

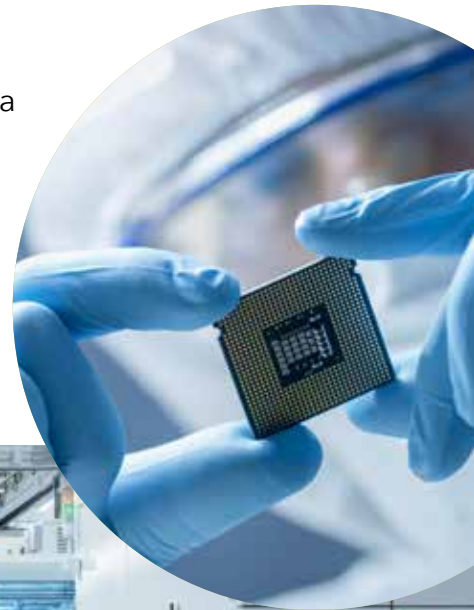
Air Emission Control Solutions for Semiconductor Industry



CECO
ENVIRONMENTAL

Chip manufacturing steps such as wafer cleaning, thin film deposition, photolithography, etching, stripping and ion implant result in the use of solvents and emissions of acid, alkaline, toxic and combustible gases.

The gases exhausted from these process steps are treated first via local scrubbers. The pre-treated stream still has some pollutants including Volatile Organic Compounds (VOCs), acid gases (such as H_2SO_4 , HF, HCl, HNO_3 , and H_3PO_4) and alkaline gases (such as NH_3), Hazardous Air Pollutants (HAPs) and particulate matter. These are treated further in different central facilities before being discharged into the atmosphere.



CECO Environmental is trusted by customers around the world to deliver reliable, high-quality and efficient products and solutions to meet the unique industrial air pollution and product recovery challenges faced by chip manufacturers. We bring decades of expertise to every project with the financial stability and resources of a global leader.

We help you reduce your total cost of ownership, whether you require Packed Bed Scrubbers to treat acid and alkaline gases and Rotor Concentrator Thermal Oxidizers to treat the VOCs in the Central Treatment Facilities. CECO also manufactures and supplies Fans and Pumps. We partner with our customers throughout the lifecycle from design, fabrication, installation supervision to start up and commissioning and other support services through the life of your system.



ACID GAS ABATEMENT



Vertical PP Scrubber

HEE-DUALL: PACKED WET SCRUBBERS

Key Features and Benefits:

- ↔ **Horizontal Design:** Cross flow, low profile, easy access
- ↕ **Vertical Design:** Counter current flow, minimal footprint
- ↻ **Airflow Range:** 1000 to 90,000 ACFM
- ⚙️ **Removal Efficiency:** Up to 99% gaseous contaminants

Advantages of HEE-DUALL Packed Wet Scrubbers:

- Superior chemical resistance to handle harsh and corrosive chemicals
- Low profile, easy access
- Small footprint
- Proven high performance across a range of applications

Design Features:

- Materials of Construction: Polypropylene or Fiberglass Reinforced Plastic (FRP) or Vinyl Ester Resin
- Scrubbing Bed: High Efficiency Polypropylene Packing
- Mist Eliminators: Polypropylene Chevron Blades, PP Mesh Pads
- Integral Sump, Optional Containment Pan
- Recirculation Pump and Piping
- Connections for:
 - » Drain, Continuous Overflow, Secondary Overflow
 - » Low Sump Level
 - » Make-up Water
 - » Sump Washout
 - » Chemical Feed
 - » pH Probe
 - » Biocide Injection
- Exhaust Fan
- Local Control Panel



Horizontal FRP Scrubber



VOC ABATEMENT

ADWEST /EIS VOC CONCENTRATOR WITH RECUPERATIVE THERMAL OXIDIZER (RCTO)

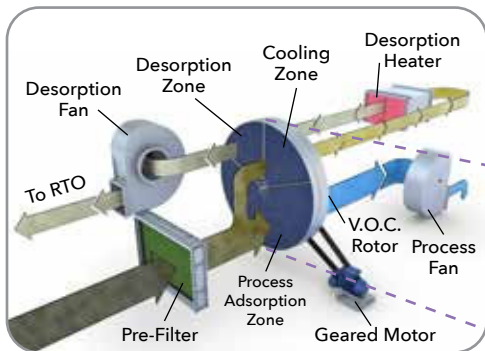
Combines lower capital and energy usage with higher operating efficiency for low solvent loading processes.



