A GUIDE TO INDUSTRIAL WATER FILTRATION

Find out everything you need to know about water filtration including how each system functions.

Membracon

INTRODUCTION

Water is wasted daily. It's either treated with chemicals to resell or disposed of incorrectly, in turn harming the environment. It's the companies responsibility to ensure waste is minimised and water is treated before disposal.

Due to the vast quantity of water used in manufacturing, businesses are the biggest culprit of wasting resources such as water.

There are a variety of options when it comes to water filtration in industrial processes. This guide runs through everything you need to know about what water filtration is, how each system works, and the sectors that can benefit from it.

CONTENTS

This guide will:

- Give an overview of what water filtration is
- Explain why it's used in industrial processes
- Explain the difference between each system and how they work
- Demonstrate how water filtration systems can be used in specific sectors

WHAT IS WATER FILTRATION?

Water filtration is the removal of impurities out of an initial raw water source or wastewater. Systems are put in place in the production line to supply the correct quality of water. As the water passes through the system, membranes capture and remove impurities.

There are various solutions such as;

- **Reverse Osmosis**
- **Water Recycling units**
- **Ceramic Filtration**
- **Ultrafiltration**
- **Nanofiltration**
- **UV light**

Different industries require different qualities of water. Food and beverage industries would require a more defined quality due to it being used to human consumption.

Reverse osmosis is capable of rejecting **99.9% of bacteria**, making it the most effective filtration system. It's used frequently in the design of pharmaceuticals pure water systems.

Finishing processes in the automotive and aerospace industries require precise water specifications to ensure the highest quality of the production parts.

THE OBJECTIVE

Membracons objective is to supply businesses on how water filtration systems can help them have a greener, cleaner and safer working environment.

Traditional water treatments can include chemicals that then impose a risk to staff.

Modern membrane technologies eliminate these risks whilst also being far more environmentally friendly. Read on to find out everything you need to know about water filtration. If you have any questions or queries then get in touch.

HOW TO MANAGE AND TREAT INDUSTRIAL WASTEWATER

Modern membrane technologies allow for the treatment of industrial wastewater solutions to be managed by an all in one system.

Dependent on the water issue and the quality of water you want to achieve, multiple units can be combined to create a bespoke water solution for your industrial process.

Industrial wastewater is mainly treated through the use of membranes; as water passes through, impurities are captured, leaving you with clean water to re-enter the water cycle or reuse in production.

More traditional treatments include the use of harsh chemicals; rising costs and growing health and safety hazards, we are seeing a decline in these methods.


PRODUCTS
Membracon provides water filtration solutions through a variety and sometimes a combination of systems.
ULTRA FILTRATION
REVERSE OSMOSIS
WATER RECYCLING
MEMBRANES
BACTERIA PREVENTION
FLEXOPERM SYSTEMS

REVERSE OSMOSIS

Reverse osmosis (RO) is becoming increasingly popular in wastewater management within the industrial process due to the many benefits it has.

