



# Facts About The Impact of Duct Cleaning on Internal Duct Insulation

## Study Analyzes Effectiveness of Duct Cleaning in Improving Indoor Air Quality

*In this issue we discuss the results of a study entitled "Effectiveness of HVAC Sanitation Processes in Improving Indoor Air Quality." The research project was designed to determine the effectiveness of three common HVAC duct cleaning methods in reducing airborne particulates.*

### Introduction

Indoor air quality in a home or building can deteriorate for a variety of reasons. Since HVAC systems are installed to carry the air necessary for indoor comfort, they are usually one of the first areas checked when complaints occur.

Over the last several years, there has been a dramatic increase in the number of air duct cleaning firms. Some of these companies are not knowledgeable about HVAC equipment operation and duct design

and construction. Others have failed to keep pace with improvements in duct cleaning methods and technology. Inadequate and ineffective cleaning of HVAC ductwork may actually cause and increase indoor-air-quality-related complaints among the occupants.

While several methods of duct cleaning are available, their effectiveness in reducing the level of airborne particulates in residential HVAC systems is unknown because there is a lack of established data and investigation. In an effort to fill the information gap, a study was initiated by the Building Construction Industry Advisory Committee (BCIAC) to evaluate which duct cleaning methods were effective and to what degree they were effective in improving indoor air quality. The results of the study published in May 1994 are outlined below.

## Duct Cleaning Methods

The study analyzed three different HVAC duct cleaning procedures which were utilized according to the North American Insulation Manufacturers Association (NAIMA) guidelines for cleaning fiber glass insulated ducts.

### Contact Method

This method uses conventional vacuum cleaning of interior duct surfaces. (See fig. 1).

### Air Sweep Method

When using this method, compressed air is introduced into the duct to dislodge dirt and debris, which, becoming airborne, are drawn downstream through the duct and out of the system by vacuum collection equipment. (See fig. 2).

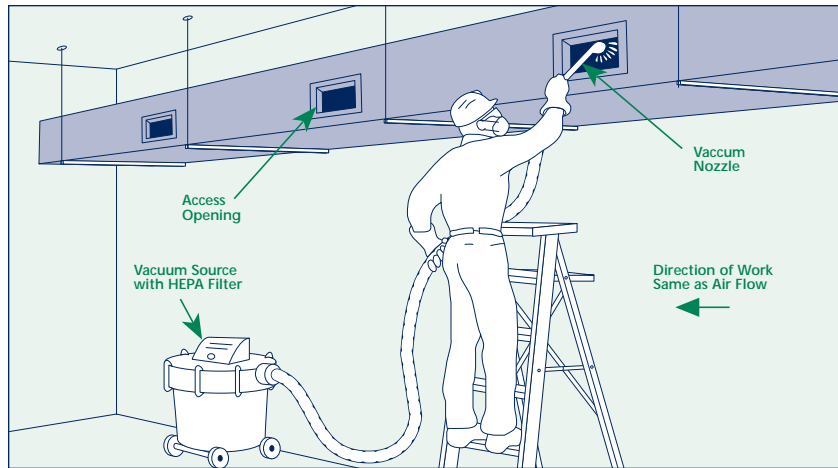
### Mechanical Brush Method

In this method a rotary brush is inserted into the ductwork to agitate and dislodge the debris, which is then drawn through the duct out of the system by vacuum collection equipment. (See fig. 3).

## Scope of Study

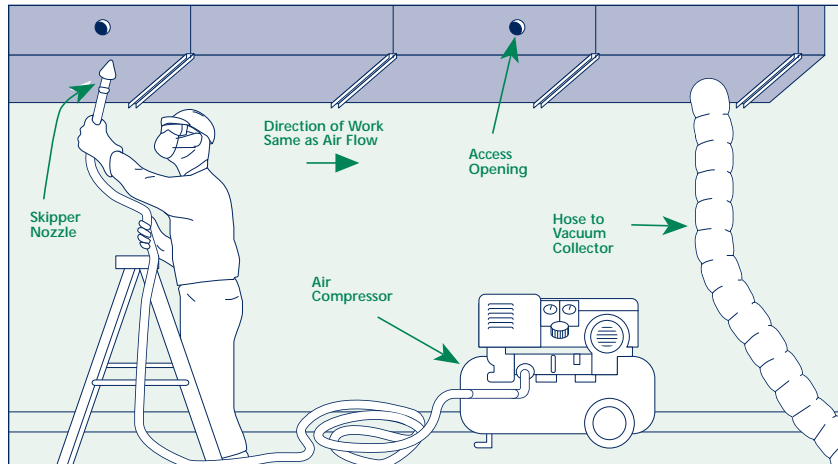
Eight identical homes were selected in a single neighborhood and all had fiber glass ductwork. Two homes were chosen for each cleaning procedure and two were used as

