HYDROTECH ENGINEERING
a gradiant company

# Modular Water Treatment

## Engineered for the Food & Beverage Industry

Standardized Engineering | Flexible Configuration | Reliable Performance



Process water | Recovery & Reuse | Safe Discharge

# A new engineering approach

Hydrotech Engineering has developed a standardized engineering platform for Food & Beverage water treatment, combining validated module design with flexible process configuration. We standardize the engineering behind each module—reducing delivery time, simplifying commissioning and maintenance, and ensuring proven performance across every installation.

Each solution is then configured according to the customer's raw water quality, production capacity and process requirements, delivering the right treatment solution for every application.

### Standardized engineering

Validated equipment design to reduce engineering time and eliminate design issues.

### Easy maintenance

Standardized spare parts and simplified servicing throughout the plant lifetime.

### Faster delivery

Up to 3 months shorter delivery time thanks to standardized engineering and in-house manufacturing.

### Faster commissioning

Up to 1 month reduction during installation and start-up thanks to pre-tested software and standardized systems.

### Proven automation

Fully tested PLC software and validated control logic ensure reliable and consistent performance.

### Total process control

Complete in-house engineering, manufacturing and testing ensure maximum quality control.

# Available configurations

Line 1
**15 m³/h**

Line 2
**30 m³/h**

Line 3
**60 m³/h**

Line 4
**80 m³/h**

Each product line is based on standardized equipment engineered to simplify design, manufacturing and maintenance while allowing flexible process configurations.

Different flow rates require different solutions, with dedicated products designed to meet the specific needs of each application.

# Water treatment process

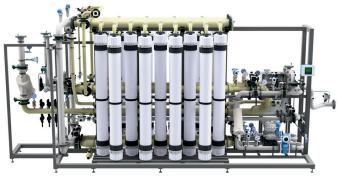
A modular product family designed to configure the optimal treatment process according to water quality, production capacity and application requirements.

1



**Multimedia Filtration (MMF)**
Removes suspended solids and protects downstream equipment.

2



**Ultrafiltration (UF)**
Removes bacteria, colloids and fine suspended particles.

3



**Activated carbon (standard)**
Removes chlorine, organics and compounds affecting taste and odour.

4



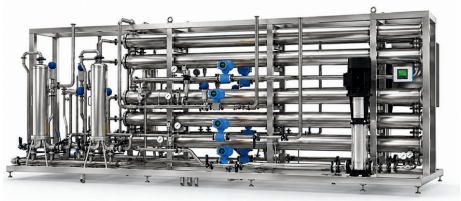
**Softener**
Reduces hardness and protects membrane systems.

5



**GAC LL (Hygienic Lead-Lag)**
Provides continuous chlorine removal and protects downstream membrane systems.

6



**Reverse Osmosis (RO)**
Produces high-quality process water by removing dissolved salts.

7



**Treated water storage**

# Water treatment tecnologies

## 1. Multimedia Filtration

### The first barrier for reliable process water treatment

Water passes through multiple layers of specially selected filtration media that retain suspended solids and naturally occurring particles according to their size.

This robust pretreatment technology provides the ideal operating conditions for all downstream treatment stages.



✓ **Removes suspended solids**

✓ **Iron & manganese removal**

✓ **Protects downstream equipment**

✓ **Fully automatic backwashing**

| Technical Highlights | |
|---|---|
| Technology | Multimedia granular pressure filtration |
| Filter Media | Quartzite + Activated Pyrolusite |
| Vessel Material | Coated Carbon Steel |
| Automation | Full Automatic |
| Operation | Parallel Pressure filters |
| Backwash | Filtered water and Air |

| Available configurations | Capacity |
|---|---|
| Line 1 | 25 $m^3/h$ |
| Line 2 | 50 $m^3/h$ |
| Line 3 | 100 $m^3/h$ |
| Line 4 | 125 $m^3/h$ |

