Four Steps to Better Flexible Duct Installations

By David Richardson, National Comfort Institute Curriculum Developer & Instructor

There are common problems associated with poorly performing systems using flexible duct material that can easily be corrected with attention to detail. Let's expand on how to improve typical flex duct installation defects so you can be assured your systems perform as intended.

Step One: Avoid Sharp Turns

To increase the performance of your installations, avoid sharp turns at all cost. Your systems work best when ducts are routed as straight as possible. Due to many of the obstacles found in homes today, this simply isn't an option.

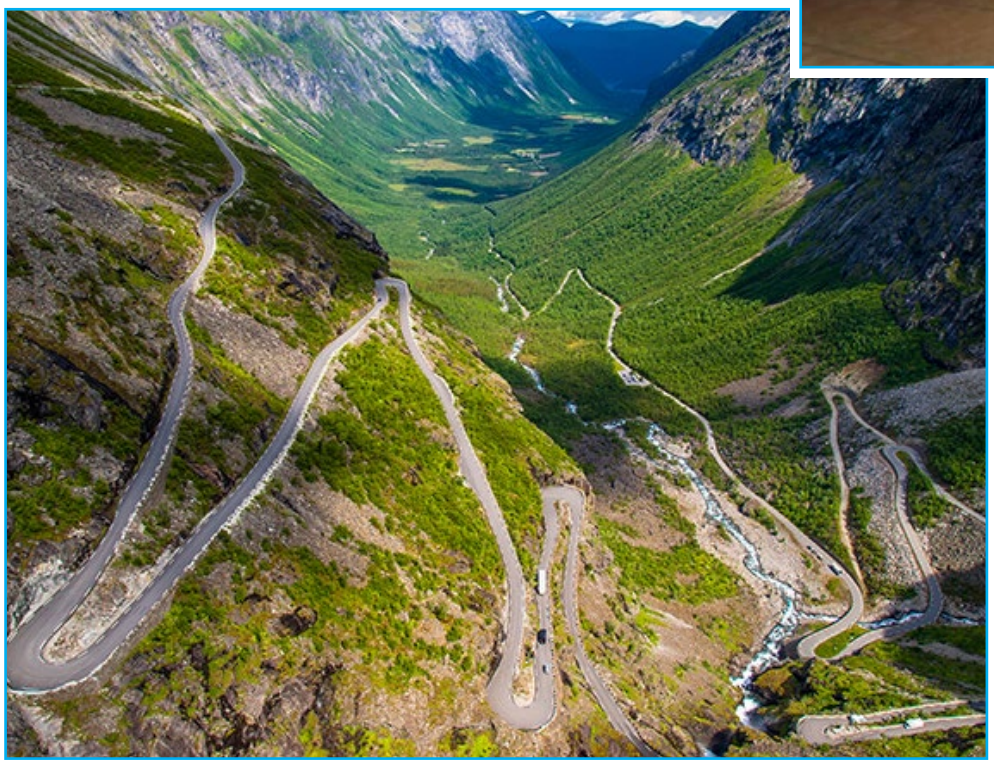
When you make a turn, do your best to keep it to a minimum. Long sweeping turns work best and allows an easier path for air to travel. Sharp, 90-degree turns kink the flex duct internally and reduce airflow. As the duct is restricted, static pressure in the system rises causing a decrease in system performance.

Some common places these restrictions occur are where ducts are incorrectly fastened to takeoffs and boots. Once the connection is made, there is often an immediate turn that destroys airflow. Solve this by providing plenty of support for the duct where it changes direction or use a sheet metal elbow.

Structural framing is another common obstacle encountered in many attics. To get around them, ducts may need to be rerouted or a different location used to avoid sharp turns.

Step Two: Increase Duct Support

Sags and kinks due to inadequate support are a common cause of poor airflow and comfort complaints. Many ducts are only supported every five to six feet, which results in severe drooping. This condition will worsen over the life of the duct system and continue reducing airflow.