**Figure 1**  
Contact Vacuum Method



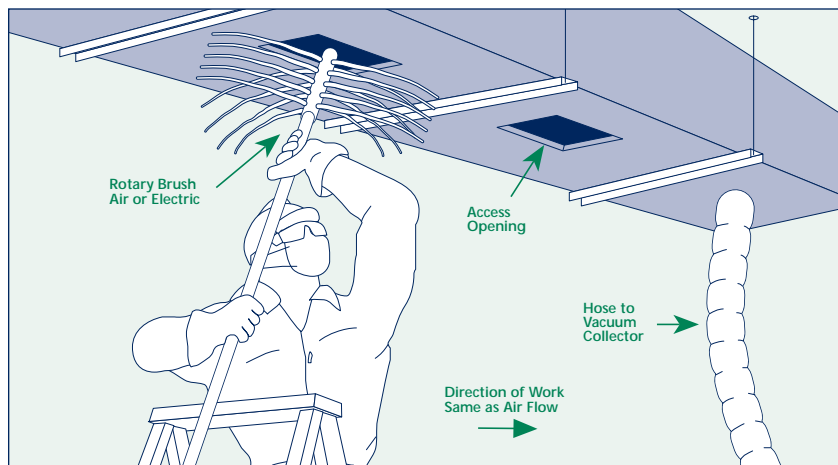
(Source: "Cleaning Fibrous Glass Insulated Ducts," North American Insulation Manufacturers Association, page 16.)

**Figure 2**  
Air Sweep Method



(Source: "Cleaning Fibrous Glass Insulated Ducts," North American Insulation Manufacturers Association, page 17.)

**Figure 3**  
Mechanical Brush Method



(Source: "Cleaning Fibrous Glass Insulated Ducts," North American Insulation Manufacturers Association, page 18.)

study controls. Data and samples were collected both indoors and outdoors before, during and after cleaning.

### Analytical Procedures

Airborne particulate matter readings were obtained using a Met-One particle counter. NIOSH 7400 and 0500 procedures were employed to collect fiber count readings and total nuisance dust readings respectively.

### According to Study Findings:

- Particle count readings were higher during cleaning than before or after cleaning. This suggests dirt, debris and other pollutants may become airborne as a result of disturbances caused by the cleaning processes. (See fig. 4).

- Cleaning procedures were not found to have contributed to a higher indoor fiber count. Thus, the concern that cleaning fiber glass ductwork using these methods might increase the amount of fibers in the house is not supported by the findings of the study. (See fig. 5).

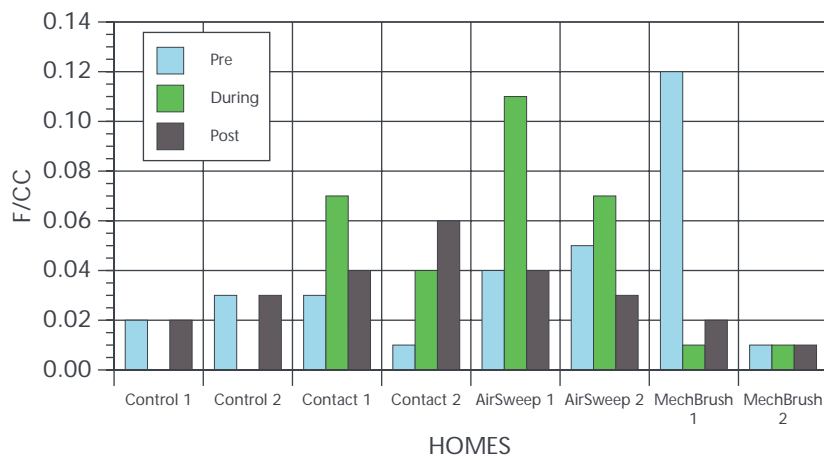
- Homes cleaned with the Air Sweep method showed the greatest reduction in bioaerosol concentration.

**Figure 4**  
MET-ONE (particle count) - Size 1.0 microns and larger

Homes	Indoor					Outdoor			
	Pre	During	% Change Pre to During	Post	% Change Pre to Post	Pre	Post	% Change Pre-Ind Pre-Outd	% Change Post-Ind Post-Outd
Control 1	3095			4641	49.95	3396	1714	9.73	-63.07
Control 2	1114			1865	67.41	3396	1714	204.85	-8.10
Contact 1	9369	15796	68.60	3691	-60.60	2368	3160	-74.73	-14.39
Contact 2	3417	19850	480.92	5076	48.55	2368	3160	-30.70	-37.75
AirSweep 1	5321	15561	192.45	4715	-11.39	1714	1904	-67.79	-59.62
AirSweep 2	4686	5288	12.85	2588	-44.77	1714	1904	-63.42	-26.43
MechBrush 1	7290	33373	357.79	3505	-51.92	3160	1031	-56.65	-70.58
MechBrush 2	6877	8450	22.87	6296	-8.45	3160	1031	-54.05	-83.62

Notes:  
Post readings were taken 2 days after pre.  
Readings are average of 15 minutes readings.

**Figure 5**  
NIOSH 7400 (fiber/cc) – Total



Notes: Post readings were taken 48 hours after pre and during.

## About the Research

### *Title*

"Effectiveness of HVAC Sanitation Processes in Improving Indoor Air Quality"

### *Sponsors*

The Building Construction Advisory Committee under a grant from the State of Florida Dept. of Education

The North American Insulation Manufacturers Association

The Florida Air Conditioning Contractors Association

### *Investigators*

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## About NAIMA

NAIMA is a trade association of North American manufacturers of fiber glass, rock wool, and slag wool insulation products. NAIMA's role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation products and to encourage safe production and use of these insulation products.

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