



# VERANTIS

Environmental Solutions Group

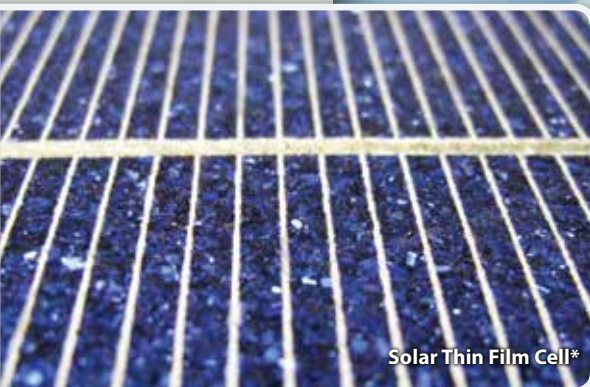


**BreatheEasier™**  
With Verantis, everybody breathes easier.

## *Environmental Solutions for* **Solar Cell Production**



CVD Reactor\*



Solar Thin Film Cell\*



Polysilicon\*



\*Images courtesy of Poly Plant Project, Inc. (PPP-E)



## ***Verantis is a Leading Supplier of Emission Control Systems to the Solar Cell Production Industry!***



### **Trichlorosilane Production**

#### **CVD Process Vent**

The composition of exhaust gases from TCS production can include various chlorosilanes, silicon tetrachloride, and hydrogen gas. Understanding the hydrolysis and interaction of these chemicals along with associated heat generation, reaction byproducts, and proper pH control is critical to maintaining continuous operation of the pollution abatement equipment.

Verantis' broad range of scrubber designs, along with our extensive chemical engineering experience, enables us to select the right equipment combination to insure maximum system availability when dealing with complex silicon chemistry. Our eductor venturis (EVS Series) provide high liquid to gas ratios and can be designed in multiple stages to achieve high-efficiency removal and minimize potential fouling. If additional removal is required, our packed tower scrubbers can be used for final exhaust polishing, as well. Complete system design, including upstream knock-out drums to deal with process liquid surges and downstream seal pots to prevent atmospheric air backflow, can be provided.

### **SiO<sub>2</sub> Particulate Control – Slicing/Lapping/Grinding**

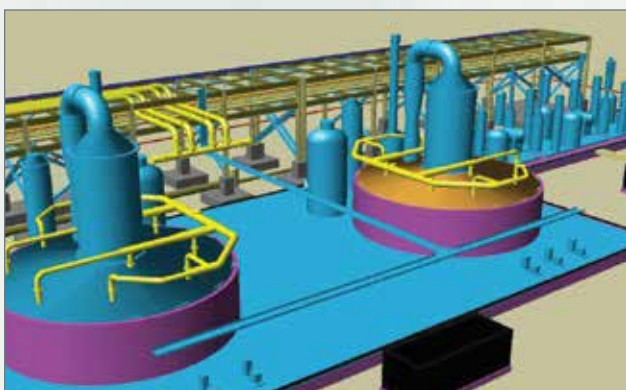
Whether the particulate is fine or coarse, Verantis has a broad range of products for controlling emissions. Our complete line of venturi scrubbers includes both fixed throat (VSV series) and variable throat (VTV Series) designs that can process a wide range of exhaust capacities from very small to very large. We have experience providing SiO<sub>2</sub> removal systems as small as 150 CFM with particulate loadings in excess of 100 gr/SCF.





## Emergency Vent Scrubbing

Emergency vent systems pose a bigger challenge than normal process venting systems. The systems must be designed to react quickly to a large release of toxic and/or pollutant gases. A high degree of system readiness, along with the ability to achieve high removal efficiency, is a must. Verantis emergency scrubbing systems have been utilized across a broad range of applications in the solar, chemical process and water treatment industries. Our systems are designed to achieve high-efficiency removal while dealing with heat generation and soluble or insoluble byproducts. Depending on the application, combinations of Verantis spray towers (ST Series), eductor venturis (EVS Series), and/or packed towers (SPT Series) can be designed to meet any performance efficiency or required outlet loading.



## Wafer Cleaning



During the cleaning process, various alkalis and acids such as ammonia ( $\text{NH}_3$ ), hydrofluoric acid (HF), and hydrochloric acid (HCl) produce emissions that must be removed prior to atmospheric venting. Verantis can provide high-efficiency packed scrubbers in either countercurrent (SPT Series) or crossflow (HRP series) models to meet this requirement. Our packed scrubber systems utilize our proprietary Tellerette® Tower Packing and our low-vibration CLUB series fans have become the accepted standard for cleanroom exhaust systems throughout the solar and semiconductor industries.

## enVIGORATE™ Custom Engineering Services

When you submit an initial request to Verantis, our team will perform a thorough engineering examination to be sure the system you request is the one that will actually meet all your needs. With a background in Chemical Engineering, the Verantis team understands your industrial process and can customize a solution that will work for your application and according to your budget.

We've developed thousands of systems for a wide variety of applications and know what works in the real world. Our customers don't always have this background, so our engineering team makes sure customers don't end up with a design that works only on paper. Contact us today to take advantage of our custom engineering services and proven experience in the solar cell production market.

