Technology for Water

ENVIROCHEMIE

# WASTEWATER TREATMENT SOLUTIONS FOR THE PHARMACEUTICAL & LIFE SCIENCES INDUSTRY


## EnviroChemie – international competence in water technology

We are experts in industrial water and wastewater technologies. Our core competence lies in providing our customers with reliable and innovative solutions. As an engineering company, we offer a complete range of services based on our long international experience. We are always focused on our customers and assist them with the design, planning, engineering, building and commissioning of our plants. In our research facilities and our pilot plants, together with our partners and customers we can develop custom solutions for even the most complex and demanding tasks.

Our high-quality "Made in Germany" solutions are based on chemical-physical, biological and membrane filtration processes, whose state of the art draws on our long list of research achievements and patents. Additionally, more than 30,000 plants already installed worldwide have given us the necessary expertise for further continuous development of industrial water and wastewater technologies. Thanks to our in-house Research and Development Department, we can always take advantage of the full potential of technology to consistently meet our customers' requirements.

Leading companies from all around the globe, representing a wide range of industrial sectors already rely on our expertise.

## Sustainable plant solutions – environmentally friendly and economic

**Tasks**

- Minimising operating costs
- Energy efficiency
- Sustainable technologies
- Plant optimisation of cost reduction
- Zero discharge

**Solutions**

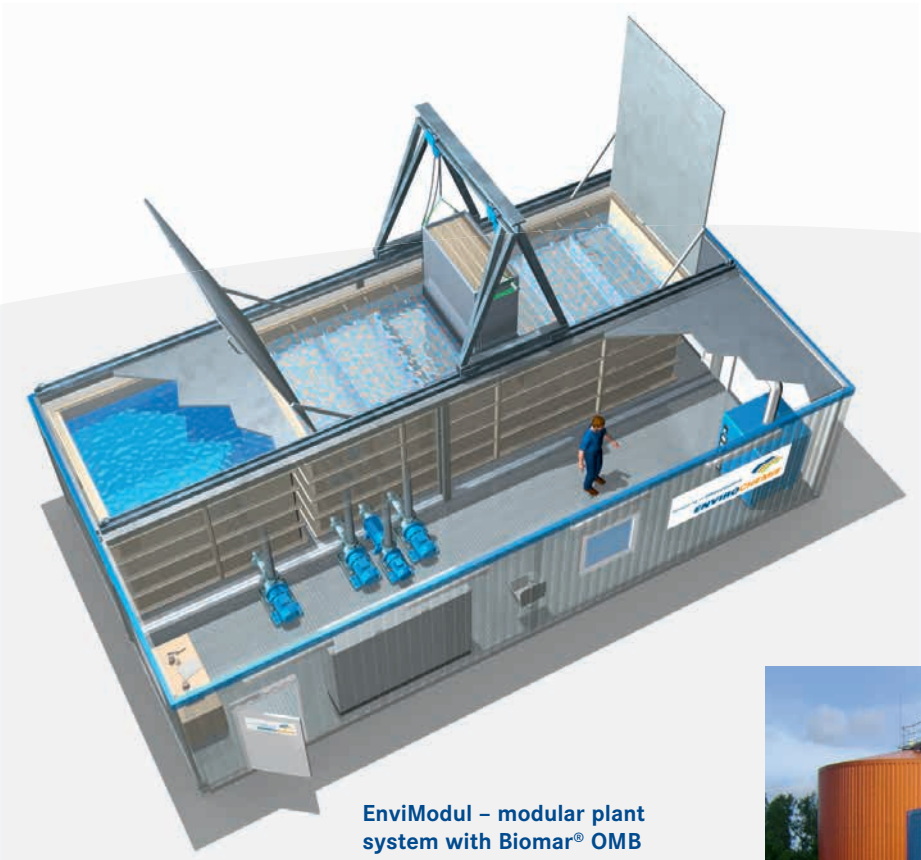
- Wastewater treatment
- Reliable removal of traces of substances
- Water recycling
- Wastewater detoxification
- Energy recovery from wastewater and waste
- Flexible modular plant solutions

# Pharmaceutical and life sciences industry

Few working environments are as demanding and challenging as that of the pharmaceutical and life sciences industry. The highest quality and performance are demanded at all levels, including for water and wastewater treatment technologies.

