

CAMERON GREAT LAKES, INC.

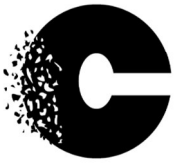
MOLECULAR FILTRATION SPECIALISTS

Installation Procedures – LiquiScrub Pressure Rated Carbon Vessels

Cameron Great Lakes, Inc. LiquiScrub 100 PSIG Pressure Rated Carbon Adsorption Vessels (“LS-HP”) are designed for simplicity of installation and operation. Please follow the procedures outlined below to install your vessel(s):

1. Place the vessel in your designated area. Considerations in choosing a location of your vessel include access to all vessel connections, location and orientation of inlet & outlet piping, and headroom over the vessel to allow spent carbon removal and re-charge with fresh granular activated carbon (GAC) or other filtration/adsorption media as specified on your initial order. The vessel does not require special bracing for most applications. The only requirement is a flat level surface capable of supporting the weight of the unit when full of water. Anchoring the vessel legs to the floor is desirable but not mandatory. *Freeze protection of the vessel and piping is the responsibility of the owner or installation contractor.*
2. Please refer to the CGL specification sheet for the LS-HP series vessels [or job specific drawing(s) if supplied] for vessel weight, dimensions, and connection sizes. LS-HP series vessels are designed for downflow operation. Typical installation piping features by the owner to facilitate servicing include inlet & outlet isolation valves, a vent valve connected to the top of the vessel, and a drain valve. Other common piping features include sample taps on the inlet & outlet piping, pressure gauge(s), and backwash piping. Be sure to use Teflon tape or other suitable pipe thread sealant/lubricant to protect the pipe threads and to guard against leaks. **The installer must provide a pressure relief valve set at 100 PSIG and sized for the maximum water flow if the pressure in the system can reach or exceed 100 PSIG.** *Please contact CGL with any questions you may have on your proposed installation piping design and general arrangement.*
3. Standard LS-HP units are shipped empty, lying down on the side shell on a special pallet. The GAC is shipped separately in bulk sacks or 50 pound bags per your initial order. Once the empty vessel has been installed, the vessel is filled with the GAC by gravity flow through the top access fitting or manway. *It is normal for black carbon dust to be present when filling the unit with dry carbon in this manner.* **Workers should wear dust respirators and goggles while filling the unit.** Proper ventilation of the installation area is recommended. Please refer to the enclosed MSDS data sheet for additional information when working with carbon.
4. Fill the vessel from the top with clean water until all of the carbon is covered by water. Leave the top cap off and let the carbon soak for a minimum of 4 hours to allow air trapped in the carbon micropore structure to escape through the top vent.
5. After initial soaking, the filter bed must be rinsed, preferably with clean water. **It is normal for the initial flow of water out of the unit to be gray or even black in appearance** due to carbon dust or “fines” which need to be rinsed out of the filter bed. The discharge water should be directed to an open drain or the inlet tank so the operator can observe when the water begins to run clean. Rinsing typically requires 10 to 15 minutes of operation at rated flow. Be sure that the water flow for bed rinsing is downflow (i.e., the same as the normal process flow).
6. Once the filter media bed is rinsed, it can be placed in service. DO NOT exceed the maximum pressure rating or flow rating of the vessel. Check system for leaks, excessive pressure drop, and filter media in the discharge line. *Please contact CGL if any questions or problems arise.*

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Installation Procedures – CGL LS-HP Series Carbon Vessels

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 water for laboratory analysis. Sample analysis and report frequency are established by the state or other government agency granting the permit to operate the system. It is the responsibility of the owner or operator to follow all requirements of the operating or discharge permit for the system using this carbon vessel(s).

Most systems are designed with two carbon beds piped 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 water from the lead bed (the second bed remains on line, removing the VOCs from the water 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 all free water, and the spent carbon removed. For LS-HP series vessels, the spent carbon is usually removed by vacuuming out through the top access fitting or man-way. The empty vessel is then rinsed and refilled with fresh dry carbon as noted in step 3 above. The new carbon bed is then soaked and rinsed as noted in steps 4 and 5 above. After rinsing, the carbon vessel is placed back in service or reconnected to the system as the new polish or second bed.

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 & Backwashing (optional)

The LS-HP vessel requires virtually no maintenance during normal operation. The operator should periodically check system pressure gauges to insure against sediment build up in the piping and carbon bed(s). The top head(s) of the carbon vessel(s) should be periodically vented to remove any trapped air that can cause a reduction of pump flow. If particulate matter becomes a problem in the influent water, installation of a 10 micron rated filter before the lead carbon bed is recommend. This will assist in extending the carbon service life, reduce internal pressure drop, and facilitate change of the spent carbon.

The clean pressure drop of your LS-HP vessel at rated flow should be about 3 psig. If a gradual, minor increase in pressure drop across the carbon bed is observed, periodic backwashing may be performed on the bed. To backwash the unit, the water flow and connections are reversed (either by use of hoses with quick connect fittings or by suitable valves in the piping). The backwash flow rate should be approximately *twice* the rated design flow or set at 10 gpm/sq.ft. of bed area.

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.