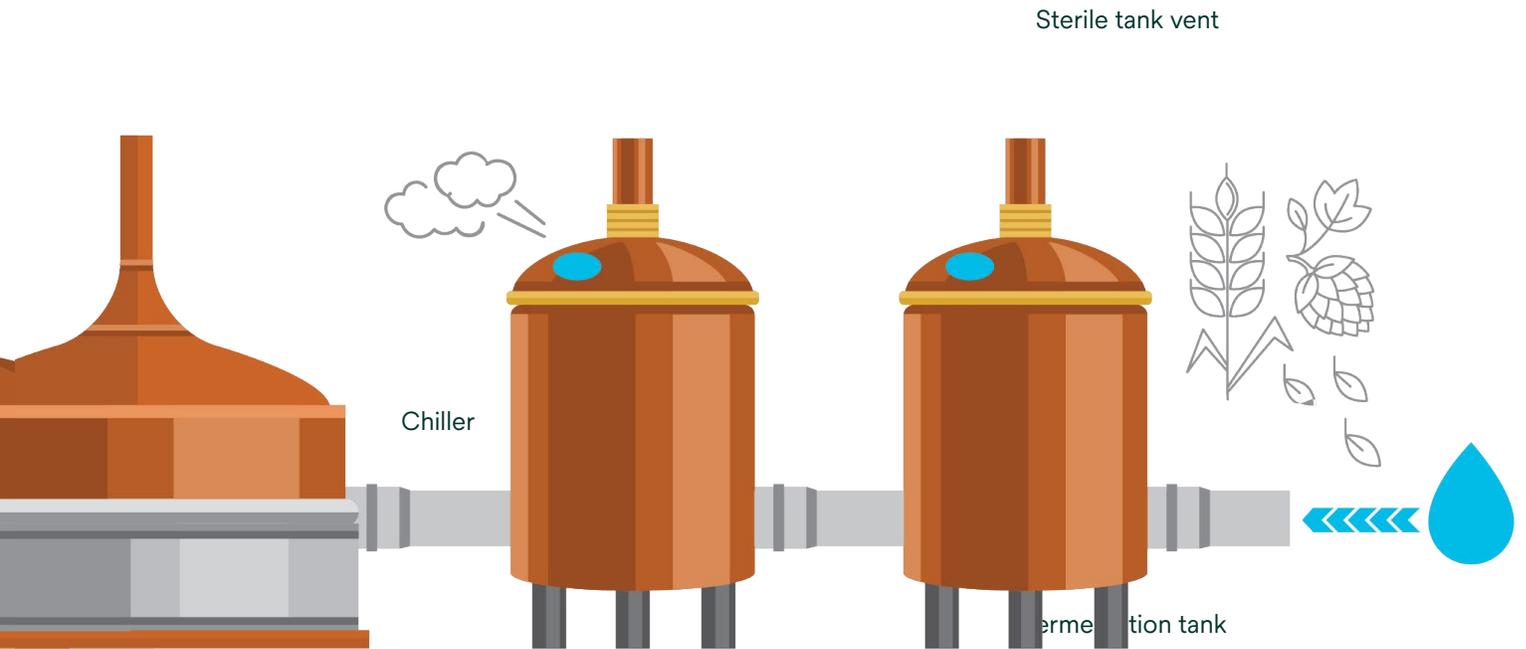
- 3M™ High Flow Series Filters
- 3M™ DF Series Filters
- 3M™ Micro-Klean™ RT Series Filters

## Final filtration solutions:

- 3M™ LifeASSURE™ BBA Series Filters
- 3M™ LifeASSURE™ BA/BNA Series Filters

## Pre-filter haze control solutions:

- 3M high flow series filters
- LifeASSURE BBA series filters
- 3M™ Betafine™ XL Series Filters
- 3M™ Betapure™ NT-T Series Filters



**Gas control solutions:**

3M™ Liqui-Cel™ Membrane Contactors

**D.E. trap filtration solutions:**

- 3M™ Betafine™ XL Series Filters
- 3M™ Betapure™ NT-T Series Filters
- 3M™ High Flow Series Filters
- 3M™ Micro-Klean™ RT Series Filters
- 3M™ Zeta Plus™ H/MH Series Filters

# Quality beer comes from quality water

Water, the fundamental ingredient in beer, must be carefully monitored and controlled. Since most breweries aren't located next to sediment-free mountain springs, process filtration is a vital part of brewing and blending water preparation, bottle/keg washing water and sanitizing water.