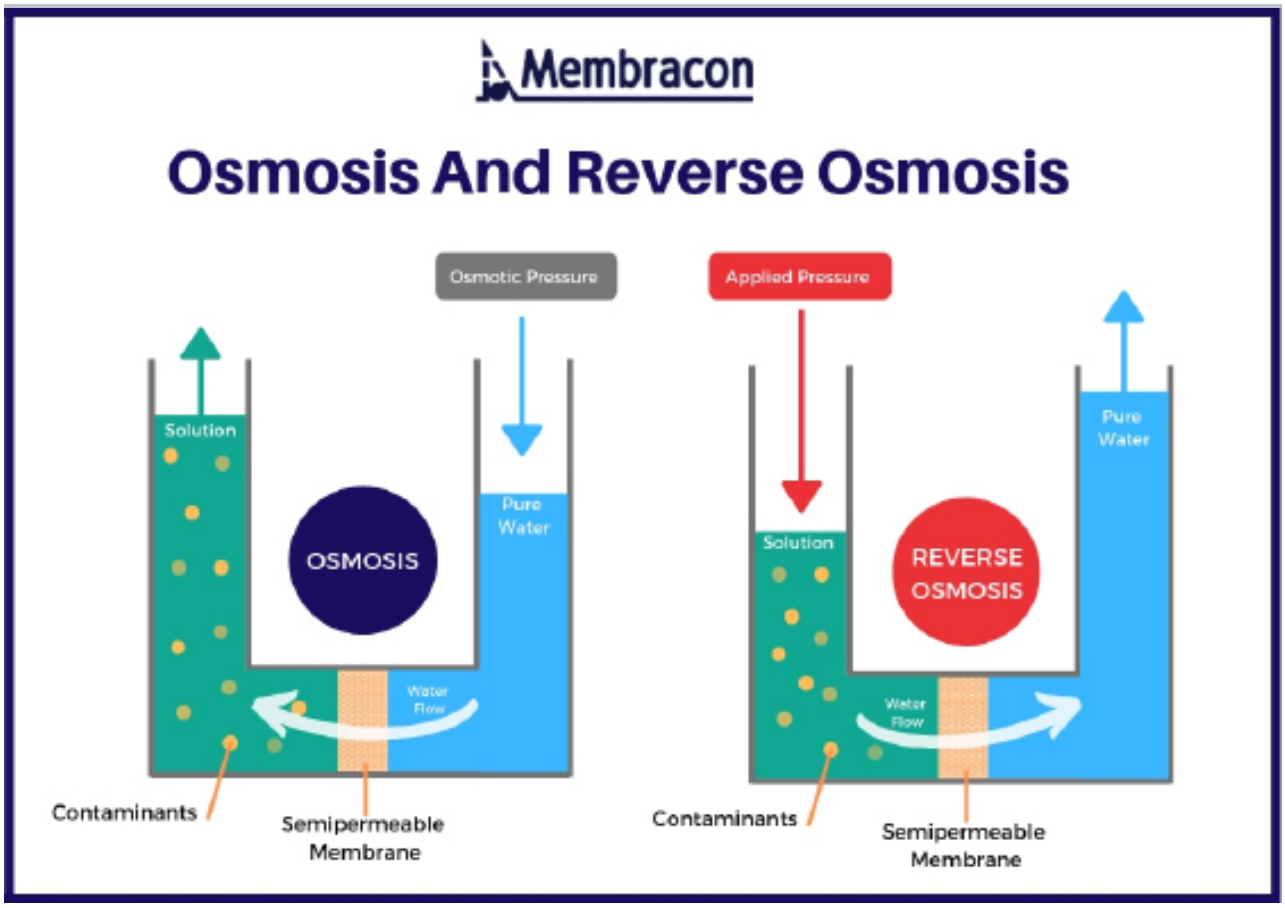
It's capable of rejecting 99.9% of bacteria, making it ideal for the use in pharmaceuticals pure water systems.

RO systems manage wastewater and themselves, as they are self-containing self-cleaning units. RO treats wastewater by using pressure to make the water pass through semi-permeable membranes, removing impurities as it passes.

It doesn't use any chemicals and requires very little maintenance, just a daily check by onsite personnel.

This makes RO an incredibly sustainable and green option for industrial wastewater management.

RO is already being used heavily in the automotive and aerospace industry in finishing processes to achieve precise water specifications to ensure the highest quality of the production parts.



In osmosis, a lower-concentrate solution will filter its solvent to a higher concentration solution. In reverse osmosis, we are just reversing the process, by making our solvent filter out of our high concentrate into the lower concentrated solution.

So instead of creating a more equal balance of solvent and solute in both solutions, it's separating solute from solvent (the contaminants from water).

These are more commonly referred to as concentrate and permeate.

This isn't something that solutions want to do, so the pressure is added to the equation to make reverse osmosis occur.

Pressure forces the water to pass through the membrane, removing the impurities in the water.

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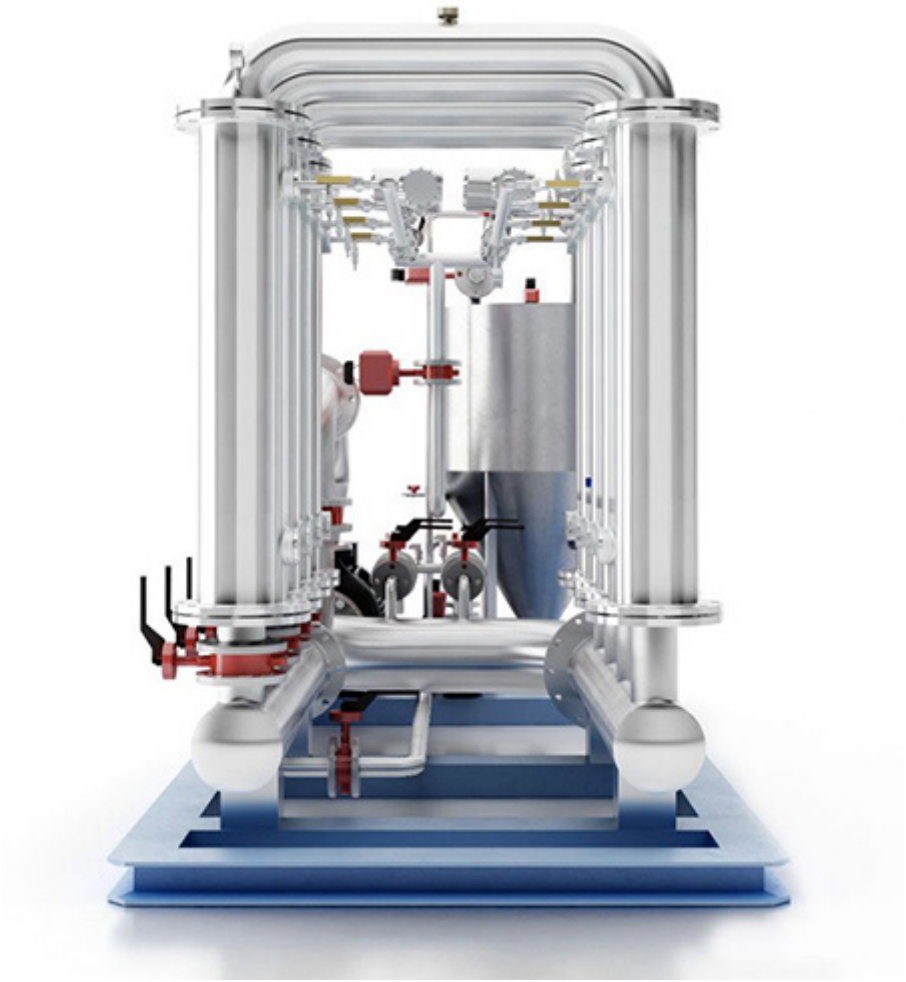
WATER RECYCLING UNITS AND CERAMIC FILTRATION

