

Application Bulletin

Powdered Activated Carbon for Flu Gas Treatment

Activated carbon injection has been identified as the Best Available Control Technology (BACT) by the EPA for the removal of mercury, dioxins, furans, and other VOCs from municipal, industrial, hospital, and hazardous waste incinerator flue gas streams. There are a variety of ways to use activated carbon in flue gas treatment. The best application method depends on the existing pollution abatement system.

Dry Abatement System

Dry powdered activated carbon (PAC) is injected into cooled (<200°C) flue gas. The carbon can be injected in numerous locations, including prior to or after acid gas scrubbing. The overall design is similar to the semi-

wet/semi-dry abatement equipment except the PAC is injected dry. The used PAC will be collected in the particulate matter (PM) collection device and safely disposed of with the ash. Typically, the usage of activated carbon ranges from 50 to 500 mg per Nm³ of flue gas. Carbon usage rate is highly dependent on the flue gas temperature, available contact time, and the particulate matter collection device. expertise in the industry:

Semi Dry/Semi Wet Abatement System

Powdered activated carbon (PAC) is injected (dry or as a slurry) into the humidified 130 to 160°C flue gas stream. Although the contact time in the gas stream is usually less than a second, the contact time is substantially increased by the residence time of the carbon in the particulate matter (PM) removal equipment. The PAC can typically be disposed of as non-hazardous with the other ash. PAC can be added alone or in conjunction with lime used for acid gas treatment. When mixed with lime, some of the PAC or PAC/lime can be recirculated. Carbon usage rates range from 50 to 500 mg per Nm³.

Wet Scrubber Abatement System

For over 20 years, activated carbon has been used to remove mercury and dioxins from water. In a wet scrubber system, granular (GAC) or powdered (PAC) activated carbon is used to remove dioxins from the scrubber liquid. Powdered carbon is added to the re-circulating liquid, and a small slipstream of solution is continuously purged. Alternatively, the re-circulation scrubber solution is continuously pumped through a GAC bed and purified. When the GAC is saturated and no longer performs as required, the spent carbon must be disposed of in an environmentally safe method.

In Europe, powdered activated carbons supplied by Chemviron, European Branch of Calgon Carbon Corporation, have been consistently meeting emission discharge standards of 0.5 µg/Nm³ mercury and 0.01 ng/Nm³ T.E .dioxins. In the United States, proposed incinerator facilities and existing incinerator facilities face stringent flue gas discharge requirements. Many facilities are currently using Calgon Carbon's FluePac™ line of powdered carbons for mercury, dioxin, and VOC control. Some local governments and state environmental agencies have already established flue gas treatment objectives prior to upcoming federal regulations.

For flue gas treatment, removal of trace levels of mercury and dioxin is required. To accomplish the adsorption of these micro-pollutants, the adsorbent must have sufficient high energy adsorption sites. Calgon Carbon's FluePac™ line of coal-based powdered activated carbons has a high minimum Iodine Number (measurement of available surface area) with up to twice the amount of high energy adsorption sites when compared to other adsorbent carbons. With proper dosing levels, over 95 percent reduction in mercury/dioxin is achievable.



Visit our web site at www.calgoncarbon.com, or call 1-800-4-CARBON to learn more about our complete range of products and services, and local contact information.

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The use of Calgon Carbon coal-based carbon adsorbent in the treatment of flue gas should pose no hazard or safety concerns to the user. Calgon Carbon's process for activating/reactivating granular carbon leaves no residual volatiles, thus the activated carbon can be safely transported, stored, and handled.

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.



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