



VERANTIS IONIZING SCRUBBERS

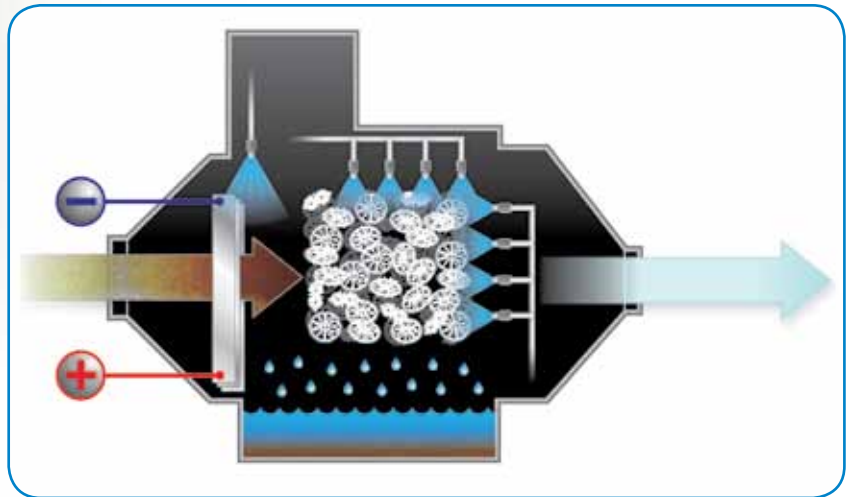
IWS[®] SYSTEM
IONIZING WET SCRUBBER

CEILCLEAN^{IPS™}
IONIZING PARTICULATE SCRUBBER

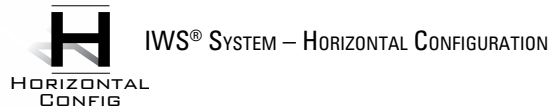


THE PROCESS:

Verantis' IWS[®] and IPS[™] scrubbers use high voltage ionization to electrostatically charge particulate in the gas stream before the particles enter a Tellerette[®] packed scrubber section where they are removed by attraction of the charged particles to neutral surfaces.



Particulates of seven to eight microns and larger are collected through inertial impaction. As smaller particles flow through the scrubber, they pass close to the scrubbing liquid droplets and the neutral Tellerette[®] surfaces. The electrostatic charge on the particles causes them to be attracted to these neutral surfaces through an electrostatic principle called Image Force Attraction.



All particles are eventually washed out of the scrubber with the exit liquor. Noxious and malodorous gases are absorbed and reacted in the same scrubbing liquor.

IWS[®] SYSTEM
IONIZING WET SCRUBBER

CEILCLEANIPS[™]
IONIZING PARTICULATE SCRUBBER

TYPICAL MARKETS & APPLICATIONS:

- **Metal Refining and Recovery** – Metal oxides, metal salts and acid gases
- **Incineration** – Hazardous waste, chemical or pathological heavy metals, HCl, HF
- **Boiler Exhaust** – Ash, metals, HCl, SO₂
- **Semiconductor** – NH₄Cl fume from cross-ventilation
- **Diesel Engine Exhaust** – Ash, SO₂
- **Fiber-Optic and Specialty Glass Production** – HCl, Cl₂, SiO₂, GeO₂
- **Pulp, Paper, Wood Processing** – Ammonium bisulfite fumes, dust, condensable organics
- **Other processes** requiring removal of submicron particulate

Proven Scrubber Technology From the Global Leader

Two Great Patented Products to Choose From:

1

IWS[®] SYSTEM IONIZING WET SCRUBBER

THE GOLD STANDARD...FOR DEMANDING APPLICATIONS

Using technology pioneered by Verantis, the IWS Ionizing Wet Scrubber has been at work for over 35 years and can be found in more than 500 installations worldwide.



2

CEILCLEAN IPS[™] IONIZING PARTICULATE SCRUBBER

...FOR CHANGING EMISSIONS STANDARDS

The CeilClean IPS Ionizing Particulate Scrubber is based on the proven technology of the IWS...and is the newest member of the Verantis scrubber family.



VERANTIS SCRUBBER TECHNOLOGY:

Both the IWS and CeilClean IPS are based on a proven means for the removal of pollutants from industrial process gas streams. The IWS and IPS combine the established principles of electrostatic particle charging, image force attraction, inertial impaction, and gas absorption to collect submicron solid particles, liquid particles and noxious and malodorous gases simultaneously. These systems require minimal energy, and collection efficiency is high for both submicron and micron size particles.



Fractional Collector—The IWS system acts as a fractional collector. The percentage of particulate removed varies little with load and particle size distribution over a wide range. As particulate load increases, the percentage removed remains nearly constant. The collection efficiency for fine particles is nearly as great as for coarse particles.

Turn Down—Collection efficiency improves with turn down from 100% to 0% load.

Size Range—Factory assembled modules are available in standard capacities from 500 to 50,000 ACFM, and can also be grouped together to clean virtually any gas volume.

Low Energy Consumption —High efficiency ionization combined with high-throughput Tellerette® packing results in lower energy usage.



Patent Nos. 3,874,858 and 3,958,958

Horizontal Configuration—Can be configured in multiple stages to increase collection efficiencies.

Track Record—At work around the world for over 35 years in more than 500 of industry's most demanding applications.

FOCUS ON: TELLERETTE® TOWER PACKING

Tellerette® Packing has a unique patented toroidal helix design that makes them dramatically more efficient than conventional packing for mass transfer, heat transfer and particulate collection. Benefits include:

- Greater gas flow capacity permits use of smaller diameter, lower cost columns.
- Existing towers can be retrofitted for higher capacity and improved efficiency.
- Lower pressure drop for reduced operating costs.
- Minimal fouling because of high open area.
- Effective impingement of both liquid droplets and solid particulate.
- Available in a wide range of materials including polypropylene, polyethylene, PVC, PVDF, and Tefzel.





