

## REACTIVATED CARBON:

### FREQUENTLY ASKED QUESTIONS

Reactivated carbon is spent carbon that is recycled by being regenerated in a rotating kiln or a multiple hearth furnace. Once carbon is reactivated it can be used in place of new virgin carbon for aqueous and vapor applications to remove organics.

#### **How is spent carbon reactivated?**

The reactivation process uses steam and elevated temperatures to remove and destroy the organic compounds that had been adsorbed onto the carbon. Reactivation restores the surface area and pore volume of the spent carbon to a point close to that of a virgin carbon. In fact, the process of carbon reactivation is identical to the process of creating virgin activated carbon.

#### **What happens to the organics that were loaded onto the spent carbon?**

The reactivation process first drives the organic materials off the carbon and then destroys them. The organics are completely mineralized by first by their reaction with the reactivation process gases and second by oxidation in the reactivation plants afterburner to form simple environmentally acceptable compounds. Volatile inorganics are removed by a wet chemical scrubber. The reactivation process ends the chain of custody for the adsorbed contaminants and a certificate of reactivation can be issued.

#### **Where can reactivated carbon be used?**

Reactivated carbons can be used in all applications (both liquid and vapor phase) where virgin carbons have been traditionally used. Reactivated carbons are suitable for use in treatment of potable water, process water, wastewater and groundwater remediation.

#### **Why should I consider using reactivated carbon for my applications?**

The single most important benefit of using reactivated carbon is cost savings. The process of carbon recycling reduces operating costs since the relative costs of reactivation are less than the cost of creating new, virgin carbon. In addition, some facilities also receive environmental credits issued by regulatory agencies for waste minimization.

#### **Does reactivated carbon have the same performance as new, virgin carbon?**

Performance can be measured by a variety of methods including Iodine and Butane Numbers. Clients have found that reactivated carbons from Siemens Water Technologies provide very similar performance to virgin activated carbons.

#### **How can I compare reactivated carbon performance to virgin carbon performance?**

Standard adsorption capacity tests such as Iodine number and butane number are an initial basis for comparison of Reactivated and virgin carbon. While these tests are sufficient for most applications, some applications require comparing removal of targeted compounds. A comparative test utilizing the Rapid Small Scale Column Test (RSSCT) should be utilized by comparing the adsorption performance of Reactivated vs. virgin carbons with a sample of the end users influent water stream.

#### **Can reactivated carbon be used to treat drinking water?**

Yes. Reactivated carbons have been used in drinking water applications throughout North America and in Europe. In these types of applications, it is often required that the customer begins with an NSF- certified virgin carbon and receives back the same carbon lot following reactivation. The carbon is not mixed or pooled with any customer's carbons during reactivation. This type of service is commonly referred to as "React and Return". To ensure that

water remains uninterrupted during the reactivation service, this program also provides the customer with a “float” or inventory set of carbon.

### **What reactivated carbons programs does Siemens Water Technologies offer?**

Siemens Water Technologies has three types reactivated carbon programs:

- **React and Return** -A highly controlled program where activated carbons are removed, reactivated, and returned for reuse to the same client. 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.
- **Pool Reactivation** -Spent carbons are segregated and 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.

### **How does Siemens Water Technologies segregate its carbon for the React and Return program?**

When a React and Return customer’s carbon is transported to our facility, Siemens uses a rotating kiln furnace for the reactivation process. The carbon is loaded directly from the shipping container into the furnace and then reactivated. Once the carbon has been reactivated it is then re-bagged and warehoused for storage until you need it.

### **What services are available with these programs?**

A complete line of field services are available including: spent carbon profiling, spent carbon removal and packaging, non-hazardous and/or hazardous waste handling/transportation to our reactivation plant or a hazardous waste reactivation plant, vessel inspection with minor repair, vessel reloading with reactivated carbon.

### **Can Siemens Water Technologies take my hazardous waste carbon for reactivation?**

Siemens Water Technologies can reactivate carbons that are classified as hazardous, on the Federal level as well as CA state hazardous level, at one of our regional reactivation plants located across the US. Each spent carbon is different and prior to accepting for transfer a profile must be completed. There are several contaminants, such as PCBs, which our plants do not handle. A local Siemens Water Technologies Sales and Technical Support specialist can assist in determining the next step for handling your spent carbon.