**Envigorate Custom Engineering Services: one more reason to BreatheEasier with Verantis.**

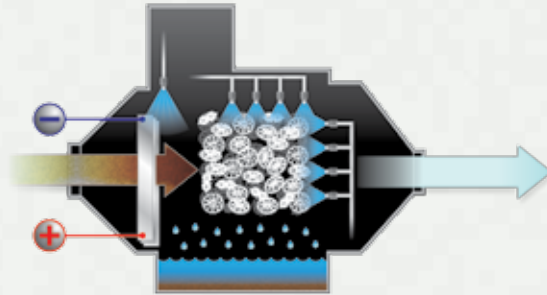


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## Silane Waste Incineration

Waste destruction of chlorinated silanes presents the unique challenge of treating incineration gases containing both hydrochloric acid gas and ultra-fine particles of  $\text{SiO}_2$ . The Verantis IWS® (Ionizing Wet Scrubber) system was designed with this specific problem in mind and has been proven to achieve strict compliance standards across a broad range of applications. Typical examples include thermal destruction of silica compounds in the chemical process industry and silicon ingot production in the fiber optics industry.



*IWS® Ionizing Wet Scrubber System For Removal of Submicron Particulate and Acid Gases*



The IWS® system is a patented design combining electrostatic charging with a packed scrubber which provides removal of submicron particulate with simultaneous acid gas removal. The crossflow design of the wetted ionizer and packed section minimizes fouling and provides maximum system availability. The IWS® units can also be operated in a series providing retrofit flexibility for changes in system capacity or to meet future regulatory requirements.

## NO<sub>x</sub> Control for Acid Etching

The solution for NO<sub>x</sub> emission control is more complex than standard scrubbing methodology. Achieving the required removal efficiency requires an understanding of the various components of NO<sub>x</sub>, their interaction, and their effect on visible emissions. Verantis has conducted extensive pilot tests on this application and has installed NO<sub>x</sub> removal systems on a variety of wet-chemistry applications. We can select the right combination of equipment and chemistry to meet the required process design and guarantee a "clear stack."



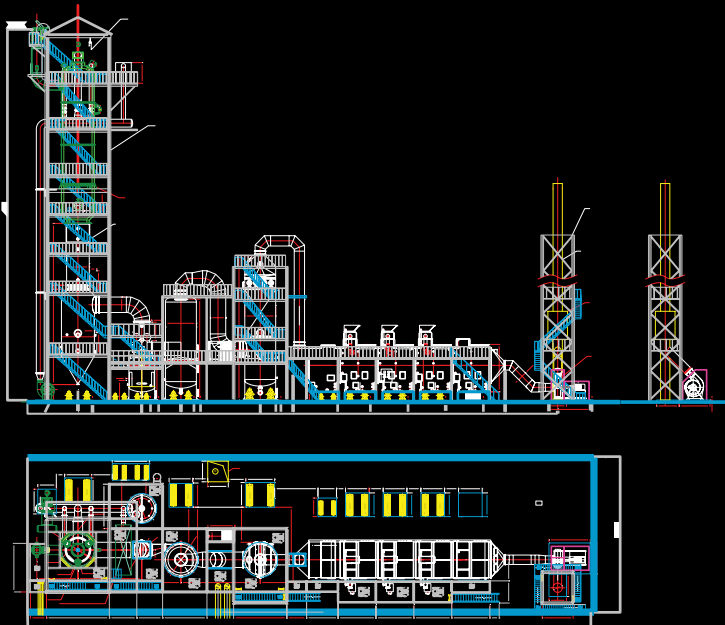
## General Facility Vent



Production facilities typically require multiple hooded ventilation points for the evacuation of acid and particulates. Verantis' Eductor Venturi (EVS) and Packed Tower (SPT) scrubbers provide high efficiency removal of contaminants at a wide range of gas flow rates and contaminant concentrations. In addition, our diverse fan product lines provide ventilation gas flows from 100 to greater than 100,000 CFM and static pressures of 60" WC or higher as required.



## Complete System Design



Verantis can provide complete system designs to handle the most complex environmental control problems for solar cell production.

From production lines to waste destruction, our systems include all necessary components from the vent source to the outlet stack.

**Additional equipment options:**

- Hazardous waste incinerators
- Heat recovery systems
- Steel support structures
- Exhaust blowers and stacks
- Fully automated control systems

**Contact Verantis for the complete solution.**

## World Headquarters

### Verantis Environmental Solutions Group

Cleveland, Ohio  
United States of America

**Toll-Free:** 800-554-8673  
**Phone:** 440-243-0700  
**Fax:** 440-243-9854  
**Email:** [sales@verantis.com](mailto:sales@verantis.com)  
**Web:** [www.verantis.com](http://www.verantis.com)

## Verantis Asia

### Verantis Environmental Solutions Group

Singapore

**Phone:** 65-6262-5311  
**Fax:** 65-6261-0181  
**Email:** [1singapore@verantis.com](mailto:1singapore@verantis.com)

### Verantis Environmental Solutions Group

Shanghai, China

**Phone:** 86-21-6288-6882  
86-21-6288-7770  
**Email:** [1china@verantis.com](mailto:1china@verantis.com)

## About Verantis

**Verantis is a global company dedicated to solving environmental control challenges.** We design, fabricate, install and service a complete line of pollution control equipment including Scrubbers, Industrial FRP Blowers, Tellerette® Tower Packing and much more. With over 50 years of experience and thousands of installations worldwide, Verantis is your single source provider of innovative environmental control solutions.

*To find the name of the representative nearest you, call the Verantis Environmental Solutions Group sales offices at 440-243-0700 or visit [www.verantis.com](http://www.verantis.com).*



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