Traditional end-of-pipe solutions for dealing with effluents coming out of the production facilities are gradually being replaced by an increasingly decentralised approach of treating individual wastewater streams in the most effective and economically sound way. Moreover, additional goals like reducing overall effluent emissions by reusing treated wastewater in order to work towards zero-discharge strategies, or minimising waste generation and disposal costs, have gradually been incorporated into a more holistic water and wastewater management approach.

A whole array of modern and innovative technologies are currently available in order to be able to tackle the complexity presented by these effluents, : active carbon filtration, biological degradation, membrane filtration technology (e.g. reverse osmosis, ultrafiltration in membrane biological reactors, etc.), oxidation technologies combining different available AOPs (Advanced Oxidation Processes) like ozonation, hydrogen peroxide with radiation from UV light, etc.



EnviModul – modular plant system with Biomar® OMB membrane biology

Biomar® anaerobic wastewater treatment plant generates biogas and recovers heat

## Biological wastewater treatment

### Biomar® OMB Membrane biological reactors

In order to minimise their footprint wastewater treatment plants have gradually been incorporating state-of-the-art technologies such as membrane biological reactors (MBR) for the main COD (Chemical Oxygen Demand) reduction stage. In these reactors, ultrafiltration membrane modules are implemented as secondary clarifiers, making tertiary filtration stages superfluous.

The main advantages of MBR technology compared to conventional activated sludge technology:

- Overall smaller footprint (30% to 50%)
- Less aeration needed (due to high mixed liquor concentrations, approx. 10-15 g/l)
- Long sludge lifetime (10 to 50 days), hence low sludge production and growth of "specialist" bacteria
- Stable UF permeate quality effluent, which may be suitable for reuse

## Energy from wastewater

### Biomar® ASBx Anaerobic reactors

The distinguishing characteristic of anaerobic technology is the acidification and fermentation of organic carbon bonds to produce methane and carbon dioxide. Anaerobic processes need no oxygen and produce only minimal excess sludge. Biomar® anaerobic plants are particularly suitable for wastewater with high or occasionally occurring COD and BOD loads. High COD loads can be reduced with minimal reactor volume, hence keeping the footprint of the plant small.

Envopur® ultrafiltration plant pre-assembled in a rack

Envopur® membrane filtration plant designed as a compact and factory pre-assembled EnviModul system

# Treatment of radioactive wastewater

## BioChroma
## Decay of radioactive iodine

After undergoing radiotherapy, patients generate wastewater with a considerable quantity of radioactivity, which can reach levels of as much as 90% of the administered dose. Due to the risk of accumulation after discharge into the sewer, it is advisable to collect this effluent for treatment prior to final discharge.

Delay and decay (natural decomposition of the isotope) is the most commonly used technical method of abating iodine, but it is frequently criticised as being complex and very expensive. BioChroma was developed as an alternative to these complicated and expensive systems. The BioChroma technology combines an optimised biological treatment of the incoming radioactive effluent with a final adsorption and filtration stage.

# Water recycling and reliable removal of traces of substances

## Envopur®
## Membrane technologies – reverse osmosis

Efficient use of resources plays an important role nowadays when planning industrial processes. Intelligent water technology solutions obviously help to save water and minimise operating costs. EnviroChemie plans, constructs and commissions plants which provide solutions for water recycling using conventional construction, or in the EnviModul modular plant concept.

Moreover, wastewater treatment plants comprising a final reverse osmosis stage provide us with a safe and reliable barrier against the undesired discharge of dangerous trace elements (e.g. active pharmaceutical ingredients, endocrine disruptors, etc.) into the environment.

**Envochem® chemical-physical wastewater treatment as EnviModul system**

**Modular plant system for the detoxification of wastewater at a pharmaceutical production site**

**Ozonation plant built as a modular unit**

# Detoxification and removal of organic and inorganic compounds

## Envochem® Chemical-physical wastewater treatment

Chemical-physical water and wastewater treatment ranks among the most efficient basic processes in water purification.

EnviroChemie has been using tailor-made Envochem® systems to produce high-quality solutions for chemical-physical waste-water treatment for more than 35 years. Envochem® plants remove inorganic and organic components and toxic substances from wastewater. The largely standardized plant technology ensures that the customer benefits from both consistently high quality and rapid project implementation.