Solventum provides quality water filtration that can accommodate virtually any design to meet your process requirements.

## 3M™ Micro-Klean™ RT Series Filters

Micro-Klean RT series filters are all-polypropylene rigid depth filter cartridges.



### Rigid depth filter construction

- Reduces unloading at high differential pressure
- Efficiently reduces deformable materials
- Provides consistently superior particle reduction throughout filter life
- Enhanced holding capacity for fewer filter change-outs
- Grooved cartridge with extended surface area prolongs filter life
- All-polypropylene construction leaves taste unaffected

### Larger volume requirements or space restrictions?

We have the right filtration solution for you. Check out the 3M™ High Flow Series Filters on page 9.



### Other applications



### Bottle and keg washing water

Bottle and keg washing water filtration are frequently overlooked applications. Wash water can contain particles and organics that affect the final product. Proper filtration of wash water is especially important when the container (bottle or keg) will not be pasteurized. Micro-organisms from poorly filtered water can re-contaminate non-pasteurized beer, easily causing spoilage.

### Sanitizing water

Sanitizing water (>80°C) is used to reduce bioburden and to clean systems, including the filters. Filtering sanitizing water is important so that the system is not contaminated with particulates in the sanitizing water between beer production runs.

# Help protect your downstream process

Trap filters serve two essential functions. First, they reduce extraneous diatomaceous earth (D.E.) fines and yeast that randomly passes from the D.E. filter during normal filter operation. Secondly, trap filters provide additional protection in the event of a process upset if diatomaceous earth filter malfunctions (start-ups/screen rupture/overdosing/bypass). The trap filter protects against failure by preventing the yeast and D.E. fines from contaminating downstream equipment and piping as they are difficult to flush out completely.

## 3M™ Betafine™ XL Series Filters

The all-polypropylene filter is constructed using a design that utilizes flow enhancing filter media and an innovative flow pattern. The result is an absolute-rated filter with superior on-stream life that provides more cost-effective filtration than conventional melt blown filter technologies.

Betafine XL series filters feature advanced pleat technology (APT). This design construct maximizes the useful surface area of the filter cartridge while maintaining proper flow paths between media pleats.

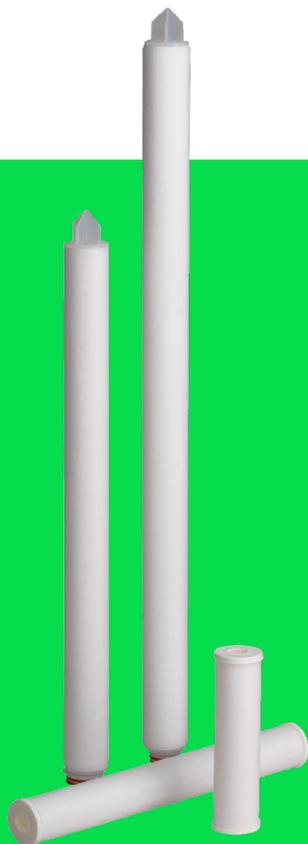


### How it works

The staggered pleats with increased open area allow for greater contaminant loading between pleats at the inside diameter while the reduced length pleats take advantage of existing open space closer to the cartridge diameter.

### Why it matters

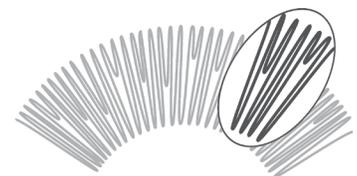
The result is a fully used surface area that provides superior service life. APT provides faster flow rates and greater surface area compared to conventional depth filters.



