



AEDG Implementation Recommendations: Ducts

The Advanced Energy Design Guide (AEDG) seeks to achieve 30 percent savings over Standard 90.1-1999. This guide focuses on improvements to small office buildings, less than 20,000 square feet. The recommendations below are adapted from the implementation section of the guide, and should be used in cooperation with the whole document.* The full design guide is available from the ASHRAE website, [Advanced Energy Design Guide for Small Office Buildings](#) .

Ductwork Distribution



Air should be ducted through low pressure (System Pressure Classification of less than 2-inches), rigid ductwork. Supply and return air should be ducted to supply diffusers and return registers in each individual space. The ductwork should be direct as possible, minimizing the number of elbows, abrupt contractions and expansions, and transitions. Long radius elbows and 45 degree lateral take-offs should be used wherever possible. Where variable air volume systems are used, they should have single duct air terminal units to control the volume of air to the zone based on the space temperature sensor.

In general, the following sizing criteria should be used for the duct system components:

1. Diffusers and registers should be sized with a static pressure drop no greater than 0.08 in.
2. Supply and return ductwork should be sized with a pressure drop no greater than 0.08 in. per 100 linear feet of duct

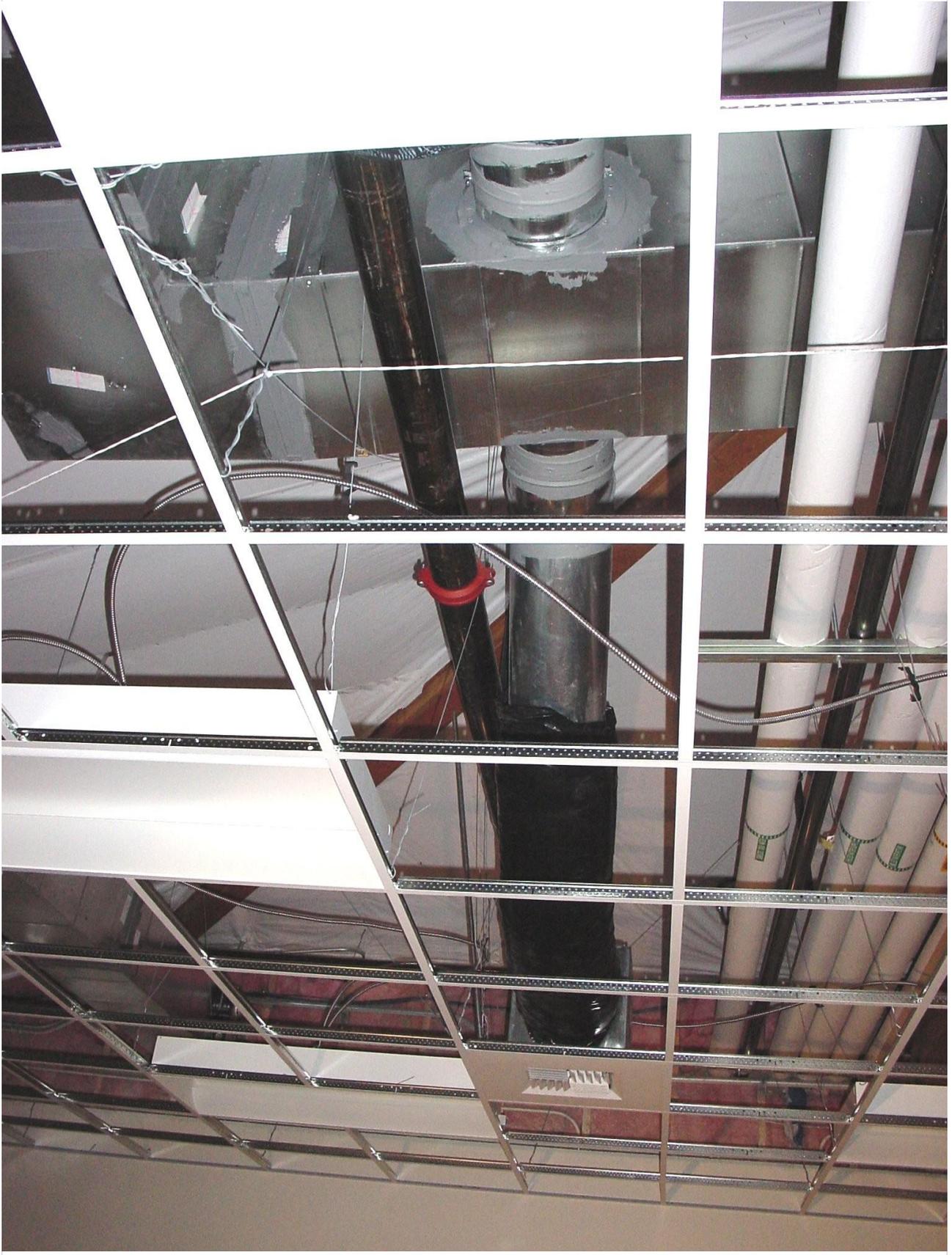


run.

Flexible ductwork should be of the insulated type and should be:

- limited to connections between duct branch and diffusers
- limited to connections between duct branch and variable air volume terminal units
- limited to 5 ft or less
- installed without any kinks
- installed with a durable elbow support when used as an elbow

Ductwork should not be installed outside the building envelope in order to minimize heat gain to, or heat loss from, the ductwork due to outdoor air temperatures and solar heat gain. Ductwork should enter or leave the air conditioning unit through an insulated roof curb around the perimeter of the air conditioning units footprint.





exceed the noise criteria for the space. See [Noise Control](#) for additional information.

Duct Insulation

All supply air ductwork should be insulated. All return air ductwork located above the ceiling immediately below the roof should be insulated. Any outdoor air ductwork should be insulated. All exhaust and relief air ductwork between the motor-operated damper and penetration of the building exterior should be insulated. Include a vapor retardant on the outside of the insulation where condensation is possible.

Exception: In conditioned spaces without a finished ceiling, only the supply air duct mains and major branches should be insulated. Individual branches and runouts to diffusers in the space being served do not need to be insulated, except where it may be necessary to prevent condensation.

Duct Sealing and Leakage

The ductwork should be sealed for Seal Class B and leak tested at the rated pressure. The leakage should not exceed the allowable CFM/100 ft² of duct area for the seal and leakage class of the system's air quantity apportioned to each section tested. See [AEDG Implementation Recommendations: Testing and Balancing](#) for guidance on ensuring system performance.

Fan Motors

Motors for fans 1 horsepower or greater should meet NEMA premium efficiency motor guidelines when available as an option (see www.nema.org).

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