

# CST-18 Vapor Scrubber System



**Skid Mounted Emission Control System**

**[www.vapor-tech.com](http://www.vapor-tech.com)**

Visit our website for a comprehensive listing of our products and technical information



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# CST-18 Vapor Scrubber System

Vapor Tech offers a small, compact vapor control system designed for a variety of hazardous and/or odorous vapors. This system combines the high efficiency of a dual counter-flow packed column scrubber coupled with the excellent adsorption capabilities of a carbon polishing vessel (optional attachment). When outfitted with the carbon vessel, This system satisfies the EPA requirement for proper emission control devices which yield an efficiency of over 98% (40 CFR 61 Subpart FF). It is designed to be connected to tanks, centrifuges, and/or dryers to provide emission/odor control. This is a skid mounted unit which is rated up to 500 CFM, making it ideal for lower flow applications.

The system is fairly simple. First, the vapors flow through each of the towers where cohesion takes place between the vapor and the chemical media (through the interaction with the packing media in the towers). Most of the vapor is captured or neutralized during this stage. The vapors are then directed through the 1000 pound carbon bed (if needed) where they are polished (up to 99.9% in most cases). Many different types of chemicals may be used in this scrubber system. Whether you want to scrub out hydrocarbons, hydrogen sulfide or amines this unit has the capability since it is merely a function of the chemistry. Vapor Tech personnel can help assist you in determining which chemical media will provide the highest removal efficiency. We have over 50 years combined environmental and chemical experience to fall back on.

Lastly, not only are our scrubber systems unique in their design and practicality, they are very safe. We are the only company in the country who has temperature monitoring and emergency water quench systems on our carbon vessels as a standard feature. We are the largest portable vapor scrubber system leasing company for a reason; companies trust our reputation and dedication to safety.



# Applications

Below is a sample list of applications and an estimated removal efficiency using the CST-18 system (some with carbon polish)

HAZARDOUS VAPOR / VOC NEEDING REMOVAL	POSSIBLE REMOVAL EFFICIENCIES
EDC	99%
Acids	99.9%
Amines	99%
Acrylates	99%
Mercaptans	99%
Hydrogen Sulfide	99.9%
Wastewater Odors	99%
Hydrocarbons (BTEX, Etc.)	99%
Contact Vapor Tech for other applications...	

# Scrubbing Chemicals

Vapor Tech offers many types of chemicals for use in our scrubber systems. Generally, for hydrocarbon applications, our CARBONIL line of products is used for maximum scrubbing efficiency. For H<sub>2</sub>S, our EZ-STRIP provides 99.9% removal. To achieve the highest efficiencies and safety, it is crucial that the scrubbing media is tailored to your specific vapor stream. Through our vast experience in the chemical and vapor scrubber industry, we will optimize the equipment and chemical needs of your specific application. Contact us if you need further information.



# CST-18 Specifications

## Operational Parameters

Maximum Flow Rate (CFM)	500
Minimum Flow Rate (CFM)	50
Maximum Pressure (PSI)	2
Maximum Temperature (°F)	140
Pressure Drop Across System (@ 500 CFM) with Carbon Vessel	Approximately 7" of water
Pressure Drop Across System (@ 500 CFM) without Carbon	Less than 3" of water

## Vapor Scrubber Specifications

Overall Unit Footprint (Scrubber Skid)	4' x 6'L
Optional Carbon Bed Footprint	4' x 4'
Empty Weight (Pounds)	1500
Vapor Inlet	6" Flange (Adjustable)
Vapor Outlet (From Scrubber Tower #2)	6" Flange (Adjustable)
Number of Towers	2
Tower Diameter (Inches)	18
Packing Height (Feet)	10 (Total for Both Towers)
Reservoir Capacity (Gallons)	450
Re-Circulation Pump Type	Air Diaphragm Standard ( Electric Mag Drive Optional)
Number of Pumps	1
Utility Required for Pump	Compressed Air or Nitrogen
Pump Air Consumption (SCFM)	65
Available Blowers	Venturi Air-Horn / 250 CFM Electric
Unit Equipped with Mist Eliminator?	YES

