

CYCLESORB®

Description

Calgon Carbon's CYCLESORB® is a compact, all stainless steel portable liquid treatment unit that contains all the essential elements of a full scale carbon adsorption system. Containing 2,000 pounds of granular activated carbon, the CYCLESORB® can treat up to 60 gpm for removal of dissolved organic contaminants. When treatment is complete, the CYCLESORB® becomes a convenient shipping container which can be returned to Calgon Carbon for safe reactivation of the spent carbon. The CYCLESORB® is ideal for many low flow or short duration treatment projects:

- Groundwater contaminated by leaking underground storage tanks
- Wastewater stored in tanks or lagoons
- Chemical spills
- Small wastewater or process streams
- Storage tank or pipeline washing
- Off-spec product batches



Features

Flexibility

The CYCLESORB® treats the liquid downflow through a fixed bed of granular activated carbon, and, therefore, can handle varying flows and on-off operating conditions. The units can be arranged in parallel to treat higher flows or can be connected in series to optimize carbon usage.

Durability

The CYCLESORB® adsorber is constructed of Type 316L stainless steel and has no interior coating or lining that may be eroded by carbon movement or damaged during handling. The vessel support and fork channels are constructed of Type 304 stainless steel.

Corrosion Resistance

All internal and external piping is constructed of Type 316L stainless steel. Other materials are EPDM gaskets, TFE valve seats, graphite rupture disk, and Teflon and Kynar fittings.

Operating Pressure

The CYCLESORB® is hydrostatic pressure tested at 12-15 psig before shipment and is provided with a rupture disk to assure that this pressure is not exceeded.

Granular Activated Carbon

The CYCLESORB® can be provided with 2,000 lbs. of selected grades of liquid phase granular activated carbons including both virgin or reactivated grades.

Safe Spent Carbon Handling

When treatment is complete, the CYCLESORB® becomes the shipping container for the return of the spent carbon to a Calgon Carbon reactivation facility. This feature eliminates the need to handle spent carbon at the site. These containers meet all applicable transportation regulations for shipment of spent activated carbon.

