

Sealing the Deal

Duct Sealing is a Win/Win for Builder and Customer

The Problem with Leaky Ducts

A leaky HVAC system does not function as designed and creates a less comfortable indoor environment while costing the occupant money. Leaky ducts allow unfiltered air into a home, which can result in uneven temperature distributions and contribute to mold growth and other moisture issues. To help prevent these problems, all ductwork in a house, whether located in conditioned space or not, needs to be sealed to minimize air leakage. Properly sealed ducts lead to better indoor air quality, a smaller HVAC unit, lower capital cost, longer equipment life and a more comfortable and happier customer (meaning fewer callbacks!).

Duct Sealing Practices

The energy code requires that all ducts be properly sealed, whether they are located in conditioned spaces or not. It is best practice to seal all ducts with mastic, including all joints and seams. Particular attention should be paid to the air handler's cabinets and plenums, which have the greatest potential for leakage due to their higher pressure. Mastic should be applied about 1/8" thick (a little thicker than a nickel). Any gaps larger than 1/8" need to be covered with fiberglass mesh tape and then sealed with mastic.



When working with flex ducts, after connecting all ducts to boots, trunk lines and return boxes, fasten the inner liner of the flex duct with nylon draw band and tighten with a manufacturer-approved tool. Similar to hard ducts, seal all flex duct connections, closure systems and junctions with mastic about 1/8" thick.

Duct Insulation

It is best practice to include a vapor barrier when insulating ducts outside the thermal envelope. This will help prevent unnecessary heat gain or loss through the duct walls and condensation from forming on the ducts themselves. Ensure that the insulation completely covers the ducts and their connections without gaps, voids or compressions. Seal all insulation seams with UL-181 tape.

Duct Testing is Vital

Duct testing is mandatory if any part of the system is in unconditioned space. The code requires that the entire system must be tested if any portion is outside conditioned space (total leakage of no more than 4 CFM25/100 SF). However, it is best practice to test the system even if all components are in conditioned space to ensure that the system is sealed appropriately. All test results should be signed by the tester and provided to the code official.

All ducts should be sealed with mastic. Ensure that the mastic is installed on a clean, dry surface.

When sealing ducts, pay attention to:

- Air handler cabinet, plenum and connections to the air handler
- All duct to duct connections
- Filter boxes and where the filter rack sits in the plenum or trunk
- Branches, take-offs, elbows, "Ys" and register boots
- Register boots to floor/wall

When conducting a duct pressurization test, remember to:

- Follow ANSI/RESNET/ICC 380 guidelines
- Test all parts of the duct system, including ducts in the attic, crawlspace, garage and basement
- Temporarily seal registers and returns
- Evaluate the duct system's supply and return air balance



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Duct Sealing In Practice

For reference, please review these examples of properly sealed duct systems.

Compliant



Use about 1/8" thickness of mastic to seal ducts



Make sure the connection between the ducts and air handler is well sealed

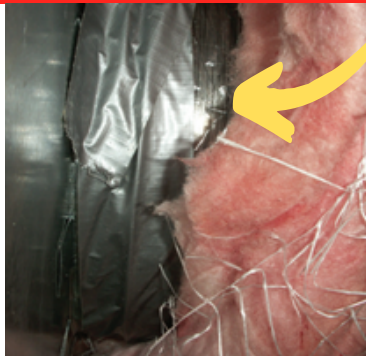


Properly seal around the register boot with mastic

Not Compliant



Gaps at duct-to-duct connections can be a major source of leakage



Duct tape is not acceptable. Use mastic as best practice



Unsealed connections between register boots and floors are a major source of leakage



Other Helpful Resources

Scan the QR code or follow [this link](#) to view the following resources:

- Pacific Northwest National lab (PNNL) Flex Duct and Metal Duct Sealing & Insulation
- Benefits of Duct Sealing
- EnergyStar Duct Sealing Brochure