## 3M™ Betapure™ NT Series Filters

Betapure NT series filters provide the consistency of absolute rated filtration, as well as the high D.E. fine holding capacity needed in breweries. They offer a range of benefits:

- Provide excellent retention of diatomaceous earth fines, helping to protect beer quality and downstream filters
- Offer consistent, reliable performance from batch to batch, lot to lot over the lifetime of the filter
- Withstand multiple hot water sanitization cycles with exceptional durability



Advanced pleat technology



Conventional pleating

# Get high flow capacity in a compact design

## 3M™ High Flow Series Filter System

For brewers who need efficient filtration and a small equipment footprint, the 3M high flow series filter system offers a compact, cost-effective solution that doesn't compromise on performance.



### Compact design

- Small housing minimizes capital expense requirements
- Up to 50% smaller than a competitively-sized housing

### Absolute rating

- Delivers consistent quality throughout the life of the filter

### Polypropylene construction

- Neutral to the brewing process, ensuring taste remains unaffected
- Cartridges are replaced only when blocked, reducing waste

### Easy to use

- No special tools or hardware needed for filter changeout, minimizing downtime
- “Twist-to-lock” seating mechanism ensures a secure, positive seal
- Ergonomically designed handle simplifies cartridge installation and removal

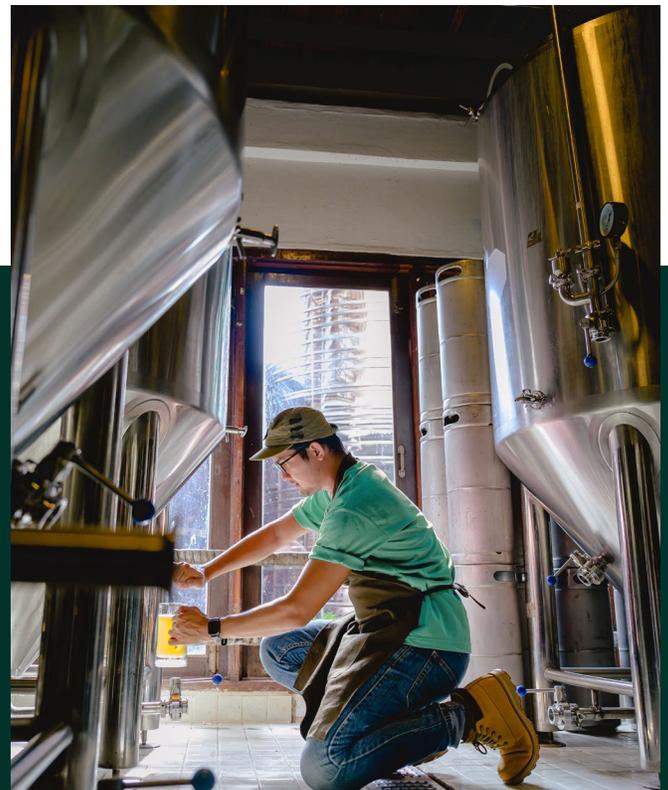
## Solutions for small brewers

Filtration is often overlooked at smaller breweries, yet it's critical for producing consistently stable beer that meets consumer expectations. Proper filtration removes haze, sediment, yeast, and other particles — while preserving the taste customers love.

### For smaller brewers, we recommend:

- 3M™ High Flow Absolute Filter for heavy sediment removal
- Dual-layer 3M™ Zeta Plus™ Series Filter, which captures particles down to 1µm, for fine filtration
- 3M™ LifeASSURE™ BBA Series Filters for enhanced microbial control

These stages allow brewers to create stable, great-tasting beer without the need for additional filtration after the bright beer tank.



# Are filter presses slowing you down?

Conventional plate and frame filter presses have been used by brewers for years, but they're neither convenient nor efficient. That's why we developed the 3M™ Zeta Plus™ Series Filters — a cost-effective alternative that simplifies the beer filtration process while improving performance.