Water recycling units use ceramic membranes as they can provide filtration at high flows, whilst minimising membrane fouling.

They can be regenerated via a wide range of chemical and chemical cleaning conditions than the more conventional spiral and hollow fibre membranes.

The ceramic material allows them to filter fluids with a high concentration of oils, suspended solids and high viscosity.

Water recycling units are designed to assist Membrane Bio-Reactor (MBR) systems, which is a biological wastewater treatment process coupled to a membrane filtration system.



The key advantages of using ceramic membranes are;

Optimum permeate quality: the high quality of the supports, along with the multiple layer depositions process, allows the appropriate permeate quality, avoiding the appearance of cracks and micro-breaks which could contaminate and deteriorate the permeate.

Reliability: membranes are manufactured following rigorous quality control, using powders of a controlled granulometry to obtain the maximum homogeneity in the pore size.

Minimum fouling: thanks to the ceramic material and the latest fabrication techniques, the suitable hydrophilicity degree is achieved, so that the deposition of molecules on the membrane surface and the biofouling processes are reduced, thus minimizing fouling.

Easy regeneration: the ceramic materials used allow aggressive regeneration to take place. Chemical cleaning, with caustic soda, acids, and other specific products at high temperatures are possible.

Therefore, severe fouling of the membranes, that has been generated during the filtration process, can be efficiently recovered, extending the membrane lifetime and minimising the maintenance required.

Membracon can supply a number of water filtration product solutions to suit your requirements.

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MEMBRANES/ULTRAFILTRATION

Ultrafiltration (UF) spiral membranes are ideal for most concentration or clarification applications.

Their construction suits a broad range of chemical, temperature and pressure applications.

They are energy-efficient, compact and economical to install, making them ideal for wastewater management in industrial processes.

Ultrafiltration blocks everything microfiltration (MF) can with the addition of viruses, requiring a slightly higher pressure to achieve this.

Although it requires higher pressure than MF, ultrafiltration can be powered by the pressure you get from the tap, making it popular in the commercial sector for drinking water.

It works the same way as MF by which a contaminated liquid passes through a membrane that is too large to fit through the membranes pore sizes, yielding a purified liquid stream.

Ultrafiltration filters have a pore size of approximately 0.01 micron (smaller).

UF can be used in the following processes:

- **Treating wastewater**
- **Concentrating proteins**
- **Chemical process separation**
- **Separating oil/water emulsions**
- **Removing pathogens from milk**
- **Clarifying fruit juices**

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ULTRAFILTRATION FLEXOPERM SYSTEMS

Membracon's revolutionary arrangement of the housing and pipework makes the Flexoperm® Ultrafiltration (UF) system more compact than any other UF system for electrocoat paints.

It's more convenient for the operator, membrane element replacement is much easier, the element is easily lifted off at a convenient height so reducing headroom or the need for a hoist.

Clean-in-place (CIP) systems, available as an optional extra, allowing routine maintenance procedures to be carried out during normal production hours.

Complete spares, replacement and service agreements are available.

Get in touch today or request a quote.

NANOFILTRATION (NF)

Nanofiltration membranes typically remove 50% – 90% of monovalent ions such as chlorides or sodium.