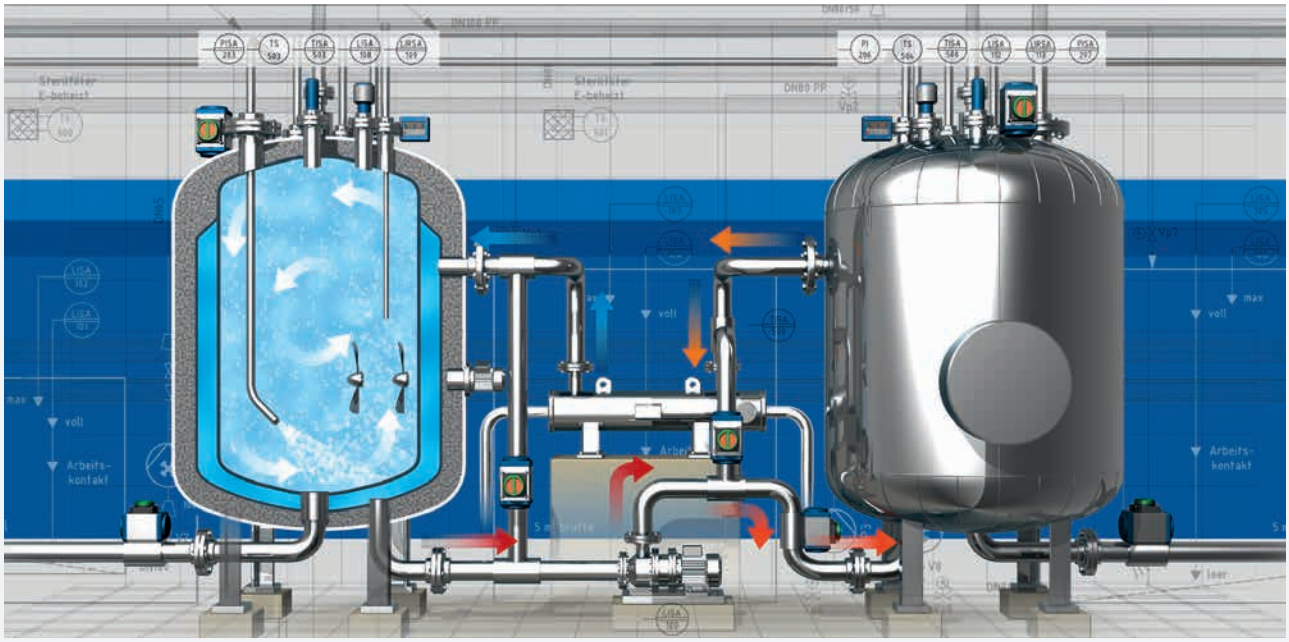
## Envochem® Advanced oxidation processes

Advanced Oxidation Processes (AOP) refers to a set of chemical treatment procedures, where contaminants are oxidised by hydroxyl radicals coming from ozone and/or hydrogen peroxide. These procedures may also be combined with/catalyzed by UV irradiation and other specific catalysts.

The AOP procedure is particularly useful for cleaning biologically toxic or non-degradable materials such as active pharmaceutical ingredients, endocrine disrupting compounds, aromatics, volatile organic compounds etc. in wastewater.

The contaminant materials are to a large extent converted into stable inorganic compounds such as water, carbon dioxide and salts, i.e. they undergo mineralization.

One goal of wastewater purification using AOP procedures is to reduce chemical contaminants and toxicity to such an extent that the cleaned wastewater can be recycled, or at least discharged into conventional sewage treatment.



**SteriFix C batch biotechnology for safe wastewater sterilisation of volumes ranging from 100 l per batch up to 20 m³ per day**

# Decontamination of biologically active wastewater

## SteriFix
## Thermal inactivation plants

SteriFix plants are designed to safely inactivate, sterilise and disinfect wastewater containing infectious or genetically altered materials via thermal sterilisation. Simultaneously, microorganisms and bacteria are eliminated by this process, while viruses, plasmids and DNA fragments can also be deactivated. The SteriFix sterilisation process additionally delivers the optimal sterilisation output for the most efficient energy input.

**SteriFix E continuous wastewater sterilisation for treating volumes of continuously inflowing wastewater from 100 l/h to 15 m³/h**

BLUECOMPETENCE
Alliance Member
Partner of the Engineering Industry Sustainability Initiative

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