

# SIEMENS

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## The Solution for Difficult-to-treat Wastewaters

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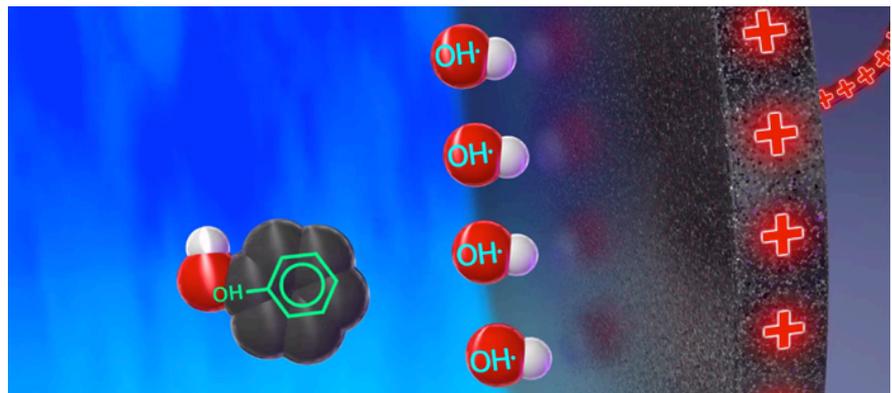
### Introduction

Siemens has developed an easy-to-operate, packaged, electro-oxidation system that can treat even the toughest wastewaters.

### The Problem

Even small amounts of a problematic wastewater can cause big issues with a wastewater treatment plant. The chemical and petrochemical industries often find themselves at odds with small amounts of wastewaters that are difficult to treat or otherwise handle, and that demand a disproportionately high level of attention when it comes to disposal. These wastewaters typically have high chemical oxygen demand (COD); may contain toxic components (e.g. sulfides, mercaptans, phenols, cyanide); may be highly odorous; and may pose health risks to plant staff or others.

Difficult-to-treat wastewaters are either disposed of off-site by a third



Zimpro® Electro-oxidation (ZEO) generates hydroxyl radicals directly in the spent caustic using electricity.

party, or they involve costly treatment processes such as oxidation with peroxide or bleach.

Off-site disposal can introduce liability concerns once the wastewater leaves the manufacturer's site. Off-site disposal still requires on-site handling

by operators to transfer the waste streams to tanker trucks or tank cars.

On-site treatment using advanced oxidation requires the purchase and storage of highly unstable and energetic oxidizers. In addition to the cost of purchase, the storage of the oxidizers can raise safety concerns.

Additionally, these advanced oxidation processes often require the addition of catalysts or modification of the pH in order for the oxidizers to work effectively, which introduces even more complexity and the need for – and use of – high-strength acid or caustic.

### A Better Solution

Siemens introduces the Zimpro® Electro-oxidation (ZEO) process to address the issues of – and to simplify – the solution. This new adaptation of a long-studied process provides a simple yet robust solution to many of today's high-strength, low-volume wastewater treatment issues. Electro-oxidation has proven to be highly effective; however, until recently, available electrode materials have had relatively short life. Now, Siemens uses the latest developments in free-standing, electrically conductive synthetic diamond to achieve a system that has a long life. Not only does the diamond hold up extremely well to very corrosive fluids, but it also allows the use of high-current densities, allowing for smaller electrode areas and thereby lowering cost.

The ZEO process requires only electricity, cooling water, and instrument air for operation. No dangerous, reactive oxidizers need be purchased or stored on-site. The oxidation reactions are performed by hydroxyl radicals formed on the surface of the electrode when current is applied, the hydroxyl radicals rapidly oxidize and destroy the contaminants in the wastewater as it is pumped through the reactor.



Hydroxyl radicals, formed on the anode, react and oxidize organic compounds in the wastewater stream.

Siemens packages the ZEO system into compact, user-friendly modules. The systems are highly automated, suitable for outdoor installation and easy to operate. Three different sizes of oxidation capacity are available to meet the demands of your particular application. And in some cases, the capacity of a ZEO system can be easily increased without major modifications.

### A System for Your Application

An important requirement for the Zimpro Electro-oxidation process to work properly is that the wastewater be electrically conductive. Many high-strength wastewaters are highly conductive, and therefore amenable to ZEO process treatment. Spent caustic from refineries is an excellent example of a wastewater that can be effectively treated using the ZEO process. With salt concentration greater than 3 wt%, spent caustic is highly conductive and typically includes contaminants such as sulfides, mercaptans, phenols, cresylates and naphthanates – all easily destroyed using the ZEO process.

Other industries that produce wastewater that could be amenable to ZEO process treatment include textiles, pharmaceuticals and landfills. And though a wastewater may not be electrically conductive, inexpensive salts can be added to the wastewater, making them suitable for ZEO process treatment.

### Contact Us Today

To learn more about Zimpro® Electro-oxidation, Zimpro® Wet Air Oxidation or other high-strength wastewater treatment solutions, contact us today.

### Specifications for a standard Zimpro® Electro-oxidation package:

- **Oxidation Capacity:** 3.5 kg/h, 7 kg/h or 10.5 kg/h
- **Minimum Conductivity:** 20 milli Siemens (mS)
- **Power Requirements:** 100 kW to 850 kW depending on oxidation capacity
- **Power Specifications:** 400V / 3 ph / 50 hz or 480V / 3 ph / 60 hz
- **Area Classification:** Suitable for installation in a Class 1 Zone 2 Group IIC T3 or Class 1, Div 2 Group B, T3

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