

Description

Knauf Insulation Eclipse® Air Duct Board with ECOSE® Technology is a rigid fiber glass board faced on one side with a foil-scrim-kraft (FSK) vapor retarder and with a lightweight black fiber glass mat on the airstream surface. It is used to fabricate rectangular or Max¹⁰ air duct systems. It comes with two stiffness ratings, EI-475 and EI-800. Both types are available with butt edge or factory molded male-female shiplap edges. The airstream surface of Knauf Insulation Eclipse Air Duct Board is treated with an EPA registered, anti-microbial agent that prevents growth of mold, fungus or bacteria in accordance with ASTM C1071 and G21.

ECOSE Technology

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

Application

Knauf Insulation Eclipse Air Duct Board with ECOSE Technology is designed for commercial and residential air handling installations for cooling, heating or dual-temperature service where good temperature control and noise absorption are required.

Features

- Low thermal conductivity of 0.23 at 75°F (24°C) mean temperature.
- Low installed cost insulated duct system.
- Excellent acoustical characteristics.
- Dark black glass mat airstream surface
- Assured insulation thickness, shiplap joints and FSK vapor retarder.
- If necessary, can be cleaned in accordance with NAIMA's "Cleaning Fibrous Glass Insulated Air Duct Systems Recommended Practices."
- Knauf Insulation Eclipse Air Duct Board systems meet the fire and smoke safety regulations of most federal, state and local building codes.
- Fabrication in shop or on jobsite.
- Certified for indoor air quality as a low emitting product by The GREENGUARD Environmental Institute to both the GREENGUARD Certification ProgramSM and the more stringent GREENGUARD Children and SchoolsSM 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
 - A minimum 60% recycled post-consumer glass content and UL Environment verification every 6 months
 - ECOSE Technology which reduces binder embodied energy by up to 70%
 - It is anticipated to reduce its Global Warming Potential (GWP) by approximately 4%, a significant reduction in our carbon footprint

Benefits

- Fabrication in shop environment lowers field installation time.
- One craft required to fabricate and install system.
- Minimum capital investment for fabrication equipment.
- Portability allows for assembly or fabrication at job site.
- Black mat facing ensures a smoother airstream surface for a cleaner cut and added durability.
- Lower installation cost than with duct wrap and duct liner with sheet metal.
- Finished internal duct appearance is black.
- Quiet, efficient air delivery.
- Reduces noise generated by air turbulence and mechanical equipment.
- Eliminates "booming" and "cracking" sounds caused by sheet metal duct contraction and expansion.
- Condensation control.
- Strong thermal performance.
- Code compliance.

Specification Compliance

In U.S.:

- ASTM C 1136; Type II (FSK facing)
- ASTM G 21
- GREENGUARD Indoor Air Quality Certified[®]
- GREENGUARD Children & Schools CertifiedSM
- California Title 24
- Corps of Engineers Guide Specifications
- International Mechanical Code
- International Building Code
- NFPA 90A and 90B
- UL 181; Class 1

In Canada:

- CAN/ULC S102-M88
- CAN/CGSB 51-GP-52M (facing)
- CAN/CGSB 51.10-92

Technical Data

Surface Burning Characteristics

- UL listed.
- 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.

Flexural Rigidity

- Available in two stiffness values: EI-475 and EI-800.
- Flexural rigidity (EI) is the product of Young's modulus of elasticity (E) and moment of inertia (I) as determined in accordance with NAIMA AHS-100-74.

Service Temperature (ASTM C 411)

- Up to 250°F (121°C).

Air Velocity (UL 181)

- 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.

Internal Static Pressure (UL 181)

- Maximum ±2" water (498 pascals [Pa]).

Water Vapor Transmission Rate (ASTM E 96)

- Less than 0.02 perms.

Water Vapor Sorption (ASTM C 1104)

- Less than 5% by weight.

Microbial Growth (ASTM G 21, UL 181)

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

Microbial Resistance

- Using the GREENGUARD protocol, Eclipse Air Duct Board is considered to be "Resistant to Mold Growth."