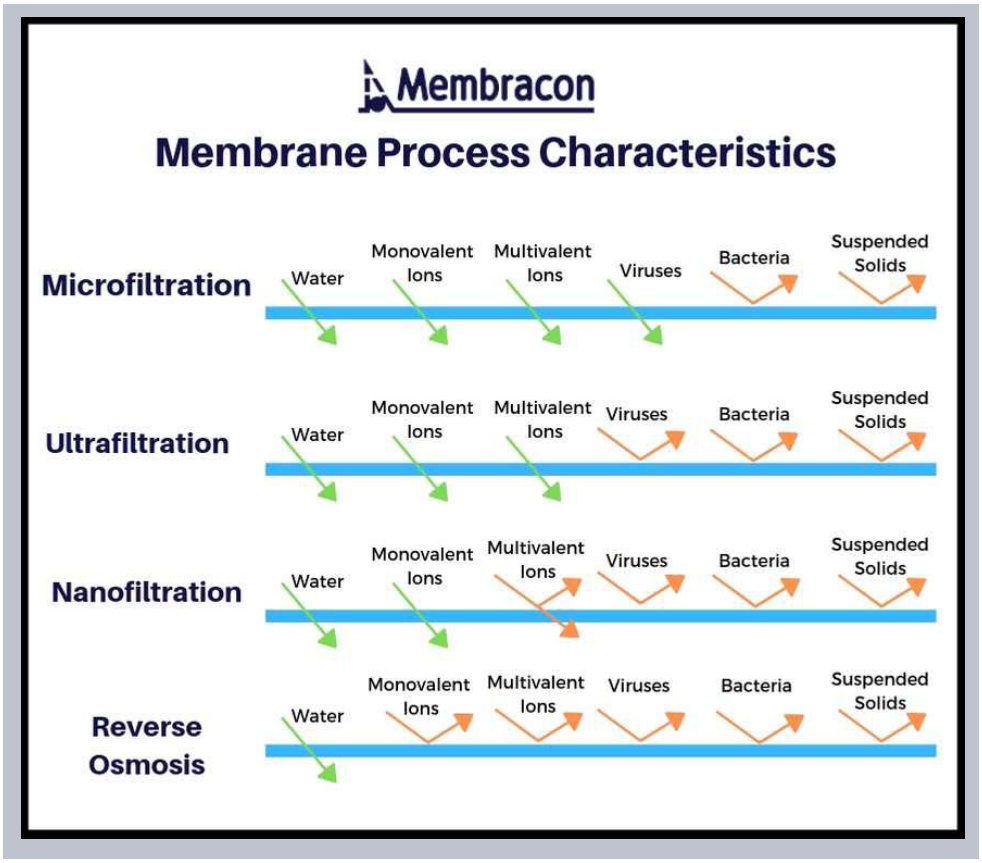
The design and operation of the filters used in NF are very similar to that of reverse osmosis, with some differences. Those being the membrane isn't as 'tight' as RO membranes and a lower feedwater pressure is required.

Nanofiltration filters have a pore size of approximately 0.001 micron (smallest).

It has attained the name of the 'softening membrane' as it is often used to filter water with low amounts of total dissolved solids, to remove organic matter and to soften water.

NF can be used in the following processes:

- **Water treatment**
- **Pre-treatment for RO**
- **Pharmaceuticals**
- **Textiles**
- **Bakeries**
- **Dairy**



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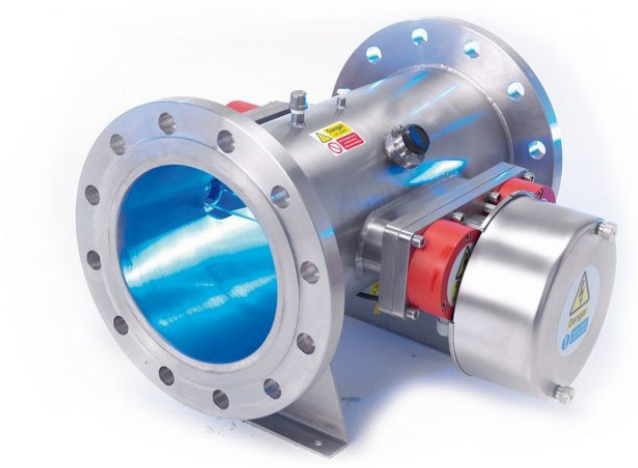
BACTERIA PREVENTION

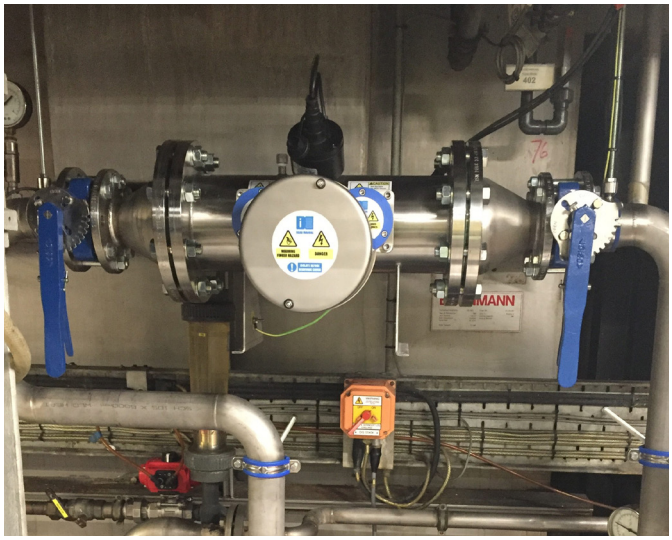
Water is used at some point in almost every manufacturing process worldwide. In many industrial applications, the use of chemicals such as chlorine or biocides is restricted for process reasons.

