



CARBON REACTIVATION FACILITY

## CARBON REACTIVATION SERVICES

### A COST-EFFECTIVE, ENVIRONMENTALLY SAFE OPTION FOR ACTIVATED CARBON

In recent years, a variety of market dynamics have driven the cost of virgin activated carbon upward. These cost increases, coupled with a greater desire for "green" processes that minimize waste and recycle raw materials, have driven many activated carbon users to reconsider a tried and true process: carbon reactivation.

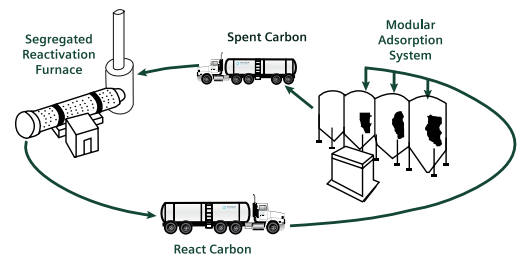
Carbon reactivation is the process of utilizing elevated temperatures followed by steam in a rotating kiln or multiple hearth furnace to remove organic compounds adsorbed onto the carbon during normal service use. Furthermore, reactivation destroys 99.99% of the removed organic contaminants through a combination of chemical reactions and oxidation in the reactivation plant's afterburner. The reactivation process thus ends the liability associated with disposing and handling of the adsorbed contaminants, while restoring the surface area and pore volume of the spent carbon to near virgin-grade levels.

The reactivation process recycles spent carbons into new activated carbon materials that continue to provide excellent performance in many treatment applications.

Reactivation can be applied to carbons used in both liquid phase and vapor phase applications. Spent carbons can be segregated from other spent carbons and returned to the same customer for reuse, or pooled with other spent carbons and sold into other applications as a cost-effective alternative to virgin carbon. Evoqua has extensive experience with all of these types of reactivation services.

### REACTIVATION FACILITIES

Evoqua operates three U.S.-based carbon reactivation facilities and is the only activated carbon services supplier with RCRA- permitted reactivation capacity serving both the East and West Coasts. All three facilities are ISO 14001 certified for environmental management. We have safely reactivated more than 600 million pounds of spent carbon over the past 25 years. Whether it be custom reactivation, pool reactivation, liquid phase applications, or vapor phase applications, Evoqua can cost-effectively handle your reactivation needs.



### Markets that Use Reactivated Carbon

- Municipalities (Drinking Water and Wastewater)
- Refineries
- Groundwater Remediation
- Environmental Cleanup
- Chemical Processing
- Power Plants

## SPENT CARBON REACTIVATION PROGRAMS

Evoqua reactivated carbon programs utilize our network of service technicians that are trained in performing carbon exchanges from both larger hard piped adsorber vessels by vacuum and slurry exchange and smaller adsorber vessels by direct vessel exchange.

**React and Return** is a highly controlled program where the customer's spent activated carbon is removed, reactivated, and returned for reuse to the same customer. The carbon is segregated from other carbons during reactivation and storage. Virgin carbon is used to offset normal losses that occur during handling and reactivation to ensure that 100% of the original carbon volume is returned to the customer. For react and return services provided for drinking water applications at our Darlington, PA and Red Bluff, CA facilities, the reactivated carbon is certified to ANSI / NSF Standard 61 for potable water treatment.

**Pool reactivation** is where spent carbons are removed and the resulting reactivated carbons are then pooled according to application type (vapor phase/liquid phase) and mesh size. These pooled carbons can then be sold into many applications as a substitute for virgin carbons to lower operating costs. Our pool reactivated carbons provided under this program are as follows: AquaCarb® S Series - for non-potable, liquid phase applications  
VOCarb® S Series - for vapor phase applications

## Additional Features and Benefits of Evoqua' Reactivation Programs

- Spent carbon sampling/profiling can be performed at our own certified environmental carbon testing laboratory
- Removal and packaging/labeling of spent carbon in D.O.T approved containers
- Transportation coordination of spent carbon to a Evoqua reactivation facility
- Inspection and maintenance of carbon adsorber vessels
- Rebedding - either virgin grade, custom reactivated carbon, or pool reactivated carbon
- A "Certificate of Reactivation" for each shipment confirming that the spent carbon has been recycled in a manner that meets or exceeds all applicable RCRA and Benzene NESHAP regulations.
- Reactivation facilities are ISO 14001 certified. ISO 14001 is part of a series of voluntary standards for environmental management tools and systems. As part of ISO 14001, our facilities all have Environmental Management Systems which ensure that our impact on the environment is minimized, that we continuously measure against best practice standards for environmental management, and that we are positioned to manage increasingly stringent environmental regulations.

## REACTIVATION FACILITIES OVERVIEW

Facility	Darlington, PA	Red Bluff, CA	Parker, AZ
In Operation Since	1989	1999	1992
Type of Furnace	Rotary Kiln	Rotary Kiln	Multiple Hearth
Number of Furnaces	5	1	1
Operation	24/7	24/7	24/7
Freight Access	Bulk Truck, Bulk Bag	Rail, Bulk Truck, Bulk Bag	Bulk Truck, Bulk Bag
Permitting	RCRA Permitted	Non-RCRA	RCRA Permitted
Custom Reactivation	Yes	Yes	No
Food Grade / Potable Reactivation	Yes*	Yes**	No
Environmental Controls	High Temperature Afterburner and Wet Scrubbing System		

\* Kiln operated in accordance with AWWA Standard B605-07 for reactivation of granular activated carbon and certified to ANSI / NSF Standard 61

\*\* Certified to ANSI / NSF Standard 61



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