REACTIVATION OF SPENT CARBON CONTAINING PFCs

Reactivation: A Primer

Carbon reactivation is a thermal treatment process in which adsorbed chemical constituents are removed from spent activated carbon and used to produce a recycled, reactivated product for reuse in potable water (municipal), as well as non-potable/non-food grade applications, such as wastewater treatment or water remediation applications.

Desorbed chemical constituents are thermally destroyed in the reactivation process, by which the spent activated carbon enters a furnace or kiln where temperatures are increased to above 1800°F. Calgon Carbon has been destroying PFCs through reactivation for 15 years.

Reactivating Spent Carbon Containing PFCs

During the reactivation process, the excess water is vaporized and organic adsorbates (including Perfluorinated Compounds) desorb and volatilize (including volatile Fluorides) into the furnace atmosphere. Desorbed organic compounds then begin to combust within the furnace (hydrogen fluoride – HF – is formed from the volatile fluorides). Some volatile organics may be charred or carbonized on the surface of the carbon as temperatures exceed 1800°F.

Our Commitment to Safety

- Robust testing methods which ensure safe and effective reactivation of spent carbon
- Customers complete a waste profile document and submit a spent carbon sample prior to reactivation
- Worldwide reactivation facilities handle industrial, municipal, non-hazardous, non-RCRA hazardous and RCRA- hazardous spent carbons

Our Commitment to the Environment

- Furnaces are equipped with air pollution control equipment to minimize the release of contaminants, including:
  - Afterburners and thermal oxidizers to combust desorbed organic compounds
  - Dry scrubber/spray dryer units to remove acid gases
  - Baghouse-type dust collectors to remove particulate matter from the afterburner and spray dryer, as well as furnace dust
- Wastewater is treated and discharged in accordance with plant discharge permits
- Solid wastes are disposed (for example, cement kiln processing or RCRA permitted landfills) - hazardous wastes are treated in a permitted system and disposed accordingly
How is **spent carbon reactivated?**

In the same manner activated carbon is manufactured:

- Multiple hearth furnaces or rotary kilns with a high-temperature steam reaction develop the pore volume of activated carbon and restore adsorptive capacity.
- Adsorbed organics are volatilized or pyrolysed to a carbon char.

How are the emissions from the **reactivation process treated?**

Reactivation furnaces are maintained under negative pressure ensuring there will be no leaks to the outside environment:

- Furnace off-gas passes through an afterburner to destroy any unburned organics.
- Emission stream passes through a chemical scrubber to remove acid gases.
- Final treatment through baghouse filters removes particulate matter.

**What is the advantage of reactivating spent carbon?**

Reactivation recycles spent carbon for reuse. When reactivated, carbon can be restored at a lower cost than the manufacture of activated carbon from raw material and long-term liability of disposal is avoided.

**Will reactivated carbon work for my application?**

Calgon Carbon will provide an assessment of standard reactivated carbon products vs. virgin carbon for most applications. Evaluation by accelerated column testing or pilot scale trials also can be conducted.

**Is reactivated carbon suitable for use in drinking water?**

Calgon Carbon has several NSF certified reactivation facilities dedicated solely for drinking water and food grade applications. “Custom Reactivation” at these facilities allow our customers to recycle and reuse their GAC with a clear chain of custody and a certificate of reactivation.

**If spent carbon is returned, can it be replaced with virgin carbon?**

Yes, we will reactivate spent carbon and supply this later to a non-food grade application. Depending on the application, spent carbon can be replaced with a variety of virgin carbons.

**Can hazardous spent carbons be returned for reactivation?**

Yes, in most cases. Our Catlettsburg, KY and Pittsburgh, PA plants are fully permitted to accept RCRA-hazardous wastes, unless unacceptable by permit.