Ultraviolet Disinfection (UV) provides a highly effective, chemical-free solution for a vast range of industrial applications.

UV light wastewater treatment is used for bacterial control, ensuring organisms are unable to replicate. They have a typical life of only a few minutes, making them harmless.

UV treatment does not affect the colour, taste or pH of the water. It can be used to remove chlorine, chloramines, ozone, bromine and a wide variety of organic contaminants, making them ideal for treating industrial wastewater.





Correctly sized UV systems can aldo be used to de-chlorinate or de-ozonate process water.

In addition to providing an effective disinfection solution, UV treatment can be used to remove chlorine, chloramines, ozone, bromine and a wide variety of oganic contaminants such as urea, phenols and polyaromatic hydrocarbons from industrial process water.

Common applications include:

- **Food & Beverage**
- **Pharmaceuticlas**
- **Building Services**
- **Aquaculture**
- **Advanced Oxidation**
- **Horticulture**
- **Liquid Sugar**

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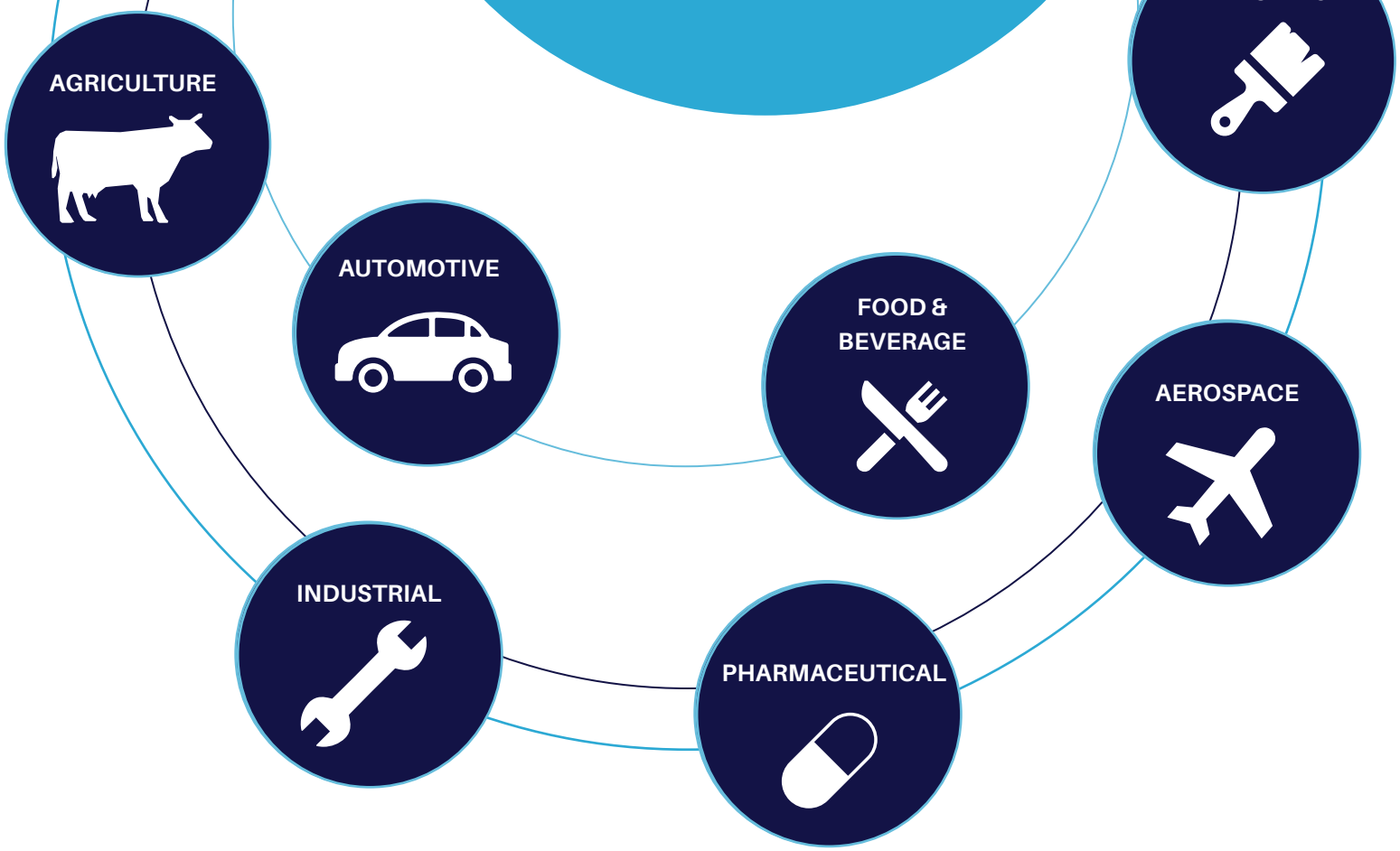
Request A Quote