## 3M™ Zeta Plus™ H Series Filters

The Zeta-Plus H series filters feature charge-modified depth filter media with high wet-tensile strength, offering:

- Reliable filtration through multiple steaming, sanitization and regeneration cycles
- Extended filter life, reducing changeouts and operating costs
- Efficient haze and particle reduction, available in 8", 12" and 16" cartridge sizes

## 3M™ Zeta Plus™ Dual-Zone MH Series Filters

Designed for challenging beer filtration, the Zeta-Plus Dual-Zone MH series filters use a dual-layer construction to capture larger contaminants in the upstream layer and smaller particles in the downstream layer. They offer:

- Higher throughput and reduced processing costs with smaller assemblies
- Customizable designs to meet specific brewing applications
- Robust construction that withstands hot water, steam and chemical cleaning for longer service life



8" | 12" | 16" sizes

## Want more haze in your beer?

Not every beer calls for brilliant clarity. We offer more open grades of filters to help you dial in the perfect amount of haze for your beer.

## Get control of microbials with 3M™ LifeASSURE™ Series Filters

For brewers seeking advanced microbial control and superior product quality, the 3M™ LifeASSURE™ BBA Series Filters deliver reliable filtration that helps protect your beer from spoilage while preserving its intended flavor and clarity.



**Reliability:** Retains common spoilage microorganisms like *Lactobacillus brevis* and *Saccharomyces cerevisiae*.

**Consistency:** Absolute-rated performance ensures the same quality filtration batch after batch.

**Durability:** Withstands multiple hot water sanitization cycles for extended filter life and reduced downtime.

Whether you're brewing a hazy IPA or a crisp lager, LifeASSURE series filters help safeguard your beer so you can deliver a consistently excellent product.

# Advantages of lenticular filters vs. filter presses

## 3M™ Zeta Plus™ Series Filters vs. filter press

	3M™ Zeta Plus™ Series Filters (lenticular filters)	Filter press
Leakage	Zero leakage – no oxygen/bacteria pick up	As high as 1-2% of volume filtered
Labor	Filters can be changed in 15 minutes	It can take 2 to 4 hours to change a small filter press, reducing productivity
Change-outs	Cartridges are used completely – fewer change-outs are needed	Filters changed based on time in the press, not when filtration capacity has been achieved
Capital costs	Filter housings are typically 25-50% the capital cost of a stainless steel filter press	Filter presses are large, expensive pieces of equipment
Maintenance	Housing systems have 3 O-rings that are easy to clean and maintain	Presses typically have 4 O-rings per plate – heavy and cumbersome plates must be cleaned regularly
Disposal	Fewer change-outs results in reduced disposal costs	Filter sheets are discarded on a timed bases – additional disposal costs could be incurred
Floor space	Very small footprint frees up space for other operations	A 60cm <sup>2</sup> press requires up to 100 sq. ft. of floor space
Energy consumption	Reduced energy/water operation time – reach sanitation temperatures in about 15 minutes	Takes 30-90 minutes to reach sanitation temperatures

# Ensure every pour meets your standards

Microporous membrane filtration is an excellent method for achieving microbiological stability in non-pasteurized beer without the use of chemicals or heat. This process preserves the organoleptic properties of the beer – ensuring its taste and aroma remain intact until the moment it's enjoyed, even weeks or months after filling.

Solventum provides a cost-effective method to achieve this stability. By combining the economy of a depth filter, such as the 3M™ Zeta Plus™ Series Filter, with the security of a membrane filter, like the 3M™ LifeASSURE™ BA Series Filters or 3M™ LifeASSURE™ BBA Series Filters, Solventum offers a complete sterile filtration package to help brewers deliver high-quality, microbiologically stable beer.

