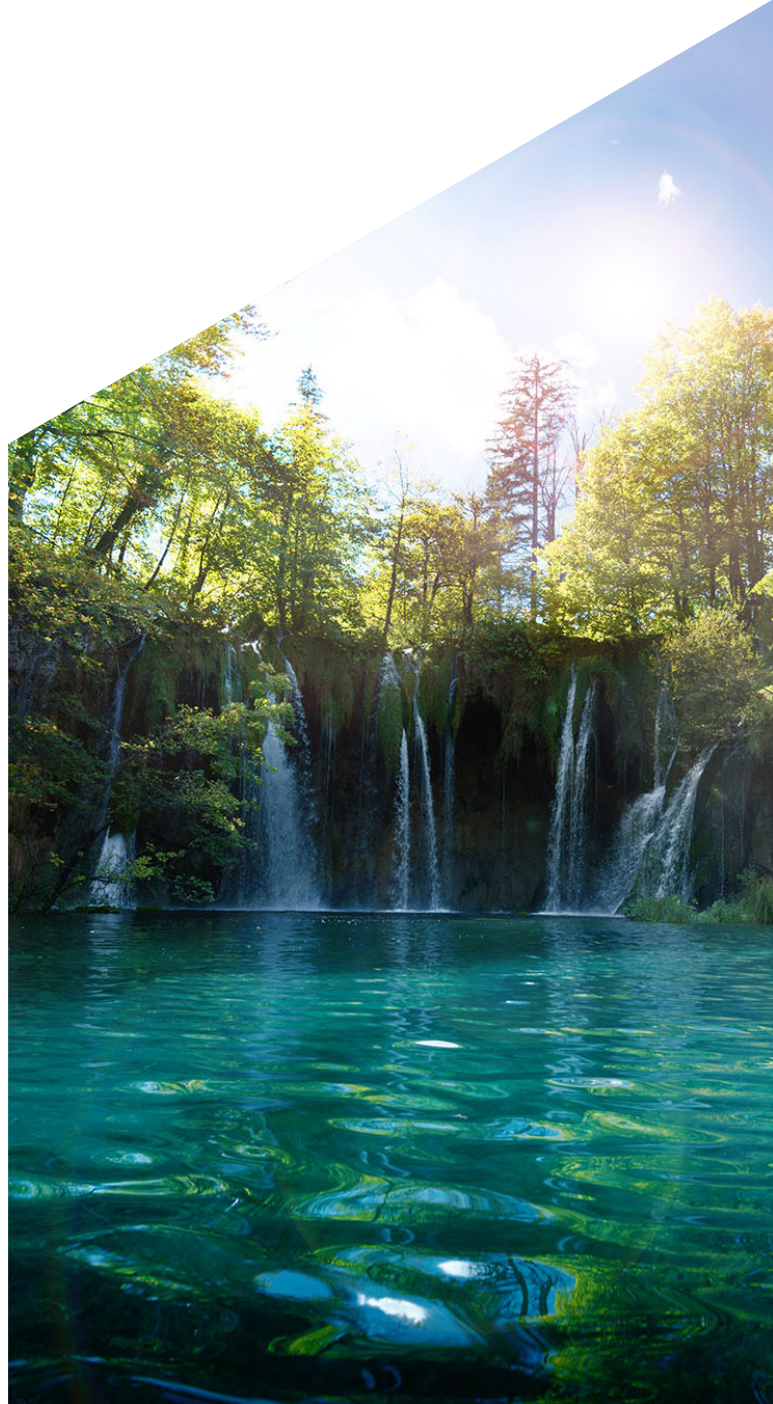


# DAS

Environmental Experts.

## PURPLE TECHNOLOGY FOR CLEAN WATER

Turnkey Solutions for Wastewater Treatment in Semiconductor Industry



In the semiconductor industry, wastewater is generated from various production and cleaning processes as well as subsequent waste gas treatment. At **DAS EE**, we are specialists in the treatment of such wastewater. Whether you're looking to upgrade an existing wastewater system or starting from scratch, our team of experts can work with you to develop a customized solution that meets your needs and exceeds your expectations.

### Benefit from our comprehensive service portfolio

The challenges of wastewater management are not in the core of an industrial company, so DAS EE offers everything from the planning to turnkey plants.

Even operating your wastewater treatment system using individual operator models is possible.

Wastewater Analysis	Planning & Development	Construction & Assembly	Optimization	Service & Maintenance
<ul style="list-style-type: none"> <li>› Water analyses</li> <li>› Biological degradation tests</li> <li>› Precipitation/flocculation tests</li> <li>› Sorption tests</li> <li>› Ion exchange (IEX) tests</li> </ul>	<ul style="list-style-type: none"> <li>› Technology selection &amp; process engineering design</li> <li>› Mechanical &amp; electrotechnical design</li> <li>› Software development</li> <li>› Feasibility studies</li> <li>› Concept evaluation &amp; comparisons</li> </ul>	<ul style="list-style-type: none"> <li>› Project management</li> <li>› Site management</li> <li>› Assembly</li> <li>› Start-up</li> </ul>	<ul style="list-style-type: none"> <li>› Analysis &amp; Assessment</li> <li>› Automation</li> <li>› Modification of existing plants</li> </ul>	<ul style="list-style-type: none"> <li>› Customized maintenance</li> <li>› Plant &amp; system services</li> <li>› Process engineering support (including via remote access)</li> </ul>

### In order to offer optimal solutions, we rely on a wide range of process technologies

As experts in water treatment, we have extensive know-how in the field of biological and also chemical-physical processes to reduce the specific pollutants in your wastewater to the threshold values.