SECTORS

Membracon provides water filtration solutions to a variety of sectors in the UK and internationally.



AUTOMOTIVE

The automotive industry has one of the highest levels of water usage across many other sectors. It's a key element of the entire process of producing, maintaining and cleaning a vehicle and the components that comprise them.

In the production stages of creating a vehicle, water usage is at its highest. The wastewater produced from manufacturing cars can contain metals, oils, grease and harmful chemicals from paint residue.

These products can cause long-term damage to the environment and be dangerous if they enter the main water system.

The paint application included in the automotive production process uses more water than any other process.

Elsewhere in the automotive sector, the car cleaning division uses huge volumes of water. The water contains soaps, cleaning agents, and the dirt, salt and grime that comes off the car. This then gets washed down the drain where it can contaminate local water sources.

Installing Water Treatment Solutions

There is a growing concern regarding water usage across the automotive sector. This means more businesses are looking for a long-term, sustainable solution that will help reduce the volume of water being wasted.

The installation of a water treatment system into an automotive plan can have a drastic impact on the environmental footprint generated by water usage. Over time, this reduces costs to the business.

Water can be treated to remove the hazardous chemicals, to then be recycled back into the plant so there is less water wasted down the drain.

The water can be reused once it's clean and the waste products that have been removed can be disposed of, rather than flushed away.

INDUSTRIAL

Much like the automotive industry, cleaning the machinery is a big contributing factor to the amount of water used in industrial processes.

The cooling of products and equipment is part of everyday processes.

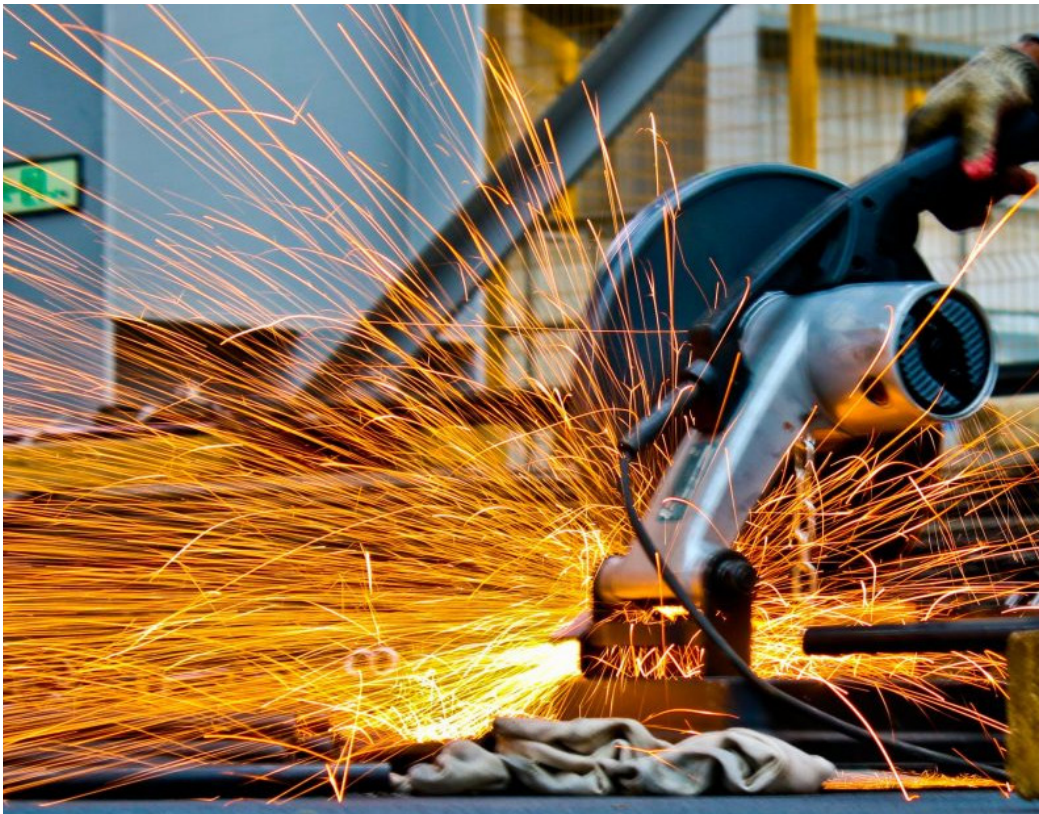
Water scarcity is often a problem for those in the industrial sector. As high volumes of water are constantly required, areas begin to experience problems with shortages.

