

Atmosphere™ Duct Liner

with ECOSE® Technology

Submittal Date _____



Description

Knauf Insulation Atmosphere™ Duct Liner is a flexible, mat-faced insulation bonded with ECOSE® Technology. It is faced with a tightly bonded mat to give the airstream a smooth, tough surface, resisting damage during installation and operation. The encapsulant edge coating eliminates airstream flaring.

ECOSE® Technology

ECOSE technology is a revolutionary binder chemistry that enhances the sustainability of our products. The "binder" is the bond that holds our glass mineral wool product together and gives the product its shape and brown color. ECOSE technology is a plant-based, sustainable chemistry that replaces the phenol/formaldehyde (PF) binder traditionally used in glass mineral wool products. Products using ECOSE technology are formaldehyde-free and have reduced global warming potential when compared to our products of the past.

Application

Specifically designed as an interior insulation material for sheet metal ducts used in heating, ventilating and air conditioning. Provides an optimum combination of efficient sound absorption, low thermal conductivity and minimal airstream surface friction.

Features and Benefits

- Low thermal conductivity
- Fire-resistant, non-corrosive, durable and resilient
- Tough, tightly bonded mat facing
- Excellent sound absorption
- Energy conservation
- Better temperature control
- Lowers operating costs
- Greatly reduces noise from fans and mechanical equipment as well as cross-talk and air movement
- Withstands damage from normal handling and shop abuse
- If necessary, can be cleaned in accordance with NAIMA's "Cleaning Fibrous Glass Insulated Air Duct Systems Recommended Practices"
- Low emitting for indoor air quality considerations

Sustainability

- Carbon negative: Knauf Insulation products used for thermal insulating purposes recover the energy that it took to make them in just hours or a few days, depending on the application. Once installed, the product continues to save energy and reduce carbon generation as long as it is in place.

- Glass mineral wool insulation with ECOSE® Technology contains three key ingredients:
 - Sand, one of the world's most abundant resources
 - A minimum of 50% recycled content and UL Environment verification every 6 months
 - ECOSE® Technology which reduces binder embodied energy by up to 70%

Specification Compliance In U.S.:

- ASTM C 1071; Type I
- ASTM G 21
- ASTM G 22
- NFPA 90A and 90B
- ASHRAE 62

In Canada:

- CAN/ULC S102-M88
- CAN/CGSB-51.11-92

Indoor Air Quality

- UL/ULC Classified (UL 723)
- UL Environment GREENGUARD Certified
- UL Environment GREENGUARD GOLD Certified
- UL Environment validated to be formaldehyde free
- UL 2824 certified to be resistant to microbial growth
- Does not contain polybrominated diphenyl ethers (PBDE) such as Penta-BDE, Octa-BDE, or Deca-BDE
- Tested and certified to meet all the requirements of EUCEB

Technical Data

Surface Burning Characteristics

- Does not exceed 25 Flame Spread, 50 Smoke Developed when tested in accordance with UL 723, ASTM E 84, UL/ULC S102-M88 and NFPA 255

Temperature Range (ASTM C 411)

- Up to 250°F (121°C)

Air Velocity (ASTM C 1071)

- Maximum 6000 fpm (1829 meters/min)
- Tested to 15,000 fpm (4572 meters/min)

Corrosiveness (ASTM C 665)

- Does not accelerate corrosion on steel, copper or aluminum

Corrosion (ASTM C 1617)

- Corrosion rate in mils/yr will not exceed that of the 5 ppm chloride solution

Water Vapor Sorption (ASTM C 1104)

- Less than 3% by weight

Microbial Growth

- Airstream surface mat facing is treated with an EPA-registered anti-microbial agent to aid in the prevention of fungal and bacterial growth.
- ASTM C 1338 - does not promote or support the growth of mold, fungi or bacteria
- UL 2824 certified to be resistant to microbial growth

Application & Specification Guidelines

Storage

- Inside storage is recommended.

