NAIMA
North American Insulation Manufacturers Association

TECH NOTES

# Duct Insulation – Do It Right The First Time

## Information from NAIMA

### Insulate it Right the First Time

Insulating duct systems reduces heating and cooling costs and prevents condensation. But insulating ducts the wrong way can lead to unnecessary and costly problems. Make sure the duct insulation is right the first time to avoid problems. This means that a single layer of insulation should be installed at an R-value that addresses both condensation control and code requirements.

NAIMA and its members are often asked if duct insulation can be double layered in combination heating and cooling ducts. NAIMA members do not recommend this, however, if a double layer is unavoidable to meet code requirements or other needs, see the section in this document on Special Considerations.

### Three Steps to Insulate Correctly

Ducts can be insulated correctly through three easy steps.

1 First, determine the minimum R-value that the local energy code requires. The 2004 IECC requires ducts in unconditioned spaces to be insulated with R-8. Contact your local building and zoning department for the energy code requirements in your area. The duct system should be insulated with the greater R-value of the two (condensation or energy code).

2 Second, determine the R-value required for preventing condensation – this is critical for ducts in hot, humid conditions such as unconditioned attics and crawlspaces. To determine the correct R-value for condensation prevention, refer to NAIMA's publications entitled Fact Sheet #64 – Fibrous Glass Duct Systems, Fact Sheet #65 – Fibrous Glass Duct Liner, Fact Sheet #66 – Fibrous Glass Duct Wrap or Fact Sheet #67 – Fibrous Glass Commercial Insulation Boards.

3 Finally, install insulation according to the industry specifications available from NAIMA and product manufacturers. This information as well as the documents listed above are available at www.naima.org.

### Special Considerations: Combination Heating & Cooling Ducts

When the correct R-value is not installed, NAIMA and its members do not recommend adding a second layer of insulation to make up for the required difference. This is because each duct insulation system is designed with one primary vapor retarder surface. The vapor retarder prevents warm moist air from contacting cooler surfaces where it can condense into liquid water. Adding another layer of insulation can create a condition where the original vapor retarder is now cold enough to be a condensing surface. This can lead to wet insulation.

If a second layer of insulation is unavoidable, the following information should be considered: The location of the interior vapor retarder must be addressed in order to prevent possible condensation on the insulation. To minimize the possibility of condensation, the temperature of any internal vapor retarder surface must be kept at or above the dew point. Contact the manufacturer for help in calculating the dew point for a specific application.

Figure 1 shows three typical duct insulation systems and their vapor retarder surfaces. The only case where adding a second layer of insulation over an existing insulation system may be acceptable is for ducts carrying heated air only.

The appropriate R-value will help control condensation and reduce energy costs. There is no substitute for getting it right the first time.

NAIMA is the trade association for North American manufacturers of fiber glass, rock wool and slag wool insulation products. Its role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool and slag wool insulation as well as encourage safe production and use of these materials.

In May, 1999, NAIMA began implementing a comprehensive voluntary work practice partnership with the U.S. Occupational Safety and Health Administration (OSHA). The program, known as the Health and Safety Partnership Program, or HSPP, promotes the safe handling and use of insulation materials and incorporates education and training for the manufacture, fabrication, installation and removal of fiber glass, rock wool and slag wool insulation products. For more information about the HSPP, visit NAIMA's web site at www.naima.org or contact NAIMA.

The Air Handling Committee of NAIMA provides information about indoor air quality as it pertains to its members' products.

**For more information, contact:**

**NAIMA**
**44 Canal Center Plaza, Suite 310**
**Alexandria, Virginia 22314**
**Tel: 703-684-0084**
**Fax: 703-684-0427**
**www.naima.org**

NAIMA AIR HANDLING COMMITTEE MEMBERS:

CertainTeed Corporation
P.O. Box 860
Valley Forge, PA 19482
800-233-8990

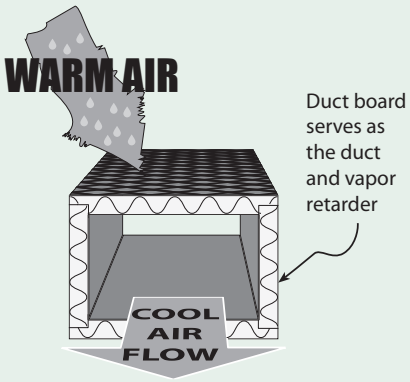
Johns Manville
P.O. Box 5108
Denver, CO 80217-5108
800-654-3103

Knauf Insulation
One Knauf Drive
Shelbyville, IN 46176
800-825-4434

Owens Corning
One Owens Corning Parkway
Toledo, OH 43659
800-GET-PINK

## Figure 1: Correct Installation of Duct Insulation

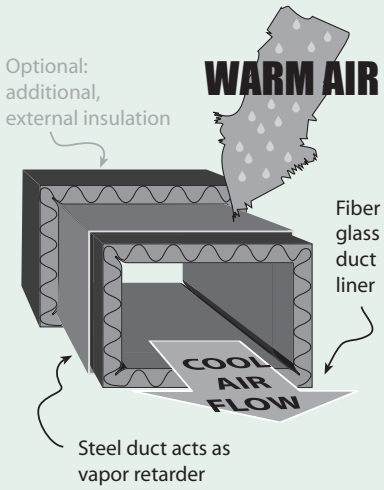
### *Fiber Glass Duct Board System*



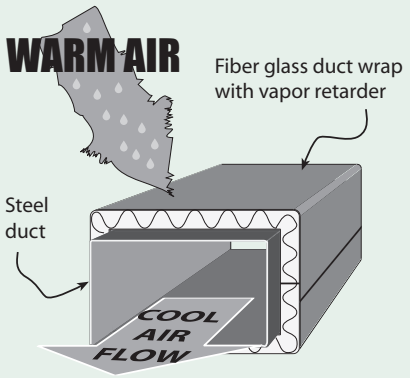

Fiber glass duct board systems are used instead of insulated metal ducts. Fiber glass ducts are made up of flat, fibrous glass duct board stock with a factory-applied reinforced external vapor retarder. The boards are then fabricated into the actual duct work, fittings, tees, offsets, elbows and transitions.

### *Steel Duct with Interior Fiber Glass Duct Liner*

Fiber glass duct liner is applied to the interior of the sheet metal duct. In addition to the acoustical benefits, fiber glass duct liner prevents the formation of water vapor condensation both inside the duct and on the exterior surface.




### *Steel Duct with Fiber Glass Duct Wrap*




Steel ductwork is insulated with an exterior fiber glass insulation blanket with a factory laminated vapor retarder facing. Duct wrap is applied to the outside of the sheet metal duct and is most frequently used for energy conservation and condensation control.