Our expertise is not limited to a specific treatment process but is based on a holistic understanding and evaluation of the wastewater treatment needed.

Mechanical Processes	Biological Processes	Chemical-physical Processes
<ul style="list-style-type: none"> <li>› Rake/Sieving</li> <li>› Sand filtration</li> <li>› Sedimentation</li> <li>› Sludge Dewatering</li> <li>› Membrane filtration (MF, UF, NF, RO)</li> </ul>	<ul style="list-style-type: none"> <li>› Moving Bed Biofilm Reactor (MBBR)</li> <li>› Membrane Bio Reactor (MBR)</li> <li>› Sequencing Batch Reactor (SBR)</li> <li>› Activated sludge process</li> </ul>	<ul style="list-style-type: none"> <li>› Precipitation &amp; flocculation</li> <li>› Flotation</li> <li>› Ion exchange</li> <li>› Sorption</li> <li>› Oxidation processes</li> </ul>

## COMBINING WASTE GAS AND WASTEWATER TREATMENT

For more than 30 years, we at **DAS Environmental Expert GmbH**, have been specialists in point-of-use treatment technologies. However, we do not only have extensive know-how in the treatment of process waste gases, but also expertise in complete wastewater treatment solutions.

**Increase the eco-sustainability of your semiconductor manufacturing processes**



## SUSTAINABLE DEVELOPMENT GOALS

We are supporting the high-tech industries to practice sustainability and green manufacturing.  
(Aligned with the sustainable development goals defined by UNESCO.)



## DAS EE POINT-OF-USE PRODUCT LINE

### Biological Treatment

#### Moving Bed Biofilm Reactor (MBBR)

##### Application

- › IPA and any other biodegradable compounds

##### Technology

- › MBBR

##### Basic Features

- › Mixing compensation tank: integrated – max. 800 L
- › Integrated dosing system for nutrients and neutralization
- › Removal rate: > 99.6 % (for IPA)
- › Designed for Semi S2 compliance
- › Seamless communication with **DAS EE** waste gas abatement systems but also works as a stand-alone system



### Physical Treatment

#### Particle filtration and water recycling

##### Application

- › Wastewater contaminated with solids from burn-wet systems (e. g. processes with metal organics)

##### Technology

- › Filtration

##### Basic Features

- › Minimization of wastewater generation
- › Small footprint of the water recycling system
- › Flexibility in the system design for targeting different particle sizes
- › Automatization and seamless communication with **DAS EE** waste gas abatement systems but also works as a stand-alone system



## CUSTOMIZED SOLUTIONS FOR WATER TREATMENT

In the last 15 years, we at **DAS EE** have designed and built wastewater treatment plants for customers on four continents. In close cooperation with our clients, our environmental experts always design the best approach for your wastewater treatment plant.

### **DAS Environmental Experts offers long-standing experience in the semiconductor industry**

The various pollutants are removed from the wastewater to below the legally required limit values using processes specially compiled for each Fab. We have a broad portfolio of reliable processes for this purpose. Our solutions are designed to meet the specific regulatory requirements of each location, ensuring compliance with local and national regulations. With our plants, we have been ensuring for many years that chip production goes hand in hand with high standards of protection for people and the environment. We are very familiar with the highest requirements for purity, reliability, and safety, because the semiconductor industry has been one of our most important customers since the company was founded.

### **Centralized, semi-centralized or POU systems**

Different customers and facilities have different needs and requirements which also affect the size-selection of the wastewater treatment system. We offer solutions for the entire system size-spectrum, giving our customers the flexibility to choose the approach that best suits their specific requests. Moreover, the modular design of the system components allows delivering them ready-to-connect to the customer's facilities.

### **Our portfolio for water treatment in the semiconductor industry includes among others:**

- › Removal of organic contaminants, measured as chemical oxygen demand (COD) and biochemical oxygen demand (BOD), from wastewaters
- › Removal of heavy metals or other toxic compounds
- › Treatment of chemical mechanical polishing/ planarization (CMP) wastewater
- › Treatment of silicon waste
- › Treatment and polishing of wastewater containing fluoride and arsenic
- › Treatment of isopropanol (IPA) or other volatile organic compounds (VOCs)
- › Reuse of treated wastewater (water recycling)
- › Recovery and recycling of valuable metals from wastewater

**DAS**

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## YOUR ENVIRONMENTAL EXPERTS

**DAS Environmental Expert GmbH**

Goppelner Str. 44

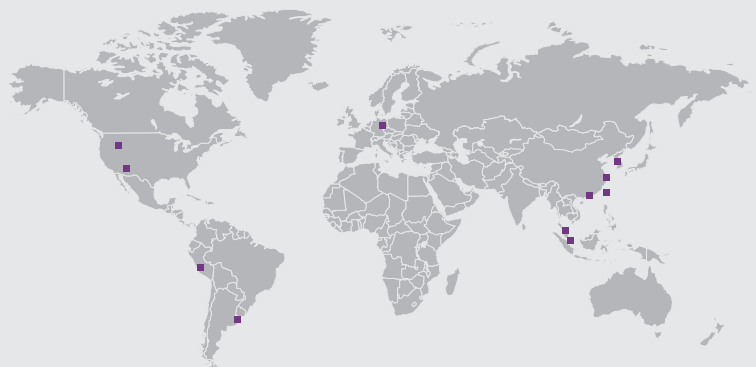
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