

DUCT CLEANLINESS FOR NEW CONSTRUCTION GUIDELINES



**Sheet Metal and Air Conditioning
Contractors' National Association, Inc.
4201 Lafayette Center Drive
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DUCT CLEANING TASK FORCE

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1.1 OVERVIEW

Duct installation contractors involved in new commercial building construction are having to address far more air quality and system contamination concerns than in the past. Owners and their construction representatives are also recognizing that inadequate job site cleanup practices and temporary operation of the HVAC systems during construction can have a negative impact on future HVAC system maintenance costs and employee productivity.

This guideline is intended to help the commercial duct installation contractor, design engineers and building owners to become more familiar with guidelines to control and reduce contamination during duct installation, and to provide reasonable installation recommendations that can be implemented to meet these goals.



2.1 GENERAL REQUIREMENTS

This section will address several procedures that can be implemented on any commercial duct installation project to reduce the potential for duct contamination being introduced during installation. The following recommendations to reduce duct contamination relate to HVAC system design, general job site cleanup, material storage, and work scheduling. Although many of these functions may not be the responsibility of the duct installer, awareness of their impact and better job site coordination can improve the cleanliness of the work environment.

2.2 DUCT DESIGN AND DUCT ACCESS

Designers are starting to recognize the need for more duct access panels near major duct transitions and along long sections of straight ductwork, in addition to those normally required near fire dampers and fans. Special attention to duct access is also important at the top and bottom of vertical ducts having multiple floor penetrations. Prior to the 1970's, duct systems in commercial buildings were installed and buried behind walls and ceilings, and access to the interior of these duct systems was not identified as necessary. Duct systems are becoming a serviceable maintenance item in commercial buildings due to Indoor Air Quality (IAQ) issues, and the proper quantity, size, and location of duct access panels require more definition in new construction design documents.

2.3 JOB SITE CLEANUP

The level and timing of cleanup procedures on the job site can have a direct impact on the cleanliness of the HVAC system installation, regardless of which trades are involved. If good housekeeping procedures are not followed by everyone, there will be a much greater potential for contamination of the duct systems.

2.4 TEMPORARY STORAGE

Job site duct material storage areas should be located away from high dust generating processes such as masonry or tile cutters, cutoff saws, drywall sanding, mortar and plaster mixers, roof pitch kettles, portable electric generators, and main walkways that will be constantly broom swept. The

general contractor should designate a suitable area for temporary storage.

To prevent ductwork material damage from standing water, storage locations should include pallets or blocking to keep fabricated metal ductwork above the floor surface. If there is risk of water runoff from above or dusty work areas cannot be avoided, coverage should be used to protect stored materials.

2.5 SCHEDULING OF WORK

The coordination of all trades and the scheduling of work is the primary responsibility of the general contractor. However, there are many simple work site scheduling procedures that can be established that will minimize the effort required to keep the duct system clean during installation and system startup.

There are times when the HVAC system must be continuously operated while the building is still under construction to maintain required temperature or humidity levels for other construction activities. During startup operation of the HVAC system, special care should be taken to protect the return air system by installing temporary filters at the air handling unit.

The following sections will discuss these temporary protective measures in more detail, based on the level of duct cleanliness specified.



3.1 CLEANLINESS LEVELS

How clean or dirty a duct system is can be very subjective and difficult to standardize measurement. Duct cleaning specifications and accurate verification measurements to quantify acceptable levels of contamination are still being refined and can be quite detailed involving special laser particle counters. The construction documents should have a specific specification that addresses duct cleaning and acceptable level of contaminants allowed in the HVAC system. If these detailed specifications are not defined and the installation does not involve zero tolerance areas like clean rooms, SMACNA recommends three generic levels of duct cleanliness for these typical duct installations. The following table lists the three standardized levels of duct installation cleanliness, in order of increasing restrictions on dirt contamination.

Duct Cleanliness Levels

- A. Basic Level
- B. Intermediate Level
- C. Advanced Level

If the specifications do not identify what level of cleanliness is expected, you should be sure your contract identifies which level of cleanliness you intend to provide. The basic level should be assumed unless noted.

3.2 BASIC LEVEL**3.2.1 CONDITION OF DUCTS**

Ductwork leaving the premises of the manufacturer will include some or all of the following:

- (a) internal and/or external self-adhesive labels or marking for part(s) identification;
- (b) exposed mastic sealant;
- (c) light zinc oxide coating on the metal surface;
- (d) a light coating of oil on machine formed ductwork;
- (e) minor protrusions into the airway of rivets, screws, bolts and other jointing devices;
- (f) internal insulation and associated fasteners;
- (g) discoloration marks from plasma cutting process.

It should be noted that ductwork will not be wiped down or specially cleaned at this level unless specified.

3.2.2 DELIVERY TO SITE

Unless otherwise specified, ductwork delivered from the premises of the manufacturer will have no protection. However, care must be taken to prevent damage during transportation and off loading.

3.2.3 INSTALLATION

Before the installation of individual duct sections they are to be inspected to ensure that they are free from all debris, but not be wiped or specially cleaned.

3.2.4 PROTECTION OF DUCTWORK RISERS

All risers must be covered to prevent the entry of debris into the duct.

3.2.5 DOWNWARD FACING AND HORIZONTAL DUCT OPENINGS

Downward facing and horizontal openings will not be required to be covered.

3.2.6 ACCESS PROVISIONS FOR ON-GOING MAINTENANCE

The specifier shall define the size, location and type of access opening required for maintenance of the system.

3.2.7 ACCESS OPENINGS TO IN-DUCT PLANT

Access covers shall be firmly fitted in position on completion of each section of the work.

3.3 INTERMEDIATE LEVEL

In addition to the provisions of the basic level, the following requirements should also be undertaken:

3.3.1 SITE STORAGE

The area provided for storage shall be clean, dry and exposure to dust minimized.



3.3.2 INSTALLATION

- (a) the working area should be clean and dry and protected from the elements;
- (b) the internal surfaces of the uninsulated ductwork shall be wiped to remove excess dust immediately prior to installation;
- (c) open ends on completed ductwork and overnight work-in-progress shall be sealed.

3.4 ADVANCED LEVEL

In addition to the provisions of the intermediate level, the following requirements should also be undertaken:

3.4.1 PRODUCTION AND SITE DELIVERY REQUIREMENTS

- (a) all self-adhesive labels for part identification are to be applied to external surfaces only;
- (b) to maintain cleanliness during transportation, all ductwork shall be sealed either by blanking or capping duct ends, bagging small fittings, surface wrapping or shrink wrapping.

3.4.2 SITE STORAGE

- (a) a clean and dry environment where the ductwork is protected from dust, must be provided for the storage of ductwork prior to installation;
- (b) all sealed ends shall be visually examined and if damaged resealed with an appropriate material.

3.4.3 INSTALLATION

The working area shall be clean, dry and the ductwork protected from dust. Protective coverings shall only be removed immediately before installation and inspected to determine if additional wipe down is necessary.

This Appendix is included for informational purposes only.

For more information on Indoor Air Quality and Duct Construction/Installation the following documents are available from SMACNA.

SMACNA
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IAQ Guidelines for Occupied Buildings Under Construction

Indoor Air Quality: A Systems Approach

HVAC Systems Commissioning Manual

HVAC Duct Construction Standards - Metal & Flexible