As water is so integral in the day to day operational demands of the industrial sector, it's naturally one of the main focuses for areas to improve on.

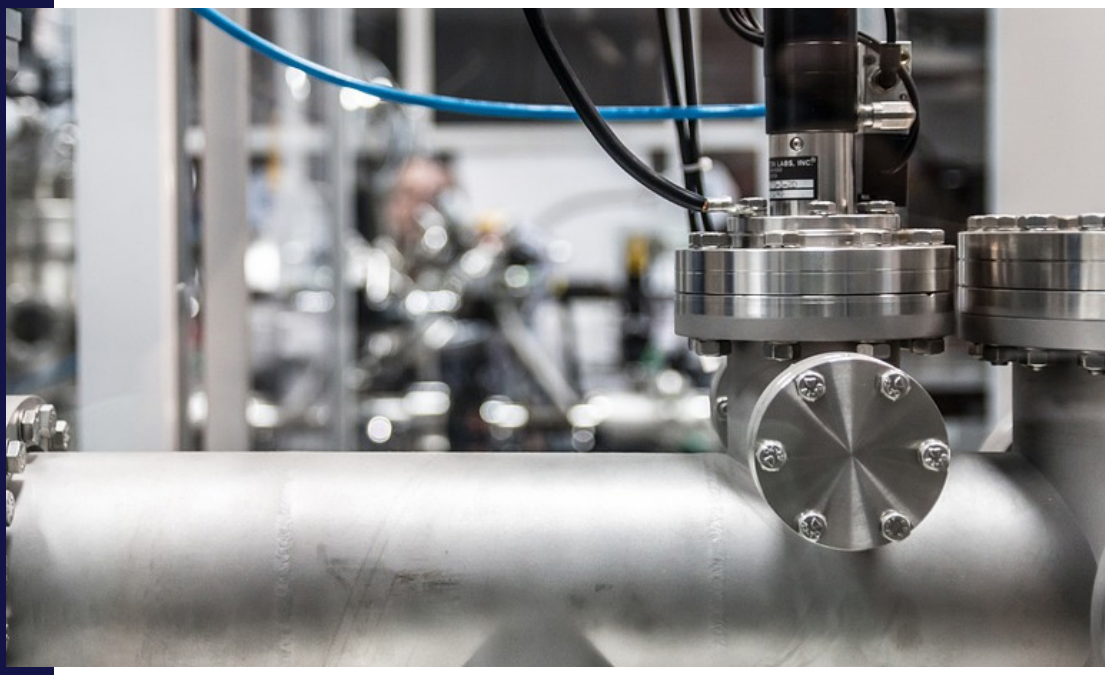
Installing water treatment facilities into your industrial plant can help to drive down the environmental damage and the cost caused by wastewater.

Installing a ceramic water filtration water recycling facility, for example, allows the wastewater to be treated through the separation of dirt and chemicals from the water.

The water can then be cleaned, making it usable once again. Reducing the amount of water that businesses need to pull in from the main water supply or store.



FINISHING



The finishing part of a production process can be one of the most demanding in terms of volume of water it requires. Certain industries have higher demands for finishing than others.

However, to ensure that the end result of the product is to the highest standard, it's inevitable that the usage of water will be very high.

Due to the nature of the process, there will very few water restrictions. For example, if you've already spent a lot of money on building a car, you're not going to compromise and do a bad job of the paintwork right at the end of production.

This makes installing a water recycling system an even smarter business decision.

Poor quality water going through the system not only affects the environment; it can affect the quality of the finished product.

Benefits Of Installing A Water Treatment Solution

Adding a water treatment system for finishing processes can help improve the efficiency of production.

Setting up, preparing chemicals and equipment are part of the pre-finishing stage. This includes cleaning tools and the working area.

By installing a water filtration system, there will be less water usage. This is due to the water being reused from previous processes. This in the long term will lower costs.

AEROSPACE

As one of the fastest developing industries of today, the aerospace sector uses huge volumes of water daily as it provides services for commercial, defence and space exploration backgrounds.

Aerospace water usage is caused by manufacturing, maintenance and cleaning of aircraft as well as the running of amenities onboard such as sinks and toilets.

A highly precise system is required for all matters around production and cleaning. To reach the high standards required, a high volume of water is used across the sector.

The result of this is a lot of wastewater being flushed away, contributing to environmental problems and higher costs to businesses.

