



## Residential Programs Duct Sealing and Duct Insulation Specifications

**Applicability** – This document outlines the requirements for prescriptively repairing, sealing, and insulating existing ductwork in existing single family, multifamily up to 4 units, and manufactured homes where the primary heat source is either an electric force air furnace or a central heat pump.

### **DUCT SEALING**

#### 1. DUCTS IN UNCONDITIONED SPACE

- a. At least 30% of the supply ducts must be accessible **and** located in unconditioned spaces.

*Exception: High operating pressure leaks*

*If high operating pressure leaks are found in an unconditioned space, the system shall be eligible for duct sealing even if the percentage of ducts is less than 30%. A high operating pressure leak is defined as any leak on the main trunk line within 15 feet of the furnace.*

- b. The entire duct system is considered to be accessible for new duct systems.
- c. Ducts in basements are considered to be in conditioned space (regardless of whether the basement is finished). However, vented crawlspaces, attics with floor insulation and garages are all considered unconditioned space.
- d. The inner liner in manufactured home crossover ducts is considered accessible. However, all other flexible duct connections with properly secured **exterior** liners, may be considered to have inaccessible **interior** liners (including those in single family homes).
- e. The belly of manufactured homes is considered accessible if a visual inspection, via non-intrusive methods (mirrors, digital cameras etc.), indicates large holes and/or leaks.
- f. The furnace to plenum connection is considered accessible.

#### 2. DUCT INSULATION/ASBESTOS

The presence of insulation alone shall not be considered a barrier to accessibility. However, if the contractor suspects asbestos may be present at **any** time, he or she shall stop work immediately and notify the homeowner that the site requires a professional assessment (and possibly remediation) before duct sealing work can be completed.

#### 3. PREVIOUSLY SEALED DUCTS

Unless a utility pre-inspection confirms that additional duct sealing is required, ducts **must not** have been previously sealed through either the Performance Tested Comfort System or BPA's Prescriptive Duct Sealing program.

#### 4. IMPLEMENTATION STANDARDS

Installation must comply with all applicable codes.

#### 5. DUCT REPAIR

- a. Where needed, all accessible portions of the duct system shall be repaired and mechanically fastened.
- b. Inferior sections of duct (including rusted, crushed, disconnected or sections that are otherwise ineffective), shall be repaired or replaced **prior** to duct sealing.
- c. When there are large gaps in sheet metal or duct connections, repairs shall be made using sheet metal, sheet metal screws and/or mastic with mesh-reinforcing tape. Before applying mastic, gaps greater than ¼" shall be reinforced using mesh-reinforcing tape.
- d. All metal ducts shall be secured with at least three sheet metal screws at each connection. They should be equally distributed around the ducts whenever possible.

#### 6. DUCT SUPPORT

- a. All accessible portions of the duct system which require support shall be supported.
- b. To minimize the possibility of disconnection, flexible ducts shall be supported with straps every 4'; rigid ducts shall be supported within 3' of each connection. Straps must not restrict airflow and should not be less than 1 ½" wide.
- c. Ducts shall be supported above ground. When contact with the ground is unavoidable, a minimum of "R-4 closed-cell rigid insulation" shall be placed between the duct and the ground. The duct shall not come in contact with standing water.

#### 7. DUCT SEALING & ACCEPTABLE MATERIALS

- a. All accessible portions of the duct that require sealing shall be exposed and sealed using only approved materials. Opportunities for sealing include :
  - *Plenum*
  - *Air-handler cabinet to plenum*
  - *Plenum-to-take-off connections*
  - *Finger/dovetail joints*
  - *Branch T's, Y's and L's*
  - *Supply and return boots*
  - *Duct-to-duct connections*
  - *Gores on adjustable elbows*
  - *End caps*

- b. All loose tape shall be removed from rigid metal ducts prior to sealing. Any remaining secured tape must be completely covered with mastic at least 1/8" thick and extend at least 1/2" beyond the edge of the tape on either side.
- c. Non-flex duct joints, connections and seams shall be sealed with UL-181 listed mastic.
  - The application of mastic shall be done according to manufacturer specifications.
  - Take offs and crimped fitted joints shall be mechanically secured with screws and sealed with mastic. Non-leaking seams such as S-drive and snappies are exempt from being sealed with mastic.
  - Only foil or mastic HVAC tape labeled as meeting UL-181 standards may be used on the air handler.
  - Cloth-backed duct tape shall not be used to seal, secure or fasten ducts.
  - Boots shall be mechanically fastened to the subfloor and properly sealed with UL-181 mastic or UL-181 sealant.
- d. Flexible duct connections shall have the interior and exterior liners secured and air-sealed with nylon straps (Panduit or equivalent) and tightened with a manufacturer-approved tensioning tool. Steel band clamps with worm drive tension adjusters are also acceptable.
- e. The return should be sealed if it is easily accessible and in unconditioned space.
- f. End caps must be made of either sheet metal or a UL-181 approved rigid product.

## 8. INSULATION

When duct insulation is removed, the insulation shall be reinstalled and securely attached to the duct system using mechanical fasteners such as permanent plastic straps, nylon twine or fastening material specified by the insulation manufacturer. Mastic will not effectively hold insulation in place.

## 9. COMBUSTION APPLIANCE REQUIREMENTS

*(only applies if combustion appliance is present)*

Whenever there is a combustion appliance present in the house, garage or other attached space, a UL listed, C-UL listed or equivalent carbon monoxide detector shall be installed.

## **DUCT INSULATION**

1. Properly support ducts before insulating.
2. Seal all accessible duct joints/seams before adding insulation. Follow prescriptive duct sealing specifications.
3. Ducts must be completely insulated with R-11 fiberglass insulation without voids or gaps.
4. Insulate all ducts located in unconditioned spaces using mechanical fasteners, such as permanent plastic straps, nylon twine, stick pins or other manufacturer approved products to support all duct insulation.
5. Duct insulation must have protective cover for high traffic areas where it is prone to human contact.
6. Follow manufacturers installation requirements when installing flex ducts.