

Chemical Exposures

Perchloroethylene (PCE or PERC) is the most commonly used drycleaning solvent. PERC is much lower in toxicity than other drycleaning solvents used in the past such as carbon tetrachloride and trichloroethylene (TCE). Nonetheless, PERC can be hazardous to employee health if not handled properly.

According to the National Institute for Occupational Safety and Health (NIOSH), the health effects associated with over-exposure to PERC include:

- depression of the central nervous systems; damage to the liver and kidneys;
- impaired memory; confusion;
- dizziness;
- headache;
- drowsiness;
- and eye, nose and throat irritation;
- repeated exposure may result in dermatitis (NIOSH Publication No. 97-156).

There are several methods to control exposure.

- Whenever possible, substituting a less toxic substance or process is recommended.
 - Alternative drycleaning methods that have been proven effective include wet cleaning and petroleum-based drycleaning (NIOSH Publication 97-155).
- If substitution of a less hazardous material is not feasible, the operation should be designed to isolate or capture solvent vapors before employees can be exposed.
 - This can be accomplished in several ways:
 1. Inside the shop, dry cleaning machines should be isolated from other work areas as much as possible. The majority of perchloroethylene emissions originate at the machines, so isolating employees as much as possible from the source will reduce exposures.
 2. The highest solvent exposures occur when workers are loading and unloading dry cleaning machines. This exposure can largely be eliminated by utilizing dry-to-dry machines that do not require transfer of the clothing from separate washing to drying machines (NIOSH Publication 97-156).

- Along with isolation of the hazard, proper ventilation in the shop will control worker exposures.
 - Capturing and removing vapors at the source (local ventilation) is the best means of reducing exposure. Dry cleaning machines that utilize an eternal exhaust system should have an inward air velocity through the loading door of 100 feet per minute, and the air should be passed through a control device that recovers solvent vapors, such as activated carbon.
- Exposures are further reduced with modern dry cleaning machines that utilize vapor recovery/capture systems that utilize a refrigerated condenser and/or carbon adsorber. General ventilation is also important, with a complete air change every five minutes optimum. (NIOSH Publication 97-157)
- Operators should not open the door of the dry cleaning machine while it is running, or cut the drying period short.
 - Machine doors should always be closed except during loading and unloading.
 - Using a long-handled tool to retrieve clothes at the back of the drum also helps.
- Properly maintained dry cleaning machinery has been shown to decrease perchloroethylene exposures.
 - Make sure that vapor recovery systems are in good working order.
 - Check for liquid or vapor leaks on equipment piping and ductwork.
 - Workers should always wear proper personal protective equipment when performing maintenance on these machines.

Zenith provides workplace safety resources at: **TheZenith.com**[®]