

## Response to White Paper 'Effects of Negative Air Duct Cleaning on Flex Ducting'

I have been involved in the HVAC hygiene and air duct cleaning industry in the Southeastern U.S. region since the beginning of 2017. I have been a member of the Scientific Committee of the National Air Duct Cleaners Association (NADCA) since it was established, and I have read and reviewed well over 200 scientific publications and white papers related to the topics of duct cleaning, indoor air quality, building science, airflow and air distribution, and related topics that involve HVAC. In my full-time field-based experience of performing duct cleaning, duct repairs, and duct replacement services, I have serviced several miles of flex duct collectively since 2017. My knowledge of the *ACR, The NADCA Standard for the Assessment, Cleaning, and Restoration of HVAC Systems (2021)*, coupled with my field-based experiences have led me to write this response to the white paper 'Effects of Negative Air Duct Cleaning on Flex Ducting'.

The premise of the white paper 'Effects of Negative Air Duct Cleaning on Flex Ducting' appears to be that because the negative air equipment manufacturers designed their equipment to exceed manufacturers maximum-rated negative pressure of flexible ducts that the use of this equipment will result in damaging the flex ducts. However, in my years of field-based experience in residential and commercial projects which involves cleaning flex ducts I have never damaged a flex duct due to negative pressure created by our gasoline-powered negative air machines.

This response is to highlight some of the significant factors that making the comparison between the flex ducts maximum rated negative pressure and negative air cleaning vacuum equipment does not accurately reflect what happens during a typical duct cleaning project.

The first important distinction that needs to be addressed is the fact that the negative air rating at the vacuum collection devices inlet is not going to be the same as the negative air pressures inside the flex branch ducts. Additionally, duct cleaning using negative air equipment involves cleaning an entire duct system instead of an individual flex branch and the vacuums capabilities are distributed throughout the entire duct system which results in significantly less pressure on the individual flex branches.

The reason negative air machine manufacturers of portable and gasoline-powered equipment design them to exceed ratings of individual flex ducts is to overcome airflow losses that result from the lengths of vacuum hoses being used (frictional losses), the duct system design issues that inhibit airflow (poor duct design/installation), and most importantly - the fact that cleaning with negative air systems involves cleaning an entire duct system that needs to remain under negative pressure to the surrounding environment. The reason there's not any additional risk of damaging the flex ducts is because they're not getting cleaned at the vacuum inlet, and the vacuums rated suction is distributed amongst all of the branch ducts and trunk ductwork that the vacuum hose is connected to.

According to the 2021 edition of *ACR, The NADCA Standard*, and the *ACGIH Industrial Ventilation: A Manual of Recommended Practices*, there is a range of minimum duct design velocities that is required for the capture and removal of different types of contaminants found within the ductwork. If a piece of equipment fails to achieve these design velocities, it usually results in contaminants that were 'mechanically agitated' and loosened up during the cleaning process but are not successfully removed from the ducts. This results in a housekeeping nightmare when the system kicks back on and blows dust out everywhere.

In conclusion, it is important to state that negative air duct cleaning is not a risk to collapsing or damaging flexible ductwork.

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