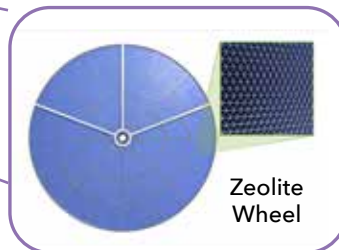
RCTO

Design Features:

- The concentrator system consists of a zeolite media rotor in a steel reinforced modular housing, with shop assembled seals, chain drive, air heaters, process fan, motor and VFD. It is installed before the RCTO.
 - » Zeolite provides 10:1 to 20:1 or greater concentration ratio that is able to create an economical system to treat large volumes of air with low VOC concentrations.
- The low-volume VOC-laden process air then enters the tube side of the shell and tube heat exchanger, which provides up to 60% primary heat recovery for energy savings and finally passes through a burner, where it is oxidized to carbon dioxide and water vapor.
- The RCTO can destroy up to 97.5% (single rotor) or 98.5% (dual rotor) of VOCs.



VOC Concentrator



Zeolite Wheel

Advantages of an Adwest-EIS RCTO with VOC Concentrator

- Industry-leading ultra low energy usage for VOC abatement
- Up to 97% heat recovery
- Up to 99% VOC abatement
- Low profile, small footprint allows for good fit in tight spaces
- Rapid onsite installation with modular pre-wired construction
- Proven high performance on varying levels of VOCs and across a range applications

VOC ABATEMENT



RETOX RTO



ADWEST/EIS REGENERATIVE THERMAL OXIDIZERS (RTOS)

For more than 30 years, Adwest has provided affordable, energy efficient and reliable regenerative thermal oxidizers for control of VOCs. Every RETOX dual chamber RTO includes our low pressure drop ceramic media with 95-97% thermal efficiency and flameless natural gas injection (NGI) for NOx free operation.

Advantages of CECO RTO:

- NOx free operation with NGI
 - RETOX RTO had lower gas usage with 95-97% primary heat recovery and NGI
 - NGI can SAVE 30-55% on the volume of gas consumed compared to burner fired RTOs
 - 5-year extended poppet valve flow control warranty
 - RETOX RTO offers low maintenance - no complex rotary valves to adjust and replace
 - RETOX RTO shop assembled modules provide rapid installation options
-
- Low profile, skid mounted RTO modules - Easy maintenance from grade level
 - Rapid natural gas burners allow for cold and warm startups
 - Uses low pressure drop/low cost RTO heat transfer media
 - Simple, zero leakage poppet valve flow control provides 99% VOC Destruction and Removal Efficiency (DRE)
 - In-house RTO and custom control panel UL/CUL certified CECO Adwest shops
 - Market proven experience - Over 1,200 RTO and VOC Concentrators installations world-wide

PROCESS EQUIPMENT

PROCESS EQUIPMENT: PUMPS AND FANS

Fybroc Pumps

Fybroc® pumps are available in different materials to provide corrosion resistance for pumping acids, brines, caustics, solvents and a wide range of waste liquids.

- FRP Horizontal ANSI Pumps
 - » Manufactured with continuous strand FRP construction
- Capable of handling capacities up to 5,000 GPM (1140 m3/hr)
- Offers heads up to 400 feet (125 m)
- FRP Vertical Sump Pumps (Series 5500)
 - » Capacities to 5,000 GPM, Heads to 275 feet, up to 30 ft. length



Horizontal ANSI Pump



Inline Centrifugal FRP Exhaust Fan

FANS

Corrosion Resistant Exhaust Fans

- Premium fiberglass and thermoplastic materials
- Models: Centrifugal, Radial
- Airflows from 200 to 135,000 cfm

HPCA Series Fans - Air Foil Wheel Design

- AMCA certification guarantees specified performance
- Capable of static pressures up to 18+” w.g.
- Capacities up to 135,000 cfm

Want to Learn More?

[Acid Gas Abatement](#)
[Thermal Oxidizers](#)
[VOC Abatement](#)

[Pump Process Equipment](#)
[Exhaust Fans](#)

CECO ENVIRONMENTAL (NASDAQ: CECO) is a leading environmentally focused, diversified industrial company whose solutions protect people, the environment and industrial equipment across the globe, serving a broad landscape of industrial air, industrial water and energy transition markets.

CECO Environmental

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