The CeilClean IPS features Verantis' proven ionizing technology in a compact package configured to meet stringent particulate requirements such as EPA-MACT PM 2.5 regulations. This innovative product scrubs fumes & particulate in ONE unit.

Other advantages include:

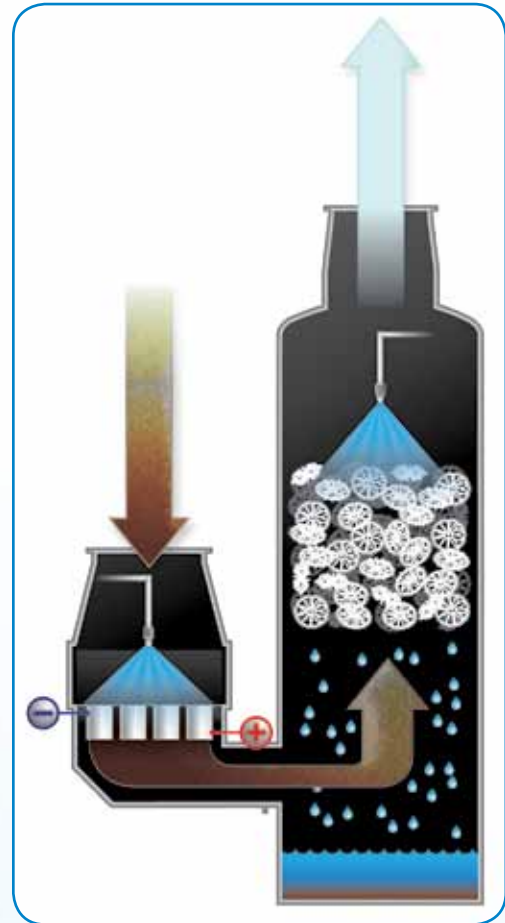
Vertical Configuration—High velocity ionization section offers optimal throughput in the least amount of space.

Retrofit Ready—Modular design allows ionization section to be retrofitted to existing scrubbers to meet new particulate removal requirements.

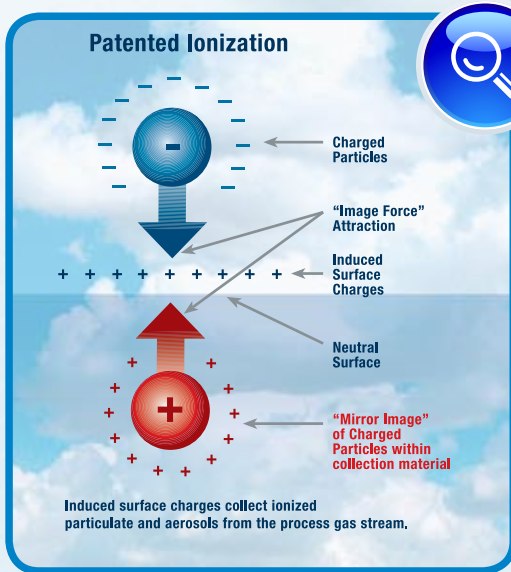
Tellerette® Collection—Allows for particulate and gaseous scrubbing in one unit.

Cost Effective—Ideal solution for multiple applications.

Low Energy Consumption—High efficiency ionization combined with high-throughput Tellerette® packing results in lower energy usage.



CEILCLEAN IPSTM – VERTICAL CONFIGURATION
Patent No. 7,267,708



FOCUS ON: IMAGE FORCE ATTRACTION

The predominant influence acting within the CeilClean IPS and IWS to collect submicron size particulate is the mechanism of impingement of electrons on particulate "Image Force Attraction."

Image force attraction occurs whenever an electrostatically charged particle comes within the boundary layer (usually within one millimeter) of a neutral surface. As the charged particle comes close to the neutral surface, an electrostatic charge of opposite polarity is induced at the neutral surface. The force of attraction is similar to that which would exist between a charged particle and an imaginary particle of equal but opposite polarity located at an equal distance behind the surface. It is as though the charged particle was seeing its "mirror image."

WHICH SCRUBBER IS IDEAL FOR YOUR APPLICATION?

The IWS System and the CeilClean IPS are both highly effective, extremely efficient scrubbing solutions. To discuss the particulars of your application, please contact a Verantis representative who can assist you with selection of the right solution for your needs.

Call us or visit www.verantis.com.

SALES OFFICES

VERANTIS USA

14955 Sprague Road, Suite 250
Strongsville, Ohio 44136-1758
Phone: 800-554-8673
Phone: 440-243-0700
Fax: 440-243-9854
www.verantis.com
E-mail: sales@verantis.com

VERANTIS (SINGAPORE) PTE., LTD

86 International Road
Singapore 62 9176
Tel: (65) 6262-5311
Fax: (65) 6261-0181
E-mail: 1singapore@verantis.com

CEILCOTE APC(SHANGHAI) CO., LTD

Room 2909, Jing'an China Tower
1701 West Beijing Road
Shanghai 200040
Tel: 86-21-6288-6882
86-21-6288-7770
E-mail: 1china@verantis.com



VERANTIS

Environmental Solutions Group

14955 Sprague Road, Suite 250
Strongsville, OH 44136 USA
Ph: 1-440-243-0700
Fax: 1-440-243-9854
E-mail: info@verantis.com

To find the name of the representative nearest you, call Verantis sales offices at 440-243-0700


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With Verantis, everybody breathes easier.