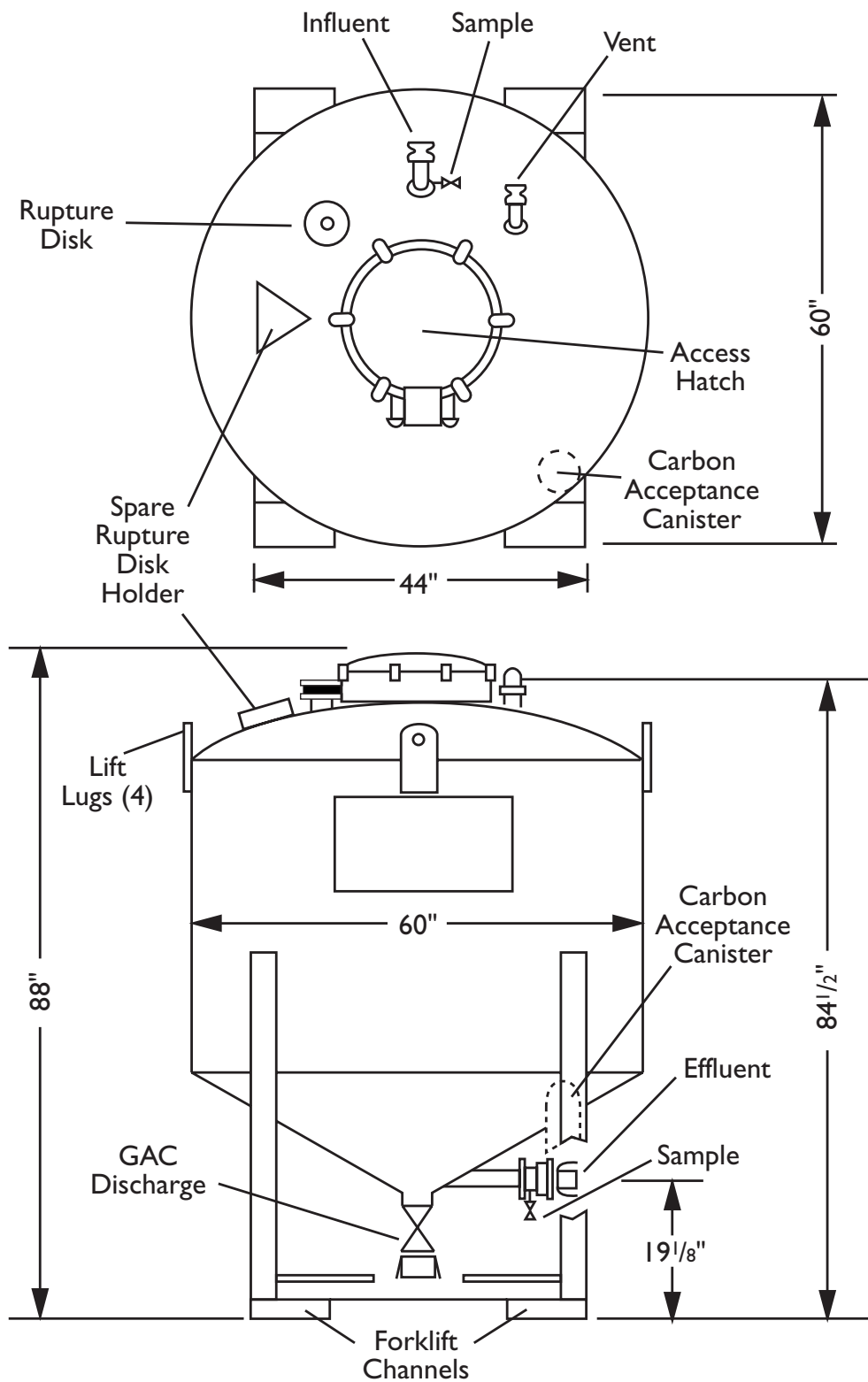
Service or Purchase Options

The CYCLESORB® is available on a service or purchase basis. With the service option, Calgon Carbon retains ownership of the units, takes responsibility for inventory and maintenance, and provides a new unit when the spent unit is to be removed so that continuous treatment is assured. If the CYCLESORB® is purchased, Calgon Carbon can provide refill and maintenance service.

Equipment and Systems

Visit our website at www.calgoncarbon.com, or call 800-422-7266 to learn more about our complete range of products and services, and obtain local contact information.

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Wetted Parts Summary-Process Flow

Wetted parts are Type 316 stainless steel, EPDM rubber (valve seat, gaskets), Teflon, Kynar, and graphite (rupture disk).

Piping and Accessories

The CYCLESORB® piping consists of stainless steel fittings and Kamlok hose connectors (with caps) with the following sizes:

| | | |
|---------------|---|--------|
| Influent | = | 2 inch |
| Effluent | = | 2 inch |
| GAC Discharge | = | 3 inch |
| Process Vent | = | 2 inch |

The effluent line is equipped with a nickel plated wafer butterfly valve with EPDM seats and a stainless steel disk, in addition to a Kynar spacer for sample valve connection and EPDM gaskets. Influent and effluent lines are provided with 1.2 inch Type 316 stainless steel ball valves for sample collection. The GAC discharge line is provided with a Type 316 stainless steel full port ball valve. The top of the adsorber is equipped with a 15 psig graphite rupture disk fitted between 2 inch flanges.