Fabrication and Application

- Fabricate in compliance with the latest edition of NAIMA's Fibrous Glass Duct Liner Standard.
- Liner shall be folded and compressed in the corners of rectangular duct sections or shall be cut and fit to assure lapped, compressed joints. Longitudinal joints in duct liner should not occur except at the corner of ducts. Longitudinal joints in liner shall be coated with adhesive. All damaged areas of the air stream surface shall be repaired with an adhesive which conforms to ASTM C 916.
- Liner should be adhered to the duct with 90% minimum area coverage of an adhesive which conforms to ASTM C 916.
- Mechanical fasteners should not compress the insulation more than 1/8" (3 mm), and shall be installed perpendicular to the duct surface. All fasteners should comply with the guidelines of NAIMA's Fibrous Glass Duct Liner Standard and the Mechanical Fastener's Standard MF-1-1975.
- Metal nosings shall be securely installed over transversely oriented liner edges facing the airstream at fan discharge, at access doors and at any interval of lined duct preceded by unlined duct. In addition, where velocities exceed 4000 fpm (1219 meters/min), metal nosing shall be used on upstream edges of liner at every transverse joint (See illustration).

Limitations

- Knauf Insulation Atmosphere™ Duct Liner with ECOSE® Technology should not be used in systems operating at velocities exceeding 6000 fpm (1829 meters/min) or at temperatures above 250°F (121°C).

Maintained Duct Systems are Key

The best way to ensure that an HVAC system, whether bare metal or internally insulated, will continue to provide efficient, quiet air delivery, occupant comfort, and cost-effectiveness is by following a regular system operation and maintenance schedule. This, along with a high-efficiency filtration system, assures protection of both HVAC system components and building occupants. Maintenance procedures include inspection, detection, and remediation of probable sources of airborne contaminants and moisture.

Glass mineral wool insulation will not sustain mold growth. However, mold can grow on almost any material when it becomes wet and contaminated. Carefully inspect any insulation that has been exposed to water. If it shows any sign of mold, it must be discarded. If the material is wet but shows no evidence of mold, it should be dried rapidly and thoroughly. If it shows signs of facing degradation from wetting, it should be replaced. Air handling insulation used in the air stream must be discarded if exposed to water.



Forms Available			
Density	Thickness**	Width	Length
1.5 PCF	1"	34" - 36** (864 mm - 915 mm)	50' (15.24 m)
			100' (30.48 m)
			140' (42.67 m)
			200' (60.96 m)
1.5 PCF	1.5"	46" - 48" (1168 mm - 1219 mm)	50' (15.24 m)
			90' (27.43 m)
1.5 PCF	2"	56" - 72" (1422 mm - 1829 mm)	50' (15.24 m)
2.0 PCF	.5"		100' (30.48 m)
			100' (30.48 m)
2.0 PCF	1"		50' (15.24 m)
			100' (30.48 m)

*Widths of 34"-36" not available with edge coating.

**Non-standard widths for all .5", 1", 1.5", and 2" products from 34"-36", 46"-48" and 56"-72" are available in 25" (6.35 mm) increments of minimum order quantity.

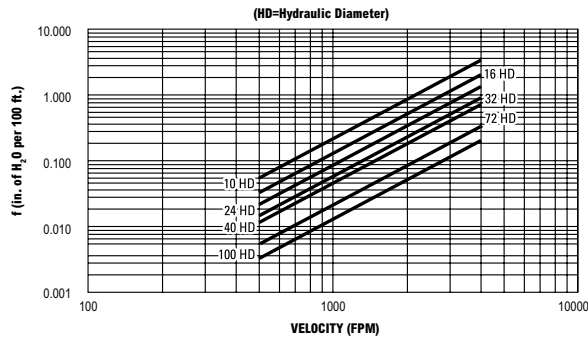
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Friction Loss (Inches of water per 100')



FPM	Hydraulic Diameter						
Velocity	10"	16"	24"	32"	40"	72"	100"
500	.054	.030	.018	.012	.009	.005	.003
600	.077	.042	.025	.018	.013	.007	.004
700	.104	.057	.034	.024	.018	.009	.006
800	.134	.074	.044	.031	.023	.011	.008
900	.169	.093	.056	.039	.029	.014	.010
1000	.207	.114	.068	.048	.036	.018	.012
2000	.806	.443	.266	.186	.141	.069	.046
3000	1.797	.988	.594	.415	.315	.153	.103
4000	3.179	1.748	1.050	.734	.557	.271	.181
5000	4.952	2.724	1.636	1.143	.867	.422	.283

