

MECHANICAL CODE DISCUSSION

Flexible Air Ducts



Every week a call or two will come in with a question or comment

concerning flexible air ducts. Most comments are negative with the many expressing the opinion that flex duct should be outlawed, that it is junk, is never installed correctly, wastes energy, leaks or is too restrictive. Many have suggested an ICC Code Change proposal should be submitted restricting the use to a few feet or to ban it outright. On the other side, a contractor will call asking how much he can squash a flex duct without effecting performance? (The answer is not at all.) While many of these complaints are partially correct, an outright elimination of flex duct is not the best solution.

Flexible air ducts **installed correctly** actually have several positive features including its quiet, ease of installation, already insulated, low cost and **the ability to be installed in a manner that minimizes turns and bends.** Flexible air duct **installed incorrectly** will have excessive friction losses (reduced airflow) and substantial heat loss and gain through duct leakage. As the focus on energy efficiency continues to increase, duct system efficiency receives increased scrutiny.

The Air Diffusion Council, SMACNA, ICC, engineers have produced Installation Standards for the industry. Let's review a few of the basic requirements for the proper use of flexible air ducts. A copy of the Air Diffusion Council *Flexible Duct Performance & Installation Standards* is

available for free download at: www.flexibleduct.org/images/ADC~IR5E.pdf

Reviewing several key requirements from the installation Standards:

Install ducts fully extended. Do not install in the compressed state or use excess length as this will noticeably increase friction losses.

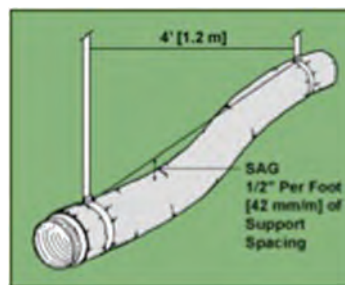
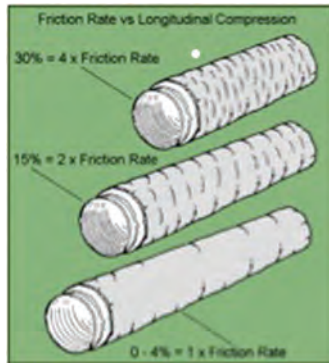
A longitudinal compression of 30% will increase the friction rate 4 times the rate of an uncompressed duct!

Do not bend ducts across a sharp corner of building materials such as joists or truss supports. The bend

radius at the center line of ducts shall be equal to or greater than one duct diameter.

Sharper bends increase pressure drop significantly and reduce airflow. Ducts shall not be crimped or crushed against joist or truss member, pipes, wires, etc. as this increases pressure loss and reduces airflow.

The combined friction and dynamic pressure losses shall be taken into consideration to properly size any duct. Pressure losses caused by the roughness of the duct wall resisting air movement are known as friction losses. Pressure losses when air flow changes direction, as caused by



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bends or when air flows across other system components are known as dynamic losses.

Residential duct systems must be designed per ACCA Manual D as commercial duct systems must be designed per ACCA Manual Q. From friction charts in Manual D we find that a 6" round sheet metal with a friction loss of .08"/100' flows 97 CFM, while a **straight** 6" flex duct at .08"/100' flows between 50 and 70 CFM dependent upon the manufacturer of the product. How often do we see a **straight** flex duct? Flex duct systems will always require upsizing to produce an airflow equivalent to that produced by smooth metal pipe.

Flexible duct shall be supported at manufacturer's recommended intervals, but at no greater distance than 4'. Supporting shall be provided so that the maximum centerline sag is 1/2" per foot of spacing between supports. A connection to rigid duct or equipment may be considered a support joint.

Additional requirements included in the Installation Standards includes sealing/clamping at connections, maintaining the integrity of the air barrier/exterior surface of the flex, how to determine friction losses through bends/sagging pipe and the 1.5" width requirement for any pipe strap or support.

In summary—don't squash, kink or compress flex duct. Do support, eliminate bends and insure all connections are sealed. Please take a few minutes and review the full Installation Standard from ADC or the manufacturer.

Thanks again for your comments and suggestions—Brent ✪