Specifications

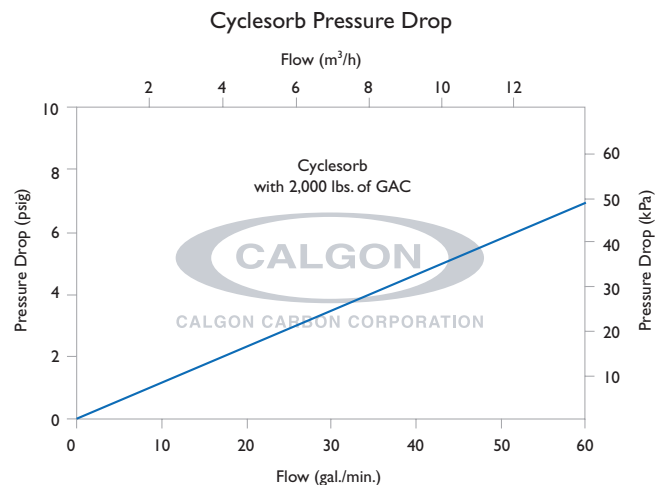
| | |
|--|--|
| Granular activated carbon per adsorber | 2,000 lbs. (908 kg) |
| Maximum operating pressure | 15 psig (103 kPa) @ 150°F |
| Pressure relief | Graphite rupture disk @ 15 psig |
| Vacuum rating | Not rated for vacuum service |
| Temperature rating | 150°F (65°C) |
| Wetted parts materials | Type 316L stainless steel, EPDM rubber, Teflon, Kynar, graphite |
| Connections | 2" Kamlok (inlet/outlet) 1/2" FNPT (sample/drain) 2" Kamlok (vent) 3" FNPT (carbon discharge) |
| Support | Stainless steel |
| Dimensions | 60" dia. x 88" height (2,012 mm dia. x 2,235 mm height) |
| Lifting | Fork lift truck or crane (4 lugs provided) |
| Weights | Empty 1,035 lbs. (470 kg) With dry carbon (ship) 3,035 lb. (1,380 kg) With wet, drained carbon (return) 5,035 lb (2,290 kg) Operating 7,400 lbs. (3,360 kg) |

Performance

Pressure drop performance is based upon "general" granular activated carbon in mesh sizes ranging from 8x30 to 12x40.

| Approx. Flow (gpm) | Approx. Pressure Drop (psig) |
|-----------------------|---------------------------------|
| 20 | 3 |
| 40 | 5 |
| 60 | 7 |

Note: Above performance based upon average GAC packed bed and clean water - actual conditions may vary.



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Return for Reactivation

The CYCLESORB® unit serves as a safe and convenient shipping container to return the spent carbon to Calgon Carbon for reactivation. Spent carbon reactivation is an integral component of the Service Agreement where Calgon Carbon provides a unit with fresh carbon to replace the unit being returned. If the unit is purchased, Calgon Carbon is able to offer exchange services incorporating most of the return and refill elements of the CYCLESORB® Service.

Prior to reactivation, an acceptability test is conducted on a small carbon sample provided with the initial CYCLESORB® adsorber that is exposed to the water or wastewater to simulate spent carbon characteristics. After this test is complete, carbon acceptance documentation is provided to allow return of the initial and subsequent CYCLESORB® units used in the same service.

When treatment is complete, the CYCLESORB® adsorber is drained of liquid, capped, and shipped to a Calgon Carbon reactivation facility. Calgon Carbon also offers other services such as transportation assistance and on-site exchange services. A Technical Sales Representative will be able to review the many options available for purchase, service, return, and carbon exchange.

At the reactivation facility, the spent carbon is thermally reactivated and the adsorbed organic contaminants are destroyed. The CYCLESORB® units are cleaned, inspected, maintained, and returned to inventory. CYCLESORB® units are then taken from ready inventory, filled with the specified carbon, and provided to the next service customer for replacement or start of treatment.

Precautionary Statements

Do not strike vessel or subject it to impact, as such practices will damage the structural integrity of the unit.

The rupture disk must not be plugged or restricted, as the system must be able to relieve over-pressurization to prevent component failure or vessel rupture. The recommended installation should include vacuum relief, as excessive vacuum created by a siphon loop or other means may cause collapse of the vessel.

Safety Message

Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate sampling and work procedures for potentially low oxygen spaces should be followed, including all applicable Federal and State requirements.

Limitations of Liability

The Supplier's liability and the Purchaser's exclusive remedy for any cause of action arising out of this transaction, including, but not limited to, breach of warranty, negligence and/or indemnification, is expressly limited to a maximum of the purchase price of spare parts or equipment sold hereunder. All claims of whatsoever nature shall be deemed waived unless made in writing within forty-five (45) days of the occurrence giving rise to the claim. In no event shall the Supplier, for any reason or pursuant to any provision of the warranty, be liable for incidental or consequential damages or damages in excess of the purchase price, nor shall the Supplier be liable for loss of profits or fines imposed by governmental agencies.

Visit our website at www.calgoncarbon.com



CALGON CARBON CORPORATION

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