## 3M™ LifeASSURE™ BA Series Filters

The LifeASSURE BA series filters combine a high-performance membrane with advanced cartridge construction to deliver reliable thermal resistance and microbiological control. This design enables continuous service under demanding process conditions, making it a trusted choice for brewers. Benefits include:

- High surface area, nylon 6.6 microporous membrane enhances flow and extends filter life
- Reliable spoilage organism retention ensures microbiological stability
- Durable cartridge design withstands repeated hot water sanitation cycles
- Individually serialized and integrity tested during manufacturing for full traceability

## 3M™ LifeASSURE™ BBA Series Filters

The LifeASSURE BBA series filters use an asymmetric polyethersulfone (PES) membrane to ensure beverage microbial stability. These filters are specifically designed for beer applications, delivering reliable microorganism retention and exceptional durability for long-lasting performance. Benefits include:

- Consistent, reliable microorganism control to protect beer quality
- Asymmetric PES membrane to optimize filtration performance
- Durable design to withstand repeated sanitization for extended service life



# Fast, efficient gas control

Capable of both adding and removing dissolved gases to liquids, 3M™ Liqui-Cel™ Membrane Contactors provide a versatile, compact in-line solution that delivers rapid deoxygenation, decarbonation, carbonation and nitrogenation of liquids to precise concentration levels.

Applying this advanced membrane-based technology in your brewing processes can improve operational efficiency, reduce guesswork and maintain or elevate product quality, consistency and stability.



## 3M™ Liqui-Cel™ Membrane Contactors

### Compact and versatile

- Install in space-limited locations
- May reduce or eliminate construction costs
- Can be mobile and used in multiple process steps

### Rapid in-line gas control

- May eliminate the need for tanks or pumps
- Reduces installation complexity
- Lower residence time may achieve the target gas concentration faster

### Predictable and precise

- Gas concentrations can be precisely controlled compared to spargers in tanks or kegs
- Gas infusion via a microporous membrane may improve foam stability and product quality

### High performance and efficient

- Systems designed to deliver low oxygen levels help protect against flavor oxidation and meet packaging specifications
- Smaller pumps and efficient use of sweep gasses reduce operating costs

### Modular design

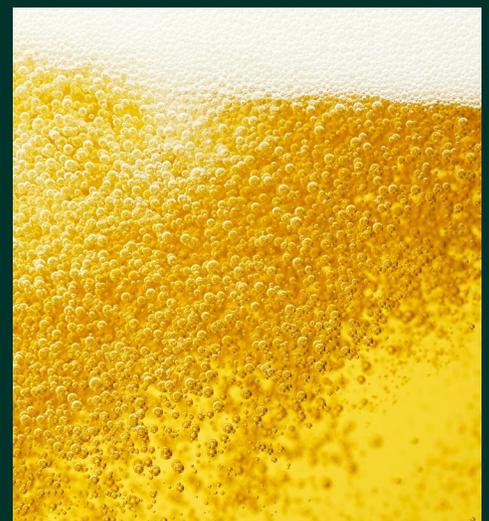
- Liqui-Cel skids can be expanded in smaller flow increments to support future production needs

