



ENVIRONMENTAL SOLUTIONS FOR THE SOLAR INDUSTRY



Ceilcote is the #1 Supplier of Emission

TRICHLOROSILANE PRODUCTION

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.

Ceilcote's 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. 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.

NO_x CONTROL FOR ACID ETCHING

The solution for NO_x emission control is more complex than standard scrubbing methodology. Achieving the required removal efficiency requires an understanding of the various components of NO_x, their interaction, and their effect on visible emissions. Ceilcote has conducted extensive pilot tests on this application and has installed NO_x 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."

WAFER CLEANING

During the cleaning process, various alkalis and acids such as ammonia (NH₃), hydrofluoric acid (HF), and hydrochloric acid (HCl) produce emissions that must be removed prior to atmospheric venting. Ceilcote can provide **high-efficiency packed scrubbers**

in either countercurrent (SPT Series) or crossflow (HRP series) modes to meet this requirement. Ceilcote packed scrubber systems utilize our proprietary **Tellerette® Tower Packing** and our

low-vibration **CLUB series fans** have become the accepted standard for clean room exhaust systems throughout the solar and semiconductor industries.



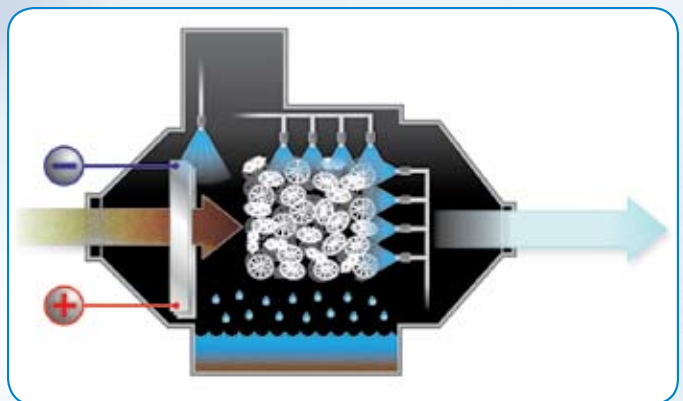
Control Systems to the Solar Industry!

SiO₂ PARTICULATE CONTROL – SLICING/LAPPING/GRINDING

Whether the particulate is fine or coarse, Ceilcote 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 vary large. We have experience providing SiO₂ removal systems as small as 150 CFM with particulate loadings in excess of 100 gr/SCF.

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 SiO₂. The Ceilcote **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. 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 series providing retrofit flexibility for changes in system capacity or to meet future regulatory requirements.



IWS® IONIZING WET SCRUBBER SYSTEM
FOR REMOVAL OF SUB MICRON PARTICULATE AND ACID GASES

TCS 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. Ceilcote **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 Ceilcote **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.



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