Kinks in the ducts require additional support. When thin materials such as plumbing strap or wire are used for hanging, the duct becomes choked at this point. In severe situations, wire can cut into the duct causing severe air leakage into unconditioned areas of the building.

When these defects exist, you can be sure air is getting choked off and slowing down. To correct these problems, provide support at more frequent intervals such as every three feet instead of five feet.

When installing more support, make wise choices in the materials you use to prevent kinks. At a minimum, use three-inch wide hanging straps or metal bands to cradle the duct. When these

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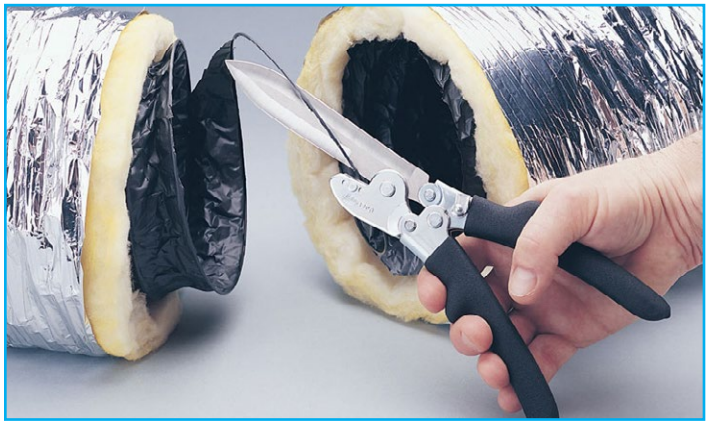
two methods are used, you can make your flex duct installation resemble insulated sheet metal.

Step Three: Remove Excess Core

Another common defect resulting in low airflow is found when the inner core is bunched up when it's fastened to a boot or takeoff. This happens if it isn't pulled tight and cut to length. Once insulation is pulled over exposed metal, this problem increases as the core compresses.



We've removed up to three additional feet of core during many of our duct renovations that would have been missed with a visual inspection. As a result we've measured airflow increases of 30 to 40 cfm on a 6-inch duct by removing excess core.

Correct this by stretching ducts out as tight as possible. Just because there's over 20 feet of flex in a box, it doesn't mean all of it has to be used on one branch run. Once the duct is connected to the boot or takeoff, stretch it tight again and remove any excess core. Complete the connection by attaching the other end and finishing the install.

Step Four: Size It Right

You can follow the three previous steps to the letter and still doom a duct system to poor performance if you size them according to old school rules of thumb. When flexible ducts are sized using methods intended for sheet metal duct, low airflow and high static pressure are the result. These materials are two completely different surfaces. Sheet metal is a smooth surface while flex is an uneven helix core.

Your systems will perform much better if you size your flexible ducts larger. Many like to use the .10 friction rate on a duct calculator for sizing, and assume a six-inch duct delivers 100 cfm. If this is your expectation, you'll be sorely disappointed in the results.

If you must use a metal duct calculator and rule of thumb, size your ducts at the .05 friction rate and follow the steps above. This gives you a greater chance of success and systems that perform closer to intentions.

The rubber truly meets the road when you measure the airflow delivery of your systems. Design methods can be argued all day long but until measurements are taken, it's strictly a guess.

I encourage you to cover these four steps with your installers and allow them the flexibility to do the job right the first time. Your customers will thank you.

David Richardson joined National Comfort Institute full time in 2010 as a curriculum developer and trainer. In this role, he develops and teaches practical, real-world training focused on the HVAC and Home Performance industries.

He has been involved in Performance-based contracting since 2001. This experience allowed him the opportunity to diagnose and correct many HVAC and Home Performance issues over the past decade.

Besides holding all NCI certifications, David has held certifications as a HERS rater, BPI building analyst, and is a BPI field and written exam proctor.

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