## Deoxygenation

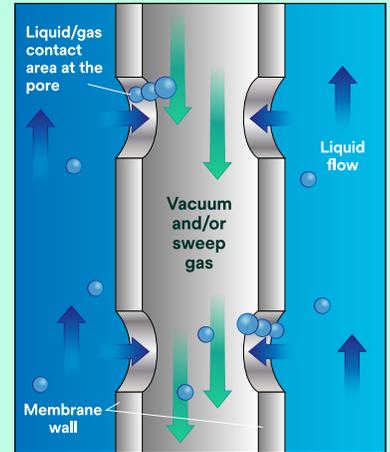
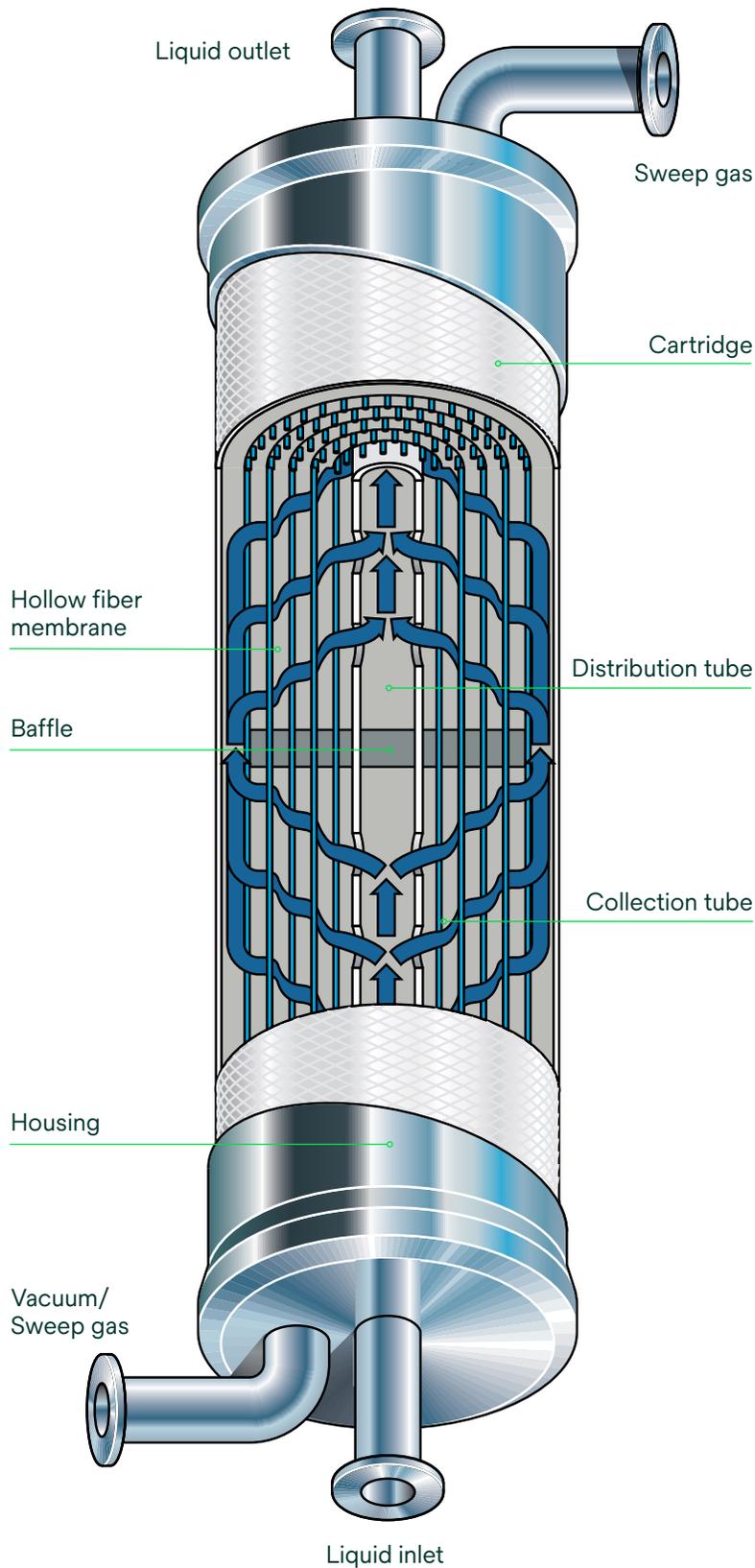
Oxygen in water used in beer production accelerates spoilage and shortens shelf life, while also impacting aroma and taste. Liqui-Cel membrane contactors can reduce dissolved oxygen (O<sub>2</sub>) in production water without chemicals, improving beer stability and shelf life.

## Carbonation, decarbonation and nitrogenation

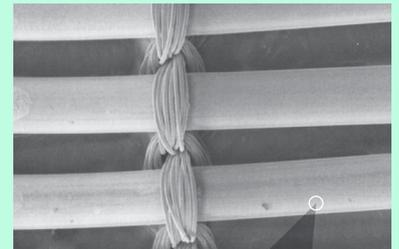
Carbon dioxide and nitrogen significantly influence beer's taste, texture, and appearance. Liqui-Cel membrane contactors offer a bubble-free in-line solution to infuse gases into water or beer with precision and predictability. They can also adjust carbonation levels to achieve your desired taste and mouthfeel.