Application and Specification Guidelines

Storage

- Protect stored duct board from water damage, construction damage and other abuse.
- If stored outside, proper protection from weather conditions should be provided.

Application

- Duct shall be fabricated and installed in strict accordance with NAIMA's "Fibrous Glass Duct Construction Standard," "Residential Standard," "1½" Fabrication Manual" or Knauf Insulation "Air Duct Fabrication Manual" in accordance with the conditions of UL 181 listing. Duct systems shall have all transverse joints, longitudinal seams and duct wall penetrations sealed using 3" (76 mm) wide glass fabric and mastic, 2" (51 mm) minimum width heat sealable tape or 2" (51 mm) minimum width pressure sensitive tape with acrylic adhesive. Rubber-based adhesives are not approved.
- Only UL 181-A listed and labeled products shall be used for closure systems. A listing of specific approved closure products is available from your local Knauf Insulation sales representative. PRESSURE SENSITIVE TAPES: Only those tapes listed under and imprinted with designation UL 181-A-P and registered with UL. HEAT SEALABLE TAPES: Only those tapes listed under and imprinted with the designation UL 181 A-H and registered with UL. MASTICS: Mastic systems listed and registered with UL and carrying the designation UL 181 A-M used in conjunction with a 3" (76 mm) wide glass fabric.

Procedures

1. PRESSURE SENSITIVE TAPE:
 - a. All longitudinal and circumferential joints must be stapled with outward flaring, ½" (13 mm) minimum length staples 2" (51 mm) on centers.
 - b. If necessary, follow the recommendations of the tape manufacturer for cleaning the surface to be taped.
 - c. Center tape over staple flap and rub tape firmly in place immediately after application, using a plastic "squeegee" or similar tool, until the scrim reinforcement of the duct board facing can be clearly seen through the tape.
 - d. A heat-sealing iron must be used to assure a good bond when installed below 50°F (10°C).
 - e. Tape should not be applied to surface of duct board when temperature is below 32°F (0°C) due to the possibility of entrapping ice crystals which, upon melting, will cause tape to loosen. Heat duct board facing surface first to drive off moisture.
2. HEAT SEALABLE TAPE:
 - a. All longitudinal and circumferential joints must be stapled with outward flaring, ½" (13 mm) minimum length staples 2" (51 mm) on centers.
 - b. If necessary, follow the recommendations of the tape manufacturer for cleaning the surface to be taped.
 - c. Center tape over staple flap and seal down tape end with 500°F (260°C) iron. Do not use heat gun; both heat and pressure are required to effect a seal.



Eclipse™ Air Duct Board with ECOSE® Technology

Submittal Date _____



- d. Press down entire length of tape with iron using a smearing action to get a good bond. Be sure edges are sealed.
 - e. Staples may be omitted when an automatic closure machine such as the Glassmaster Close-master is used. In this case, iron temperature must be set at 650°F (343°C) minimum. Continuous production may require periodic pauses to allow sealing iron temperature to recover to the 650°F (343°C) minimum.
 - f. Allow joint to cool before stressing.
3. MASTIC AND GLASS FABRIC:
- a. All longitudinal and circumferential joints must be stapled with outward flaring, ½" (13 mm) minimum length staples 2" (51 mm) on centers.
 - b. Brush approved mastic onto joint and embed 3" (76 mm) wide glass fabric in mastic.
 - c. Brush second coat of mastic over glass fabric until mesh is completely filled.
 - d. Follow mastic manufacturer's instructions on curing the mastic prior to subjecting the joint to stress.

Closure

If the closure system used is not one of the approved systems described above and if application is not in accordance with stated procedures, Knauf Insulation

assumes no liability for duct system performance. Use of a non-UL registered and listed closure voids the UL 181 Class 1 rating as well as Knauf Insulation's product performance warranties.