## Carbon Polisher Specifications

Surface Area (Square Feet)	16
Carbon Capacity (Pounds)	1000
Maximum Temperature (°F)	140
Temperature Gauge	0-200°F Dial
Liquid Purge Inlet (Used to Flood Bed in Case of High Temp)	3/4" Crows Foot
Cleanout / Service Ports (One of Each on Carbon Polisher)	18" Flange

# Operating Instructions—CST-18 Vapor Scrubber System

## **Placement:**

Set unit on level grade and attach grounding cable. When scrubbing flammables, always make sure scrubber is properly grounded.

## **Introduction of Chemical Media:**

Make sure drain valves are closed. Open 2" fill cap and add chemical media. See section on 'Chemicals' to find out about recommended dilution rates. Once the chemical has been added and diluted (water based only) with water, make sure level is not above Maximum Fill Mark ( shown near sight gauge). The vapors need this airspace in the top of the tank to be able to flow through each tower. Filling the reservoir or allowing the liquid to accumulate past the 75% capacity could raise system back-pressure or completely block airflow to tower #1.

*Note:* If you are using a water-based encapsulator like CARBONIL, make sure you add de-foamer prior to running. Foam is detrimental for scrubbing efficiency in wet scrubber systems.

## **Connection of Pump:**

Air lines must be run to the diaphragm pump so the liquid in the reservoir can be re-circulated. We recommend a regulator to keep pressure below 100 psi (or max rating on pump). Testing pump before use to make sure all line connections and fittings are leak-free. Check Wye strainer (if equipped) prior to running and remove any particulate.

## **Filling Carbon Media (if equipped):**

Add vapor phase carbon media to the carbon box through the top 18" opening. Make sure back cleanout port is properly bolted and gasketed before adding the carbon media. We usually recommend raising 1000 pound bulk bag over the 18" opening and then pulling the bottom string to allow the carbon to empty into the unit. The carbon box holds 1000 pounds of 4x10 carbon media or 4MM.

## **Liquid Purge Valve Connection (Carbon unit):**

Pipe water or fire foam to the connection just above the top temperature gauge on the carbon unit. In case of thermal situation, the valve can be opened to possibly thwart fire in the unit.

## **Unit Operation:**

Once chemical and carbon has been added, the unit should be ready to run. Start the diaphragm pump and check for leaks. Open service port and check for any significant foam. If a lot of foam is present, add de-foaming agent (see 'Chemicals' section). Once chemical media is stable, pipe vapor inlet to vapor source. Clamp down securely to avoid vapor leaks. Begin introducing vapors to the vapor scrubber. When done, disconnect and drain chemical media as well as remove carbon. When using surfactants such as Carbonil, always watch for foam. Adding de-foamer regularly is recommended.

## **Chemical Tolerances:**

With most water-based solutions like CARBONIL, once the chemical is saturated it will begin to turn opaque. When the solution starts to turn, it is advisable to drain and re-fill with fresh solution. For solutions which operate off of pH (ie. EZ-STRIP), simply monitor the pH regularly and add chemical as needed to maintain your optimal set point.

## **Carbon Tolerances:**

The carbon unit must be watched for exothermic reactions. When scrubbing hydrocarbons, always keep an eye on the temperature gauges located on the side of the carbon vessel. We usually recommend not allowing the temperature to rise above 140F. If the temperature rises above 140F, we recommend opening the liquid purge valve to cool down the carbon media. In case of high temperature situation, **NEVER** shut down blower. Isolate vapor source and allow fresh air to cycle through unit.

## **Scrubber Temperature Limits:**

The packing media in the scrubber is good up to 140F. In the case of a cold climate, anti-freeze may be added to the reservoir to help reduce the chance of freezing. Contact Vapor Tech for chemical compatibilities with anti-freeze.