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Liners

The purpose of this document is to provide information regarding the various types of liners available from Price, in order to determine what liner will be best suited for what application.

Standard Fiberglass Liner

Used in:
Single Duct, Dual Duct, Fan Powered

Material:
Dual Density fiberglass consisting of a high density skin and a low density core.

Sound Absorption:
This material provides the best discharge sound absorption

R Value (per inch):
3.846

Max Air Velocity:
Tested at 9000 fpm, meets erosion requirements of UL181

Standards:
ASTM C 1071 (Standard Specification for Fibrous Glass Duct Lining Insulation)

Fire Hazard Classification:
25/50 (per ASTM E 84 and UL 723, meets NFPA 90A and 90B).

Temperature Limit:
250°F (121°C)

Density:
Approx. 1.75 lbs/ft^3 average

Pros:
Standard liner is the least expensive liner with the best discharge sound absorption properties (although some liners can further reduce radiated noise on single duct boxes). It is the most common type of liner and provides excellent thermal insulation.

Cons:
This liner is subject directly to the air stream, therefore if damaged it can expose fiberglass material to the air stream which is sometimes undesirable. It will not support mold growth but if moisture and dirt are allowed to settle in its pores or on the surface mold can still grow.

Applications:
This type of liner is suitable for almost any application especially cases where low sound levels are required. This liner is generally not accepted for hospitals or clean room applications that require no possibility of fiberglass being exposed to the space.

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Fiber Free Liner

Used in:
Single Duct, Dual Duct, Fan Powered

Material:
Engineered Polymer Foam (low density closed cell chemically inert)

Sound Absorption:
Provides good discharge sound absorption properties (comparable to Aluminum Foil liner) for discharge sound. Improves the radiated noise on single duct boxes (compared to standard fiberglass liner), reduces radiated and discharge sound absorption in fan powered boxes (Louder than Foil faced fiberglass liner in some cases, but quieter overall).

R Value (per inch):
4

Max Air Velocity:
Meets UL 181 (9000 fpm tested)

Standards:
Doesn't meet ASTM C 1071 because that standard only applies to Fibrous Material, ASTM C 534 (Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation)

Fire Hazard Classifications:
25/50 (per ASTM E 84 and UL 723, meets NFPA 90A and 90B).

Temperature Limit:
210°F (99.4°C), -330°F (-201.1°C) as per ASTM C411

Water Absorption:
0.0% (by volume)

Density:
1.5 lbs/ft^3

Pros:
This material provides good sound absorptions with some great physical properties. The material is closed cell so any damage to the surface merely exposes more of the same material. It is very cleanable, and heavy scrubbing will not damage the surface. It is 100% water proof so no moisture or dirt can penetrate the surface therefore reducing the chance of mold growth. Insulation cut edges do not need to be protected with glue, angles or end caps so there is a savings on labor and parts.

Cons:
Slight decrease in noise absorption, increased cost over standard fiberglass liner.

Applications:
Perfect for Clean Room and hospital jobs where the possibility of fiberglass being exposed to the space is not acceptable. Great for applications where regular duct cleaning maintenance is expected to take place. Good for any other application with terminals.

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Aluminum Foil Lined Fiber board or Clean Room Aluminum Foil

Used in:
Single Duct, Dual Duct – Clean Room Foil Faced Fiber board (CRAF with metal end caps and angles).
Fan Powered – Foil Faced fiber board.

Material:
Fiber glass bonded with a special thermosetting resin. Skin is foil faced

Sound Absorption:
Provides adequate discharge sound absorption although a little less than Fiber free in most cases. Improves the radiated noise on single duct terminals, reduces radiated and discharge sound absorption in fan powered terminals.

R Value (per inch):
4.34

Max Air Velocity:
5000 fpm rated.

Standards:
Meets ASTM C 1071 (Standard Specification for Fibrous Glass Duct Lining Insulation).

Fire Hazards Classification:
25/50 (per ASTM E 84 and UL 723, meets NFPA 90A and 90B).

Temperature Limit:
350°F (177°C) (Faced surface should not exceed 150°F (83°C)).

Density:
4.25 lbs/ft^3

Pros:
Provides good sound absorption compared to perforated metal and solid metal liners, and some protection for the fiberglass material underneath. Allows for easier cleaning of the liner surface and inhibits moisture from being absorbed into the insulation.

Cons:
Material surface can still be damaged exposing fiberglass to the air stream. Liner is louder than standard liner and Fiber Free liner (in most cases). AF is more expensive than standard fiberglass liner (approximately equal to Fiber Free).

Applications:
Great for Clean Room and Hospital jobs (especially the CRAF with side angles and end caps).

Solid Metal Liners

Used in:
Single Duct, Fan Powered, Dual Duct (special request)

Material:
Solid sheet metal covering the standard fiberglass.

Sound Absorption:
The solid metal liner material offers no discharge sound absorption properties; it improves the radiated noise on single ducts but offers no sound absorption on radiated noise or inlet attenuators for fan powered boxes.

R Values:
This is dependant on the material underneath as metal is a good conductor of heat there is likely little improvement.

Standards:
These liner types meet the same standards as the material which they cover.

Fire Hazards Classification:
25/50 (per ASTM E 84 and UL 723, meets NFPA 90A and 90B).

Pros:
Solid metal liner provides the ultimate protection for the fiberglass liner underneath, it completely locks away the fiber glass from the air stream. Solid metal liner provides the best improvement in radiated noise absorption on a single duct box, is easy to clean, and eliminates the chance of moisture being exposed to the liner.

Cons:
Solid metal provides no discharge sound absorption on single duct terminals and increases the radiated noise on a fan powered terminal unit. It is the most expensive liner construction and also is the heaviest so freight charges will be higher.

Applications:
Solid metal liner is great for Clean Room and Hospital jobs as it completely protects the liner and keeps it isolated from the air stream; it does have poor sound absorption properties and is not recommended for sound sensitive areas. Due to its high cost and poor sound performance it is not recommended for simple office/school/library etc. applications.

The standard fiber glass insulation is the least expensive and most versatile liner type it provides the best discharge noise absorption for single duct units and radiated noise absorption on fan powered units. It meets all the typical insulations standards and will resist air erosion up to 9000 fpm. Overall it is the most commonly specified liner type and should be used whenever possible.

For applications where fiberglass cannot be exposed to the air stream foil lined and solid metal are violable options but fiber free insulations is a great alternative to both with equal or better sound absorption qualities. Consideration should be taken when calculating NC levels with solid metal or Aluminum foil liners since the ARI 885-98 standard adds attenuation values for 5 feet of fiber glass lined duct after the terminal unit.