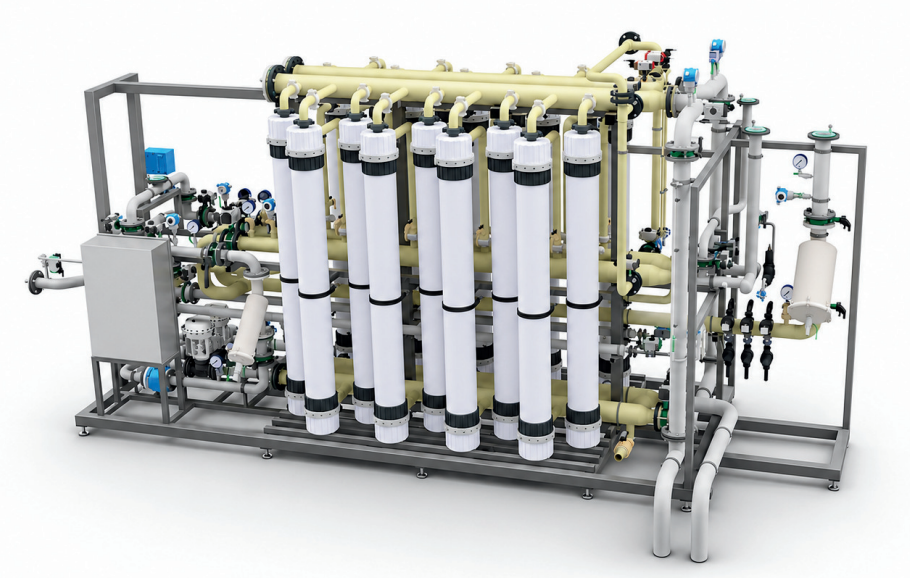
# Water treatment tecnologies

## 2. Ultrafiltration

### The microbiological barrier for superior process water quality

The UF module uses advanced hollow fiber membrane technology to remove bacteria, viruses, colloids and fine suspended particles from water.

Acting as a physical barrier, ultrafiltration produces consistently high-quality water while providing the ideal feed conditions for downstream treatment stages and ensuring reliable process performance.



✓ **High microbiological protection**

✓ **Removes bacteria & viruses**

✓ **Stable filtration quality**

✓ **High recovery**

| Technical Highlights | |
|---|---|
| Technology | Hollow Fiber UF |
| Membrane Material | PVDF / PES |
| Pore Size | 20–30 nm |
| Recovery | > 90% |
| Operation | Single – Parallel lines |
| Automation | Full Automatic - CEBW and CIP |

| Available configurations | Capacity |
|---|---|
| Line 1 | 25 $m^3$/h |
| Line 2 | 45 $m^3$/h |
| Line 3 | 90 $m^3$/h |
| Line 4 | 120 $m^3$/h |

# Water treatment tecnologies

## 3. GAC – Standard

### Preserving taste. Protecting quality.

The Activated Carbon module treats water by passing it through a bed of high-performance granular activated carbon (GAC).

Thanks to its highly porous internal structure and large adsorption surface, the carbon media captures dissolved organic compounds, residual chlorine and substances responsible for taste and odour. Once the adsorption capacity is exhausted, the carbon media can be replaced, restoring the filtration performance and ensuring continuous operation.



✓ **Removes chlorine & dissolved organics**

✓ **Improves taste & odour**

✓ **Protects downstream membrane systems**

✓ **High adsorption efficiency with automatic operation**

| Technical Highlights | |
|---|---|
| Technology | Granular Activated Carbon Filtration |
| Contact time | >15min |
| Vessel Material | Coated Carbon Steel |
| Automation | Full Automatic backwash |
| Operation | Parallel pressure filters |
| Backwash | Filtered water |

| Available configurations | Capacity |
|---|---|
| Line 1 | 20 $m^3/h$ |
| Line 2 | 40 $m^3/h$ |
| Line 3 | 80 $m^3/h$ |
| Line 4 | 100 $m^3/h$ |

# Water treatment tecnologies

## 4. Softener

### Protecting your process from scale.

The Softening module reduces water hardness through an automatic ion exchange process. As water passes through the resin bed, hardness ions are removed before the membrane treatment stages.

