



CAMERON GREAT LAKES, INC.

MOLECULAR FILTRATION SPECIALISTS

Installation & Operation Procedures Vapor Scrub Carbon Adsorption Vessels

Cameron Great Lakes, Inc. Vapor Scrub and Vapor Scrub *Radial Flow* Carbon Adsorption Vessels are designed for simplicity of installation and operation. Typical installation procedures include:

1. Place the vessel(s) in your designated area. Considerations in choosing a location include:
 - Access to all vessel connections and location and orientation of inlet & outlet ductwork,
 - Headroom over the vessel to allow spent media change out (if the unit is to be serviced *in place* as opposed to moving the unit to a different location for service), and
 - Ease of access for a forklift or pallet jack to move or change out units.

CGL Vapor Scrub units do not require special bracing or anchoring for most applications. The only requirement is a flat level surface capable of supporting the weight of the unit.

2. Please refer to the CGL specification sheet for the Vapor Scrub or Vapor Scrub *Radial Flow* series vessels [or job specific drawing(s) if supplied] for vessel weight, dimensions, and connection sizes. CGL Vapor Scrub units are designed to be installed and operated in a standing (vertical) position. Typical installation ductwork features by the owner to facilitate servicing include inlet & outlet isolation dampers and flexible hoses for connection to the process air connections. Other common features include sample taps on the inlet & outlet ductwork, pressure gauges, and temperature gauges. Be sure to use Teflon tape or other suitable pipe thread sealant/lubricant to protect pipe threads and to guard against leaks. **NOTE – Unless specifically ordered, CGL Vapor Scrub units are not rated for pressure service. Be sure not to exceed the maximum inlet pressure as noted on the specification sheet(s) provided with the unit.** *Please contact CGL with any questions you may have on your proposed installation design arrangement.*
3. Most Vapor Scrub units are shipped full of carbon ready for operation at the site. Some units are shipped empty for ease of handling at the jobsite...please check your sales order for details on how the initial charge of carbon was shipped for your order. **It is normal for the initial flow (1 to 2 minutes) of air out of the unit to be gray or even black in appearance** due to carbon dust or “fines” that are carried out of the carbon bed by the initial air flow. It may be desirable to vent the air exiting the unit to the outdoors or other non-sensitive area at the job site during start up. Once in operation, check system for leaks, excessive pressure drop, and filter media in the discharge hose or duct.

Caution – The adsorption process is an *exothermic* reaction. **Heat is released when volatile organic compounds (VOCs) and other contaminants are adsorbed by the carbon.** Normal system airflow through the carbon bed is usually sufficient to carry away the heat resulting from adsorption. If the carbon bed is partially spent (i.e., partially loaded with VOCs), it is recommended that the airflow be maintained through the carbon bed at all times. **Stopping the airflow may allow pockets of high VOC concentration to develop “hot spots”, and may result in damage to the carbon or create a fire hazard.** Other operating procedures for partially spent beds may include isolating the bed(s) when not in use to limit oxygen availability and/or purge and blanket the bed(s) with an inert gas. *Extreme care should*

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be taken in the design, monitoring and operation of any vapor phase carbon adsorption system.

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Normal Operation – Monitoring of Carbon Bed Performance

The owner or operator will need to monitor the performance of the carbon bed by taking regular samples of the inlet and outlet air for laboratory or other analysis. Sample analysis and report frequency are established by the permit to operate the system or by OSHA or other Health & Safety / IAQ requirements for the site. *It is the responsibility of the owner or operator to follow all requirements of the operating permit for the system using this carbon vessel(s).*

Most systems are designed with two carbon beds connected in series flow. This allows sampling between the beds to determine when the lead bed of carbon has become “spent”. The carbon is spent when “breakthrough” occurs, evidenced by a sudden increase in the concentration of the target VOC(s) in the outlet air from the lead bed (the second bed remains on line, removing the VOCs from the air stream). Once the first bed becomes spent, it is isolated from the system, serviced as noted below, and reconnected to the system as the new “polish” or second bed.

For single bed carbon systems, at least one sample tap and valve should be provided at 50% of the bed depth to determine when approximately half of the carbon has become spent. The operator can then predict when the bed must be taken out of service for spent carbon change out as noted below.

Periodic Replacement of Spent Carbon

When the carbon in the vessel (or lead vessel) has become spent, the vessel must be taken out of service, drained of any water or other liquid which may have accumulated at the bottom of the vessel, and the spent carbon removed. For standard Vapor Scrub series vessels, the spent carbon is usually removed by vacuuming out through the top of the unit (custom design units may have a side-mounted port for removal of spent carbon by gravity flow). The empty vessel is then reloaded (through the top access opening) with fresh dry carbon and placed back in service or reconnected to the system as the new polish or second bed.

NOTE – When filling or refilling an empty vessel, load the carbon in *slowly* to avoid damage to the PVC internals at the bottom of the unit.

NOTE - *It is normal for black carbon dust to be present when re-filling the unit with dry carbon as noted above. Workers should wear dust respirators and goggles while filling the unit.* Proper ventilation of the vessel service area is recommended. Please refer to the MSDS data sheet provided with your unit(s) for additional information when working with activated carbon.

It is the responsibility of the operator to properly characterize, store, transport and dispose of the spent carbon as “hazardous” or “non-hazardous” material per applicable U.S. EPA, U.S. DOT, and applicable state guidelines. *Please contact CGL or your nearest CGL representative for assistance for periodic spent carbon vessel service and options for spent carbon reactivation or disposal service.*

Routine Maintenance

Vapor Scrub vessels require virtually no maintenance during normal operation. The operator should periodically check system pressure gauges to insure against excessive pressure drop, which could reduce airflow through the system. CGL has a policy of continuous research & product improvement and reserves the right to change specifications without notice. No warranty, expressed or implied, is made relating to the suitability of the product for any particular purpose or application.