



Knauf Data Sheet

AH-DS-4e 09-09

# Rigid Plenum Liner

*with ECOSE® Technology*



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## Description

Knauf Rigid Plenum Liner with ECOSE Technology is a heavy-density mat-faced fiber glass board insulation bonded with ECOSE Technology. Its base board is brown with a black mat facing to give the airstream a smooth, tough surface, that resists damage during installation and operation.

## ECOSE Technology

ECOSE Technology is a revolutionary new binder chemistry that makes Knauf Insulation products even more sustainable than ever. It is based on rapidly renewable bio-based materials rather than non-renewable petroleum-based chemicals traditionally used in fiber glass insulation products. ECOSE Technology reduces binder embodied energy and does not contain phenol, formaldehyde, acrylics or artificial colors.

## Application

Knauf Rigid Plenum Liner with ECOSE Technology is specifically designed as an interior insulation material for heating, ventilating and air conditioning plenums and sheet metal ducts. It offers an optimum combination of efficient sound absorption, low thermal conductivity and minimal air surface friction.

## Features

- Low thermal conductivity.
- Fire-resistant, non-corrosive.
- Tough and resilient.
- Certified for indoor air quality as a low emitting product by The GREENGUARD Environmental Institute to both the GREENGUARD Certification Program<sup>SM</sup> and the more stringent GREENGUARD Children and Schools<sup>SM</sup> standard.
- Sustainability
  - Carbon negative: meaning 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.
  - Fiber glass insulation with ECOSE Technology contains three primary ingredients:
    - Sand, one of the world's most abundant and renewable resources
    - Post-consumer recycled bottle glass
    - ECOSE Technology which reduces binder embodied energy by up to 70%

## Benefits

- Energy conservation.
- Better temperature control.
- Lower 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."

## Specification Compliance

### In U.S.:

- ASTM C 1071; Type II
- ASTM G 21
- GREENGUARD Indoor Air Quality Certified®
- GREENGUARD Children and Schools<sup>SM</sup>
- California Title 24
- NFPA 90A and 90B

### In Canada:

- CAN/ULC S102-M88

## Technical Data

### Surface Burning Characteristics

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

### Temperature Range (ASTM C 411)

- Up to 250°F (121°C). Max thick 3"

### Air Velocity (ASTM C 1071)

- Maximum 5000 fpm (1524 mpm).
- Tested to 12,500 fpm (3810 mpm).

### Corrosiveness (ASTM C 665)

- Does not accelerate corrosion on steel, copper or aluminum.

### Corrosion (ASTM C 1617)

- The corrosion rate in mils/yr will not exceed that of the 1 ppm chloride solution.

### Water Vapor Sorption (ASTM C 1104)

- Less than 5% by weight.

### Microbial Growth (ASTM C 1338, G 21)

- Does not promote or support the growth of mold, fungi or bacteria.

## Application and Specification Guidelines

### Storage

Inside storage is recommended. Protect stored Rigid Plenum Liner from water damage or abuse. If stored outside, stack cartons on pallets and cover adequately to prevent moisture infiltration.

### Fabrication and Application

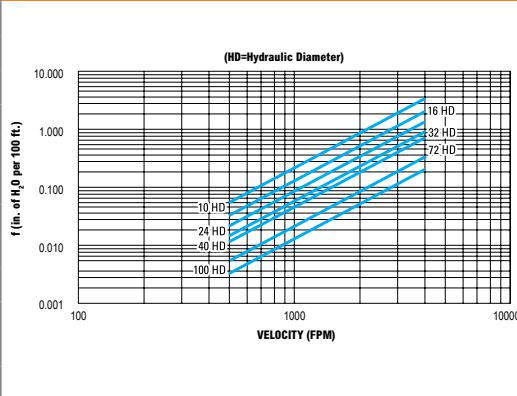
- Install Knauf Rigid Plenum Liner in metal duct and plenums operating at 250°F (121°C) service temperature or less and velocities of 5000 fpm (1524 mpm) or less.
- Liner shall be applied with the treated surface facing toward the air stream.
- Mechanical fasteners shall not compress the liner more than 1/8" (3.2 mm) and shall be installed perpendicular to the airstream surface. All fasteners must meet "Standard for Mechanical Fasteners-MF-1-1975."
- Adhesives which conform to ASTM C 916 shall be applied to the sheet metal with at least 90% coverage.
- All internal duct areas designated to be lined shall be completely covered with liner. Transverse joints shall be firmly butted together with no gaps, and coated with adhesive. All exposed leading edges shall be coated with adhesive.
- Mechanical fasteners shall be used to secure the rigid plenum liner and spaced in accordance with the chart and diagram to the right.
- Corner joints shall be overlapped so no gaps are present. Top pieces shall be supported by side pieces.
- All longitudinal joints shall be coated with adhesive conforming to ASTM C 916 at velocities over 2500 fpm (762 mpm).
- All damaged areas to the airstream surface shall be repaired with an adhesive that conforms to ASTM C 916.

