



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MEMORANDUM

DATE: December 7, 2001

SUBJECT: **Adequacy of asbestos removal from carpets
using dry-type HEPA vacuum cleaners**

FROM: Cate Jenkins, Ph.D., Environmental Scientist
Waste Identification Branch (MC 5304)
Hazardous Waste Identification Division
Office of Solid Waste

A handwritten signature in green ink that reads "C Jenkins".

TO: Responsible Parties for Evaluating Asbestos Cleanup Procedures
in Buildings in Lower Manhattan after the World Trade Center Collapse

The EPA has conducted studies to determine whether or not the use of a standard dry high-efficiency particulate air (HEPA) filtered vacuum cleaner is effective in reducing the amount of asbestos in carpets. The EPA has found that dry-type HEPA vacuum cleaners were ineffective in reducing asbestos concentrations in carpet under the experimental conditions. The wet-extraction vacuum cleaner with a HEPA filter, however, did significantly reduce asbestos concentrations.

The studies also evaluated whether the use of a HEPA dry vacuum cleaner prevented increased air concentrations because of the vacuuming activities which could stir up dusts. Dry-type HEPA vacuum cleaners had no significant effect on preventing asbestos air concentrations from increasing during vacuuming. The ordinary vacuum cleaner with no HEPA filter, the dry-type vacuum cleaner with the HEPA filter, and even the wet-extraction vacuum cleaner with the HEPA filter all increased air concentrations of asbestos during vacuuming.

These studies are summarized below, and are available at the EPA publications web site for downloading:

Evaluation of Two Cleaning Methods for Removal of Asbestos Fibers from Carpet, US EPA Risk Reduction Engineering Laboratory, Cincinnati, OH 45268, Publication No. EPA/600/S2-90/053, April, 1991, available at www.epa.gov/ncepihom/nepishom/

The effectiveness of dry-vacuuming and wet-cleaning for the removal of asbestos fibers from carpet was examined, and the potential for fiber reentrainment during carpet cleaning activities was evaluated. Routine carpet cleaning operations were simulated by using high-efficiency particulate air (HEPA) filtered dry vacuum cleaners and HEPA-filtered hot-water extraction cleaners on carpet artificially contaminated with asbestos fibers. Overall, wet-cleaning with a hot water extraction cleaner reduced the level of asbestos contamination in the carpet by approximately 70%. There was no significant change in carpet asbestos concentration after dry-vacuuming. The level of asbestos contamination had no significant effect on the difference between the asbestos concentrations before and after cleaning. Airborne asbestos concentrations were two to four times greater during than before the carpet cleaning activities. Neither the level of asbestos contamination in the carpet nor the type of cleaning method used greatly affected the difference between the airborne asbestos concentration before and during cleaning.

Evaluation of Three Cleaning Methods for Removing Asbestos from Carpet: Determination of Airborne Asbestos Concentrations Associated with Each Method, US EPA Risk Reduction Engineering Laboratory, Cincinnati, OH 45268, EPA/600/SR-93/155, September 1993, available at www.epa.gov/ncepihom/nepishom/

A study was conducted to compare the effectiveness of three cleaning methods for removal of asbestos from contaminated carpet and to determine the airborne asbestos concentrations associated with each. Baseline measurements before cleaning showed an average concentration of 1.6 billion asbestos structures per square foot (s/ft²) of carpet. The effectiveness of dry vacuuming using cleaners with and without a high-efficiency particulate air filter was compared with that of wet cleaning with a hot-water extraction cleaner. The wet cleaning method reduced the level of asbestos contamination in the carpet by approximately 60%, whereas neither dry cleaning method had any notable effect on the asbestos level. The type of cleaner used had little effect on the difference between the airborne asbestos concentration before and during cleaning.

I am aware that the U.S. Environmental Protection Agency has advised parties returning to residences and homes in lower Manhattan to use these dry-type HEPA vacuums. This advice is by way of EPA's official referral of parties to the New York City Department of Health (NYC DOH) recommendations which mention dry-type HEPA vacuums as being preferable. The NYC DOH recommendations may be found at www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html.

EPA's advice appears contrary to and in direct conflict with the official EPA studies which found that dry-type HEPA vacuum cleaners do not reduce asbestos contamination in carpets. I am aware of no other scientific evidence to substantiate the conjecture that a dry-type HEPA vacuum cleaner would effectively remove asbestos fibers from carpeting. There will be a need to closely monitor the effectiveness of asbestos removal from carpeting through laboratory testing.

This memorandum represents my personal professional judgement, and does not necessarily reflect any of the different official positions of the EPA in this matter. My December 3, 2001 memorandum detailed many other areas where EPA is in conflict with its own established scientifically based regulations and guidelines regarding the World Trade Center asbestos cleanup.