Once the resin reaches saturation, an automatic regeneration cycle restores its exchange capacity, ensuring continuous and reliable operation.



✓ **Protects membranes & equipment**

✓ **Prevents scale formation**

✓ **Removes water hardness**

✓ **Fully automatic regeneration**

| Technical Highlights | |
|---|---|
| Technology | Ion Exchange Softening |
| Resin Type | Food Grade Resin |
| Regeneration | Automatic NaCl Regeneration |
| Automation | Full automatic regeneration |
| Sanitization | Steam flushing |
| Vessel Material | AISI316 |
| Operation | Parallel pressure filters |

| Available configurations | Capacity |
|---|---|
| Line 1 | 20 $m^3$/h |
| Line 2 | 40$m^3$/h |
| Line 3 | 80 $m^3$/h |
| Line 4 | 100 $m^3$/h |

# Water treatment tecnologies

## 5. Activated Carbon Lead-Lag

### Engineered for continuous water quality.

The Carbon Lead-Lag module consists of two activated carbon vessels installed in series. Water first passes through the Lead vessel, where the primary adsorption process takes place. It then flows through the Lag vessel, which continues the adsorption process and safeguards water quality as the first carbon bed approaches exhaustion.

During maintenance, the saturated carbon is replaced in the Lead vessel while the Lag vessel temporarily assumes the primary filtration role, ensuring continuous operation without production interruption.



✓ **Uninterrupted operation during replacements**

✓ **Maximum protection of downstream membranes**

✓ **Continuous chlorine & organics removal**

✓ **Extended carbon media utilization**

| Technical Highlights | |
|---|---|
| Technology | Granular Activated Carbon LL |
| Configuration | Lead-Lag |
| Contact time | >15 minutes per filter |
| Automation | Full automatic regeneration |
| Sanitization | Steam flushing |
| Vessel Material | AISI316 |
| Operation | Parallel pressure filters lines |

| Available configurations | Capacity |
|---|---|
| Line 1 | 20 $m^3/h$ |
| Line 2 | 40 $m^3/h$ |
| Line 3 | 80 $m^3/h$ |
| Line 4 | 100 $m^3/h$ |

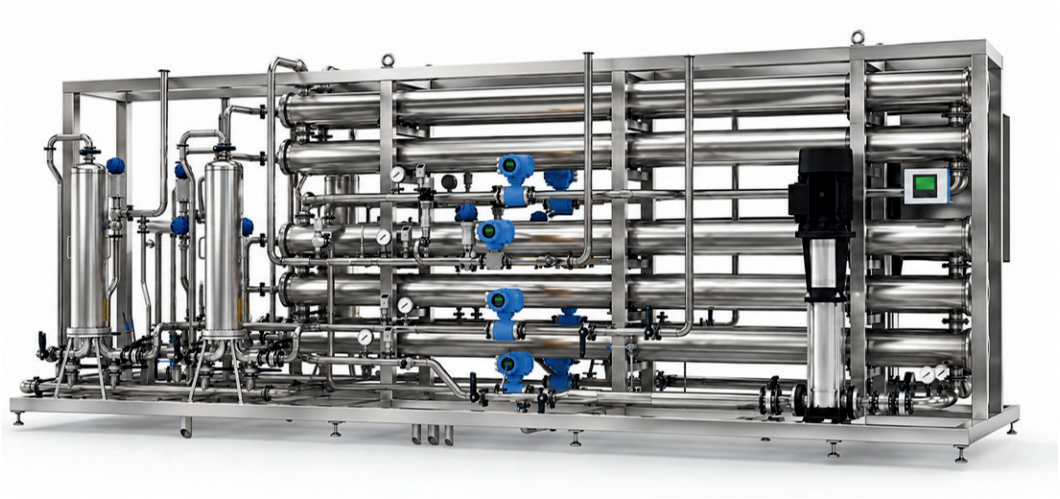
# Water treatment tecnologies

## 6. Reverse Osmosis

### Delivering the purity your process demands.

The Reverse Osmosis module purifies water by forcing it through semi-permeable membranes under controlled pressure. Water molecules pass through the membrane, while dissolved salts, minerals and other impurities are retained and discharged as concentrate.

