



# Removal of Azoles from Semiconductor Wastewater

Equipment Capacity/Flow Rate  
Low Flow

Compounds of Concern  
Various Azoles

Influent Concentration  
~7.5µmg/L

Treatment Targets  
>85%

Unit Energy Consumption  
30 kWh/m<sup>3</sup>

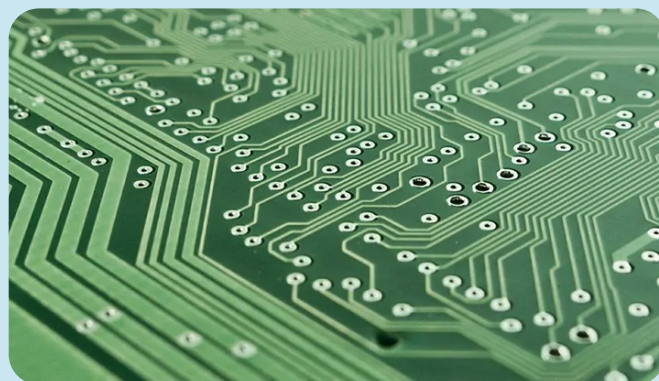
## Background

Semiconductor foundries and IDMs (integrated device manufacturers) are heavy users of water. Vast amounts of it are used for a variety of purposes from cleaning the wafer between processes to creating humidity in a clean room.

Re-use and reclamation of water is widely practised due to the high costs of cleaning the ultra pure water. Efficiencies are driven by treating the water just enough for the next process. It is common practice to reuse water in a part of the production process which needs less pure water than the first water use. For example, water that was used for rinsing can subsequently be used for cooling.

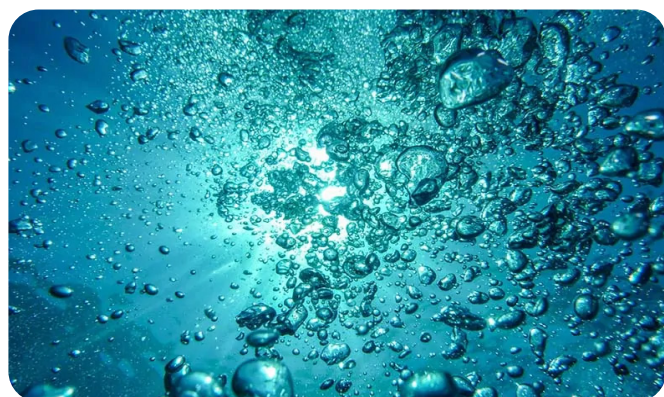
### Water Reuse Targets

Foundries and IDMs are pushing for more and more water reuse to reduce costs and to improve the impact on the environment.



All fabs have a range of water treatment processes at various stages of the production line. The trouble is that if the existing water treatment processes cannot remove a pollutant then it needs to be disposed of offsite using incineration which is expensive and very bad for the environment.

This was the problem for one of our clients, who had azoles in the wastewater which were persistent after treatment.



## The Objectives

### Removal of Azoles from Water

A world leading IDM came to us because they had azoles in the water which their existing water treatment processes were unable to remove.

The client was having to use incineration to dispose of the hazardous water, which was not only very expensive, but also went against their environmental policy. Like many IDMs and foundries, they were trying to increase the water reuse of non-process water.



## The Solution

### New Water Technology Needed

The existing water treatment technologies did not remove the azoles to the right levels. It was clear that to remove the azoles from the water would take a different kind of water treatment.

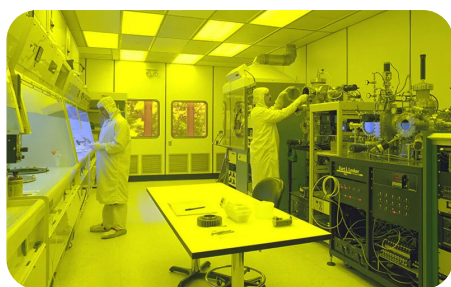
Our Nyex-e system is designed to oxidise hazardous organic chemicals such as corrosion inhibitors or azoles. We implemented a lab test to confirm and the results spoke for themselves.

## The Results

Using our Nyex-e water treatment process we achieved the treatment target of >85% of the azoles from the water, consisting of Pyrazole, Benzotriazole, and 3 amino-1,2,4 Triazole, at an energy consumption of c.a. 30 kWh/m<sup>3</sup>.

Specifically the treatment levels were as follows:

- 5-Methyl-1h-Benzotriazole – greater than 99% removal
- 3 amino 1,2,4 Triazole – greater than 99% removal
- Benzotriazole – 90% removal, down to 0.75 µg/L
- Pyrazole by – greater than 99% removal



### Further Reading

To learn more about our work in the semiconductor sector see <https://arviatechnology.com/industries/semiconductor/>.

If you would like to know if we can treat a particular chemical in your wastewater, get in touch. For a list of pollutants that our water treatment technology can treat, along with treatment figures, visit <https://arviatechnology.com/pollutants/>.

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Get in touch to discuss your company's treatment challenges and arrange a treatability trial on your wastewater today.