# How it works



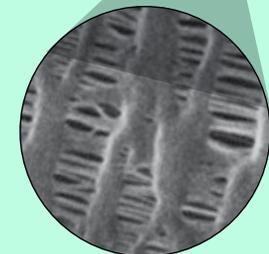
The hydrophobic membrane and small pore sizes keep liquid water from passing into the gas stream.



Hollow fiber membrane array



Hollow fiber



Hydrophobic membrane with pores

# We're always ready to serve

At Solventum, we believe in going beyond providing products — we're here to support you at every step of your brewing process. From optimizing filtration systems to solving complex separation challenges, our Application Engineering (AE) team works closely with brewers to deliver tailored solutions.

## Our market-oriented group of scientists and engineers offers:

- Validation and regulatory support to help ensure compliance
- Extractable and compatibility analysis for peace of mind
- Filter system optimization studies to improve efficiency and performance

With Solventum, you get more than advanced filtration systems — you get a partner dedicated to your success.



## 3M™ Filter Housings and Systems



### Process flow rate — small to large

Solventum offers a wide range of cartridge filter housings designed to meet diverse process flow requirements, from small-scale labs to full-scale production. These housings are built to grow with your brewery's needs, handling even the most critical applications with ease.

### User-friendly designs

Our filter housings are engineered with brewers in mind, making cartridge installation and removal quick and simple. Features like fast-action swing bolts, quick-release clamps and convenient cartridge hold-down devices ensure:

- Rapid filter changeouts
- Low labor requirements
- Reduced downtime

### Custom vessels and skids

We routinely produce housings designed for global food contact applications. Custom designs and specialized systems are available to meet your brewery's specific needs, ensuring seamless integration into your process.



## Application engineering

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The cornerstone for Solventum's philosophy is service to customers, not only in product quality and prompt delivery, but also in validation, application support, and the sharing of scientific information.

By using Solventum products, customers have access to Solventum Application Engineering support, a global team of market-focused scientists and engineers who excel in supporting collaborative efforts between customers and Solventum.

Our Application Engineers can work with you from start to finish to suggest the most effective and economical filters to achieve the clearest results.

**Intended use:** 3M™ Liqui-Cel™ Membrane Contactors are intended to remove dissolved gases and bubbles from liquids or to add gases to a liquid stream. Liqui-Cel membrane contactor products are for use in industrial separation applications of industrial fluids only, in accordance with the applicable product instructions, specifications, and where materials of construction are compatible. Liqui-Cel membrane contactors may further be used in the production of water for various pharmaceutical products upstream of the final water sterilization step. Certain Liqui-Cel membrane contactor products are compliant for use in Food and Beverage applications. For specific details regarding use or limitations for food contact applications please refer to the Liqui-Cel membrane contactor product's data sheet or contact your Solventum representative for more information.

3M™ High Flow, 3M™ Betapure™ NT, 3M™ LifeASSURE™, 3M™ Betafine™ XL, 3M™ Micro-Klean™ RT, 3M™ DF Series, and 3M™ Zeta Plus™ Series Filter products are intended for use in industrial and food and beverage filtration applications of aqueous and non-aqueous fluids in accordance with the product instructions, specifications and where materials of construction are compatible. Certain 3M high flow, Betapure NT, LifeASSURE, Betafine XL, Micro-Klean RT, DF series, and Zeta Plus series filter products are compliant for use in Food and Beverage applications. For specific details regarding use or limitations for food contact applications please contact your Solventum representative for more information.

Since there are many factors that can affect a product's use, the customer and user remain responsible for determining whether the Solventum product is suitable and appropriate for the user's specific application, including user risk assessments and evaluation of the Solventum product in the user's application.

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**Solventum Corporation**  
2510 Conway Avenue East  
St. Paul, MN 55144-1000  
Phone 1-800-243-6894  
1-203-237-5541  
Web Solventum.com

**3M Purification is now part of Solventum**

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