Thermal Conductance "C"† and Resistance "R"† (ASTM C 177)

Mean Temperature 75°F (24°C)		
Product	Conductance "C"	Resistance "R"
1.5 PCF 1" (24 kg/m³ 25 mm)	.24 (1.42)	4.2 (.74)
1.5 PCF 1.5" (24 kg/m³ 38 mm)	.17 (.97)	6.0 (1.06)
1.5 PCF 2" (24 kg/m³ 51 mm)	.13 (.74)	8.0 (1.41)
2.0 PCF .5" (32 kg/m³ 13 mm)	.48 (2.73)	2.1 (.37)
2.0 PCF 1" (32 kg/m³ 25 mm)	.24 (1.36)	4.2 (.74)
2.0 PCF 1.5" (32 kg/m³ 38 mm)	.16 (.91)	6.3 (1.11)

"C" Units: $\frac{\text{BTU}}{\text{ft}^2 \cdot \text{hr} \cdot ^\circ\text{F}} \left(\frac{\text{W}}{\text{m}^2 \cdot ^\circ\text{C}} \right)$ "R" Units: $\frac{\text{ft}^2 \cdot \text{hr} \cdot ^\circ\text{F}}{\text{BTU}} \left(\frac{\text{m}^2 \cdot ^\circ\text{C}}{\text{W}} \right)$

* The lower the value, the better the performance. † The higher the value, the better the performance.

Sound Absorption Coefficients (ASTM C 423 Type A Mounting)

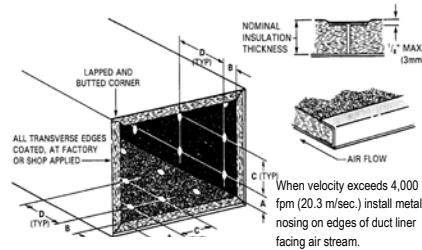
Type	Octave Band Center Frequency (cycles/sec.)						NRC
	125	250	500	1000	2000	4000	
1.5 PCF 1" (24 kg/m³ 25 mm)	.18	.36	.59	.86	.95	.90	.70
1.5 PCF 1.5" (24 kg/m³ 38 mm)	.35	.51	.83	.93	.97	.96	.80
1.5 PCF 2" (24 kg/m³ 51 mm)	.34	.64	.96	1.03	1.00	1.03	.90
2.0 PCF .5" (32 kg/m³ 13 mm)	.09	.14	.40	.60	.73	.82	.45
2.0 PCF 1" (32 kg/m³ 25 mm)	.25	.35	.69	.89	.96	1.01	.70
2.0 PCF 1.5" (24 kg/m³ 38 mm)	.27	.55	.87	.99	1.00	.98	.85

Coefficients determined per ASTM E 795 Type A Mounting.

NOTE: ASHRAE Handbook for HVAC Applications—Sound and Vibration Control contains insertion loss values for lined sheet metal ducts.

Mechanical Fastener Location

Velocity/FPM (meters/second)	0-2500 (0-12.7)	2501-5000 (12.7-25.4)
A From corners of duct	4" (102 mm)	4" (102 mm)
B From transverse end of duct liner	3" (76 mm)	3" (76 mm)
C Across width of duct, on centers (min. 1/side)	12" (305 mm)	6" (152 mm)
D Across length of duct, on centers (min. 1/side)	18" (457 mm)	16" (406 mm)



Liner Interior Width

No. Pins	Inches	(mm)
0	≤ 8	≤ 203
2	9-16	229-406
3	17-28	432-711
4	29-40	737-1016
5	41-52	1041-1321
6	53-64	1346-1626
7	65-76	1651-1930
8	77-88	1956-2235
9	89-100	2261-2540

Notes

The chemical and physical properties of Knauf Insulation Atmosphere™ Duct Liner with ECOSE® Technology represent typical average values determined in accordance with accepted test methods. The data is subject to normal manufacturing and testing variations. The data is supplied as a technical service and is subject to change without notice. References to numerical flame spread ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions.

When condensation is permitted to occur between nested Atmosphere™ Duct Liner and galvanized steel panels, discoloration of the metal may occur. Check with your Knauf Insulation sales representative to assure information is current.