

CARBETROL®

SAFETY CONSIDERATIONS VAPOR PHASE CARBON ADSORPTION

When contaminated gas streams are treated with granular activated carbon, heat is released by the physical adsorption process. This exotherm is generated from the adsorption of both the gaseous contaminants and water vapor found in the untreated gas.

Additionally, certain reactive chemical compounds once adsorbed onto activated carbon undergo chemical oxidation or polymerization on the carbon surface. These reactions are also exothermic.

Since heat losses through the walls of most granular carbon adsorbers are very low, most of the heat generated is carried off in the exit gas stream. However, in extreme cases the heat generated is sufficient to cause a significant rise in the exit gas temperature and in the carbon bed itself. A safety issue develops if the temperature rise has potential to create an ignition hazard.

The degree of heat generation (exotherm) in any given carbon application can be predicted and is based on:

- A) Gas flow rate.
- B) The concentration of the gaseous contaminant.
- C) The relative humidity of the gas.
- D) The presence of certain reactive type compounds.
(e.g. various ketones, aldehydes, etc.)

A thorough understanding of the above process conditions will allow an assessment of the heat generating potential of an application. CARBTROL can assist in this analysis and, where warranted, can recommend process, operation or equipment changes to address safety concerns.