



Glass Fiber Air Transmission Systems:

The Benefits and Recommended Use of Fibrous Glass Duct Liner

In this issue, we address the performance characteristics, installation recommendations, and use limitations of fibrous glass duct liner.

Introduction

One of the keys to a well-designed HVAC system that delivers occupant comfort and acceptable indoor environmental quality (IEQ) is fibrous glass thermal and acoustical duct liner insulation. Duct liners help maintain a consistent air temperature throughout the system, reduce condensation (and consequently the opportunity for microbial growth), absorb noise from the system's operation and conserve energy. Plus, fibrous glass duct liners have additional benefits: they are cleanable and have integrated anti-microbial protection.

Consistent Air Temperature

By reducing the heat transfer across the walls of the duct system, fibrous glass duct liner products allow a building's HVAC system to deliver conditioned air at design temperatures. Consistent air temperatures mean increased comfort without over-taxing the energy source while maintaining lower energy costs.

Noise Reduction

Without fibrous glass insulation products, the acoustical environment of mechanically conditioned buildings can be greatly compromised, resulting in reduced productivity and a decrease in occupant comfort. Fibrous glass duct liner greatly reduces the transmission of HVAC noise through the duct system. The insulation also helps reduce cross-talk from one room to another through the ducts.

Condensation Reduction

Fibrous glass duct liner helps reduce condensation outside or inside the air handling system, thus reducing the opportunity for microbial growth and amplification as well as other moisture-related building damage. Condensation will form on bare sheet metal air-conditioning ducts anywhere the duct surface temperature falls below the dew point. The moisture may remain in place or drip, causing moisture damage and creating a potential for microbial contamination. Fibrous glass duct liner corrects this problem by controlling condensation, thus eliminating a precondition for microbial growth.

Energy Conservation

The insulating role of fibrous glass air handling products has become even more important because of the increased emphasis on ventilation as a critical element in indoor environmental quality. Increased ventilation requirements which mandate a specific cubic foot rate of air per occupant place more demands on the building's energy source. Thus, the importance of a building's energy efficiency and conservation is increasing, both from the standpoint of overall energy conservation, comfort, and cost of increased ventilation.

Added IEQ Benefits

In addition to the traditional benefits of fibrous glass duct liner, the product has added IEQ benefits:

Cleanability

Fibrous glass duct liner products have surfaces that are resistant to the kind of abuse that occurs during duct

cleaning. The industry has worked with the National Air Duct Cleaners Association and the EPA in developing standards for cleaning lined systems.

Integrated Anti-Microbial Protection

Fibrous glass air handling products comply with stringent standards for mold and bacteria growth. Consequently, fibrous glass duct liners are designed with anti-microbial properties as an integral part of the product. While the best way to ensure that an HVAC system will continue to perform is by following a regular maintenance schedule, the anti-microbial properties are an added prevention measure for a well-maintained system.

Composition

Fibrous glass duct liner is a thermal and acoustical insulation applied to the inside of a sheet metal duct. It has a coated or mat-faced airstream surface designed to resist damage during installation, operation and cleaning. The liner is applied to the interiors of rectangular sheet metal ductwork with metal fasteners and adhesives.

Performance

Fibrous glass duct liners are designed to meet or exceed the requirements of ASTM C 1071, Standard Specification for Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material). This material standard establishes requirements for the following physical properties: Sound Absorption Characteristics; Thermal Conductivity; Surface Burning Characteristics; Erosion Resistance; Temperature Resistance; Corrosiveness; Odor Emission; Moisture Vapor Sorption; and Fungi Resistance.

Fibrous glass duct liners are designed to meet the requirements of the National Fire Protection Association (NFPA) Standard 90A for the installation of Air Conditioning and Ventilating Systems.

Specification, Fabrication & Installation

Fibrous glass duct liner should be specified, fabricated and installed per project specifications in accordance with NAIMA Fibrous Glass Duct Liner

Standard AHS-124-93 or SMACNA HVAC Duct Construction Standards. Care should be taken to keep the liner dry and clean during liner fabrication, duct transport, job site storage and system start-up and operation.

Application Limitations

While fibrous glass duct liners are very practical in most areas of commercial and institutional buildings, there are several places where they should not be used:

- With equipment of any type that does not include automatic maximum temperature controls and where an operating temperature of 250°F may be exceeded.
- In kitchen or fume exhaust ducts, or ducts conveying solids or corrosive gases.
- In any application where the liner may come in direct contact with liquid water or in those areas where water droplet carryover is likely (such as cooling coils, humidifiers, evaporative coolers) unless protected from the water source.
- Inside fire damper sleeves.
- Immediately adjacent to high temperature electric heating coils without radiation protection.
- When duct work is used in systems supplying operating rooms, delivery rooms, recovery rooms, nurseries, isolation rooms and intensive care units.

In addition, the following applications are subject to precautions as follows:

- When ducts run through unconditioned space and are used for cooling only, register openings must be tightly sealed to prevent accumulation of water vapor in the duct system during the heating season.
- To avoid damage to duct liner due to the physical abuse caused by foot traffic of maintenance personnel working in physically accessible plenums, some means of duct liner protection must be considered.
- Ductwork supplying clean rooms should have terminal filtration of

the efficiency required for the particular class of cleanrooms to minimize the existence of any type of particulate matter.

Commissioning, Operation and Maintenance

An HVAC commissioning program should be specified and followed to ensure the proper condition of the lined ductwork at the time of building occupancy. The HVAC system should be operated according to generally accepted design parameters. The use of efficient filtration in combination with a program of regular scheduled maintenance will ensure a long lasting, high performance HVAC duct system.

Conclusion

Over the last forty years, millions of square feet of fibrous glass duct liner have been installed in HVAC systems throughout the U.S. When used in modern air handling systems, fibrous glass duct liners improve the quality of the indoor environment by maintaining a consistent air temperature throughout the system, reducing condensation and absorbing noise from the system's operation.

About NAIMA

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

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

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