

## Disinfection of GAC

In many applications in which Activated Carbons are utilised, it may become necessary from time to time to disinfect the Carbon bed because of the presence, on the Carbon, of bacteria. The growth of these bacteria can result from a number of factors, and the presence of these bacteria can be undesirable in a number of processes, for example food and beverage manufacture, and potable water treatment .

Traditional disinfection procedures have utilised steam, or the use of proprietary chemical products. Following is described an in-situ method utilising Sodium Hydroxide (Caustic Soda), followed by a neutralisation step.

### Procedure

- Before taking the adsorber vessel off-line, drain all the water from the vessel through the effluent line.
  
- Take the adsorber vessel off-line, taking care to close off all the influent and effluent lines, with the exception that one line at or near the top of the adsorber vessel is left open to act as a vent.
  
- Pump 5% w/w Sodium Hydroxide into the adsorber vessel through the effluent line, until the solution overflows through the vent line. Alternatively, the vessel may be filled by adding the appropriate quantity of a commercially available concentration (typically 40-50%) of Sodium Hydroxide solution, and diluting to 5% concentration by backfilling through the effluent line at sufficient flow rate to ensure that thorough mixing of the water and the Sodium Hydroxide will occur. Ejectors/eductors of suitably alkali resistant material have also been successfully used.
  
- After the Carbon has soaked in the Sodium Hydroxide solution for a period of 4-6 hours, drain the adsorber through the effluent line, taking care that the Sodium Hydroxide solution is disposed of in accordance with the relevant discharge/disposal Regulations.
  
- Wash the residual Sodium Hydroxide from the Carbon in the adsorber by backwashing through the effluent line, for 8-10 hours, with clean water at a flow rate of approximately 50-100 litres per minute per square metre of cross-sectional area of the Carbon bed, after which the adsorber can be brought back on-line.

Alternatively, the process can be shortened by soaking the Carbon in the appropriate quantity of approximately 0.05% Hydrochloric Acid solution. The acid can be added to the adsorber directly, or by adding the relevant quantity of commercially available strength of acid and adding water at a sufficient rate to ensure thorough mixing and in sufficient quantity to ensure the above Hydrochloric acid concentration. Alternatively, a suitable ejector/eductator may be used. The carbon is then allowed to soak for a minimum of one hour before the adsorber is drained, again taking care that the solution is properly disposed of. The pH of the water should be in the range 8-10. The Carbon is then washed by backfilling through the effluent line, at a rate of around 50-100 litres per minute per square metre of cross-sectional area until the pH of the effluent water matches that of the influent water. The adsorber vessel is then ready to be brought back on-line.

### Caution:

Both Sodium Hydroxide and Hydrochloric Acid are hazardous compounds. Appropriate procedures must be followed when handling these materials, including the wearing of a face shield, suitable gloves, goggles and other protective clothing. The Materials Safety Data Sheets for these chemicals should be consulted before use. The relevant storage procedures should also be followed.