How Can Water Treatment Help?

Installing water treatment facilities into aerospace plants will create a cleaner process that will be both environmentally conscious and cost-effective.

Water treatment systems can remove the dirt and chemicals from manufacturing or cleaning of aerospace products. Once correctly separated the chemicals can be disposed of rather than allowed to be washed down the drain.

By running the separated water through a cleaning process such as Reverse Osmosis or Ultrafiltration, it can then be recycled and used again.

PHARMACEUTICAL

There is a naturally high volume of water that is both used and wasted in the pharmaceutical sector. This is a result of the chemicals that are used in the production of medical products that are intended for both human and animal use.

This sector also covers the production of chemical-based products such as cleaning agents, which require a lot of water throughout producing and distributing.

If any chemicals used in production were allowed to enter the main water system they can pose a health risk to the population as they contain medical products that could have damaging long-term effects.

The Benefits Of Water Treatment

A managed water treatment system can remove chemicals and bacteria from the water, allowing businesses to reduce the overall amount of water they use.

Water is not only used to produce products but to sterilise equipment, working areas and in cleaning processes that follow.

Producing purified water isn't just vital for the reduction of water usage but is critical to ensure that when water is recycled that it's clean and had all harmful bacterias removed.

If not, there is a risk of cross-contamination with other products which can be costly to rectify as well as damaging to a business's reputation.

FOOD AND BEVERAGE

The food and beverage sector is as expected, heavily regulated, as the products are consumed by humans.

Because of this water usage is high, not only is it a major ingredient in food and drinks but it's an essential part of maintaining food hygiene standards.

Certain foods like meat and poultry carry pathogens that need to be properly removed though cleaning and cooking. As the food is prepared these pathogens can spread onto surfaces and kitchen equipment.

This is where sterilisation of kitchen areas is supported by the use of water, ensuring the bacteria can't reach other areas which could cause harm.

The strict guidelines around food handling and hygiene mean safety is at it's highest at all times. As a result of this, water usage is high.

How Can Water Treatment Help

It's predicted by Food Manufacturer that through proper management and the installation of water recycling and treatment facilities, businesses could save drastically on their bills every year.

Savings can be so big that they could be reinvested into staff training, hiring more employees and growing businesses.

There's a social responsibility to have better water practices. This can be achieved without a sacrifice of food hygiene standards which many businesses rely on within the sector for reputation and success.

AGRICULTURE

The dairy and agriculture sector is one of the most heavily regulated in terms of its hygiene standards. This is due to the need for strict disease control and the sheer volume of produce it generates.

Water is also used as part of the growth and management of crops, the cleaning and sterilising of farm equipment and the cooling and storage of fresh produce.

The fact that it takes 41 billion litres of water to produce one year's worth of milk highlights how vast quantities are.

Part of this huge volume is to keep dairy sheds clean to prevent the spread of harmful bacteria. Unclean environments could have catastrophic consequences for a farm if a herd was to be affected.

With large quantities of water usage comes a high volume of waste. With over half of the producers in the UK using water inefficiently, there is large scope for improvements.

Why Install A Water Treatment Solution?

With the mounting concern of preventing disease, the cost of installing a water treatment facility could far outweigh the damages to a business if harmful bacteria were to infect livestock.

The UK Government have lay out strict regulations on managing the risk of disease within this industry. It's vital that businesses manage their water as part of this.

Taking a Reverse Osmosis system as an example, they form part of water treatment solution that could be invaluable to a dairy and agriculture business. This is because it reduces the presence of harmful bacteria, reducing the overall expenditure needed to generate clean waterfor the business over time.

The correct water treatment can remove the presence of mud, solids and harmful bacteria from the water. This could lower the risk of illnesses within livestock whilst also driving up the quality of the produce.

Additionally the water can then be recycled back into the facility which creates a cost saving over time on the amount being spent on water use.

CLIENTS

Membracon has worked with a range of companies, below are examples of just some of our clients.

ABOUT MEMBRACON

Membracon is a global leader with 60 years experience in the industrial water treatment sector, providing product solutions and technology to world-class manufacturing businesses on every continent.

Membracon's expertise help companies find the right water treatment solution for their processes. Each system is built completely bespoke to each customer. Some include a combination of more than one water filtration system to ensure your target water quality is achieved.

The first step to understanding your water issue is to have a water analysis test. Click here to get your free test.

It's Membracon's mission to educate and supply companies on how they can recycle, reuse and save money by introducing a water filtration system.

Not only is it environmentally friendly but Membracons modern membrane technology is safer and requires less maintenance than traditional water treatment methods.

To help with your water treatment problem, Membracon offers a wide selection of finance, rental, product solutions, service maintenance and commissioning programs to suit your requirements.

Membracon offers full product range Installation services, Training, Performance Surveys, Maintenance and Service Agreements.

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