This separation process produces high-purity permeate suitable for the most demanding Food & Beverage applications.



✓ **Produces high-purity process water**

✓ **High recovery and energy efficiency**

✓ **Removes dissolved salts & impurities**

✓ **Reliable automated operation**

| Technical Highlights | |
|---|---|
| Technology | Reverse Osmosis |
| Membrane Type | Spiral Wound RO Membranes |
| Salt Rejection | Up to 99.5% |
| Recovery | Up to 90.0% |
| Sanitization | Hot Water Sanitizable membranes |
| Automation | Full automatic - CIP - SIP |

| Available configurations | Capacity |
|---|---|
| Line 1 | 15 $m^3/h$ |
| Line 2 | 30 $m^3/h$ |
| Line 3 | 60 $m^3/h$ |
| Line 4 | 80 $m^3/h$ |

# Water treatment tecnologies

## CIP/SIP

### Automated cleaning for hygienic process performance

The CIP/SIP unit is designed to automatically clean and sanitize process equipment without dismantling the system. During the CIP (Cleaning In Place) cycle, dedicated cleaning solutions are circulated through the process line to remove product residues and fouling.

The SIP (Sanitizing In Place) cycle subsequently sanitizes the equipment using hot water or steam, depending on the application, restoring hygienic operating conditions before production resumes.



✓ **Fully automatic cleaning cycles**

✓ **Reduced production downtime**

✓ **Consistent hygienic conditions**

✓ **Optimized chemical and water**

| Technical Highlights | |
|---|---|
| Technology | CIP / SIP Unit |
| Cleaning Process | Automatic Recirculation |
| Heating fluid | Hot Water or Steam |
| Material | AISI 316L Stainless Steel |
| Automation | Full automatic / Recipe Management |

| Available configurations | Capacity |
|---|---|
| Line 1 | 30 $m^3/h$ |
| Line 2 | 50 $m^3/h$ |
| Line 3 | 70 $m^3/h$ |
| Line 4 | 100 $m^3/h$ |

# Engineered for Hygiene

Every Hydrotech Engineering module is designed according to hygienic engineering principles to simplify cleaning, reduce contamination risks and maximize long-term process reliability.



Traditional RO Plant



Hydienic Design

| Traditional RO Plant | Hygienic Design |
|---|---|
| ❌ Difficult cleaning | ✓ AISI 316 stainless steel |
| ❌ Mixed construction materials | ✓ Easy access for maintenance |
| ❌ Higher maintenance effort | ✓ Cleanable piping |
| ❌ Higher contamination risk | ✓ Optimized component arrangement |

# References

Hydrotech Engineering has established important collaborations with leading global companies in the Food & Beverage sector, building turnkey plants in different parts of the world, including Asia, Africa, Central America and Europe. These successes have solidified our partnerships with renowned players in the industry who have repeatedly confirmed the high standard of our services during various collaborations, reinforcing their trust in Hydrotech Engineering.

Discover the plants built by Hydrotech Engineering here:



For over 25 years, Hydrotech Engineering has been building state-of-the-art turnkey plants for the treatment of process water and wastewater using semipermeable membrane and biological process technologies. With more than 200 proven installations in over 25 countries, Hydrotech Engineering has supported over 100 companies in reducing water consumption and recovering as much as possible for more sustainable water use.

Our team coordinates projects, from design to after-sales service, all over the world between the headquarters in Italy and India.

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