### Fiber Glass and Mold

Fiber glass 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.



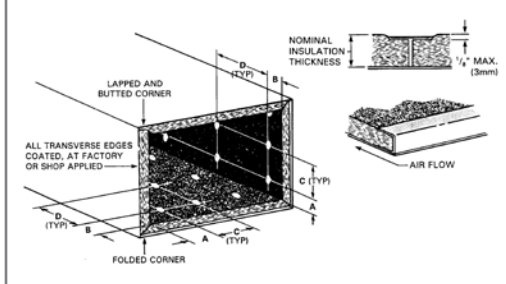
### Friction Loss (Inches of water per 100')



FPM	Hydraulic Diameter						
Velocity	10"	16"	24"	32"	40"	72"	100"
500	.056	.031	.018	.013	.010	.005	.003
600	.080	.044	.026	.018	.014	.007	.004
700	.108	.059	.035	.025	.019	.009	.006
800	.140	.077	.046	.032	.024	.012	.008
900	.176	.096	.058	.040	.031	.015	.010
1000	.216	.118	.071	.050	.038	.018	.012
2000	.845	.463	.278	.194	.147	.071	.048
3000	1.887	1.034	.620	.432	.328	.159	.106
4000	3.340	1.831	1.097	.765	.580	.281	.188
5000	5.206	2.854	1.710	1.193	.904	.438	.293

### 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)	12" (305 mm)
D Across length of duct, on centers (min. 1/side)	18" (457 mm)	18" (457 mm)



### Sound Absorption Coefficients (ASTM C 423, Type A Mounting)

Product	Octave Band Center Frequency (cycles/sec.)						
	125	250	500	1000	2000	4000	NRC
3.0 PCF 1" (48 kg/m <sup>3</sup> 25 mm)	.13	.24	.56	.83	.92	.98	.65
3.0 PCF 1.5" (48 kg/m <sup>3</sup> 38 mm)	.19	.41	.89	1.02	1.03	1.04	.85
3.0 PCF 2" (48 kg/m <sup>3</sup> 51 mm)	.33	.67	1.07	1.07	1.03	1.06	.95

### Thermal Conductance "C"<sup>1</sup> and Resistance "R"<sup>2</sup> (ASTM C 177)

Product	Mean Temperature 75°F (24°C)	
	Conductance "C"	Resistance "R"
3.0 PCF 1" (48 kg/m <sup>3</sup> 25 mm)	.23 (1.31)	4.3 (.76)
3.0 PCF 1.5" (48 kg/m <sup>3</sup> 38 mm)	.15 (.85)	6.5 (1.15)
3.0 PCF 2" (48 kg/m <sup>3</sup> 51 mm)	.11 (.62)	8.7 (1.53)

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

<sup>1</sup>The lower the value, the better the performance. <sup>2</sup>The higher the value, the better the performance.

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## Forms Available

Product			Width	Length
<b>Standard Sizes</b>				
3.0 PCF	1"	(48 kg/m <sup>3</sup> 25 mm)	24" (610 mm)	48" (1219 mm)
3.0 PCF	1½"	(48 kg/m <sup>3</sup> 38 mm)		
3.0 PCF	2"	(48 kg/m <sup>3</sup> 51 mm)		
<b>Made-to-Order Sizes*</b>				
3.0 PCF	1"	(48 kg/m <sup>3</sup> 25 mm)*	24" (610 mm)	36" (914 mm)
3.0 PCF	1½"	(48 kg/m <sup>3</sup> 38 mm)*		72" (1829 mm)
3.0 PCF	2"	(48 kg/m <sup>3</sup> 51 mm)*	48" (1219 mm)	96" (2438 mm)
				120" (3048 mm)

\*Consult price sheet for minimum order quantities. Pallets available on made-to-order basis.

## Notes

The chemical and physical properties of Knauf Rigid Plenum 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.

Check with your Knauf Insulation sales representative to assure information is current.



Knauf Rigid Plenum Liner with ECOSE Technology products are certified for indoor air quality by The GREENGUARD Environmental Institute™, to both the GREENGUARD Certification Program™ and the more stringent GREENGUARD For Children and Schools™ Standard. [www.greenguard.org](http://www.greenguard.org)

The GREENGUARD INDOOR AIR QUALITY CERTIFIED Mark is a registered certification mark used under license through the GREENGUARD Environmental Institute.



## LEED Eligible Product

Use of this product may help building projects meet green building standards as set by the Leadership in Energy and Environmental Design (LEED) Green Building Rating System.  
MR Credit 4.1 – 4.2 Recycled Content  
MR Credit 5.1 – 5.2 Regional Materials