Reinforcements

Duct sections shall be additionally reinforced where necessary, according to Knauf Insulation and NAIMA standards. Ductwork shall be supported as required on straight runs, at all turns and at transitions to maintain proper alignment. Hangers and supports shall be in strict accordance with Knauf Insulation and NAIMA standards.

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.

Notes

When used in accordance with NAIMA's and Knauf Insulation's application instructions, the closure systems

described herein meet UL 181 requirements, and the resulting system carries a Class 1 Air Duct rating.

This submittal sheet is not intended to be a design or fabrication manual. For specific details and recommendations on fabrication, reinforcement, hanging and other details, refer to the latest edition of the NAIMA "Fibrous Glass Duct Construction Standard," "Residential Standard," "1½" Fabrication Manual" or Knauf Insulation "Air Duct Fabrication Manual." Application and installation procedure is at the discretion of and is the responsibility of the Design Engineer to meet specific job requirements.

The chemical and physical properties of Knauf Insulation Eclipse Air Duct Board 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.

Friction Loss (Inches of water per 100')		Hydraulic Diameter							
Velocity (FPM)	Friction Loss (in. of H ₂ O per 100 ft.)	Hydraulic Diameter							
		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		

Recommended Maximum Duct Dimensions Without Reinforcement*						
Internal Pressure inches of water	EI-475-1"			EI-800-1", 1-1/2", 2"		
	.5 (125)†	1.0 (249)†	2.0 (498)†	.5 (125)†	1.0 (249)†	2.0 (498)†
Positive	36" (914 mm)	24" (610 mm)	15" (381 mm)	36" (914 mm)	24" (610 mm)	18" (457 mm)
Negative	34" (864 mm)	24" (610 mm)	14" (356 mm)	36" (914 mm)	24" (610 mm)	18" (457 mm)

* The above table summarizes span/pressure limitations for unreinforced duct. For larger ducts, refer to NAIMA's "Fibrous Glass Duct Construction Standard" or Knauf Insulation's "Air Duct Fabrication Manual".
†(Pressure—Pascals [Pa])

Sound Absorption Coefficients (ASTM 423, Type A Mounting)								
Octave Band Center Frequency (Cycles/Sec.)								
Type	125	250	500	1000	2000	4000	NRC	
EI-475 1" (25 mm)	.03	.25	.62	.92	1.03	.97	.70	
EI-800 1.5" (38 mm)	.02	.44	.96	1.17	1.16	1.12	.95	
EI-800 2" (51 mm)	.19	.64	1.08	1.13	1.06	1.06	1.00	

Thermal Conductivity k (ASTM C177) Mean Temperature 75°F (24°C)	
k-Value	
EI-475 and EI-800	.23 (.033)
"k" Units:	$\frac{\text{BTU} \cdot \text{in}}{\text{ft}^2 \cdot \text{hr} \cdot ^\circ\text{F}}$ $\left(\frac{\text{W}}{\text{m} \cdot ^\circ\text{C}} \right)$

Forms Available				
Thickness	Size*	Edge	Pieces/Carton**	
1" (25 mm)	48" x 96" (1219 mm x 2438 mm)	Shiplap	8	
1" (25 mm)	48" x 120" (1219 mm x 3048 mm)	Butt, Shiplap	6	
1.5**** (38 mm)	48" x 120" (1219 mm x 3048 mm)	Shiplap	4	
2**** (51 mm)	48" x 120" (1219 mm x 3048 mm)	Butt, Shiplap	3	

* Other lengths available on made-to-order basis. ** Palletized packaging available on request. *** EI-800 only.

Thermal Resistance R (ASTM C518) Mean Temperature 75°F (24°C)	
Thickness	R-Value (R.S.I.)
1" (25 mm)	4.3 (.76)
1.5" (38 mm)	6.5 (1.14)
2" (51 mm)	8.7 (1.53)
"R" Units:	$\frac{\text{ft}^2 \cdot \text{hr} \cdot ^\circ\text{F}}{\text{BTU}}$ $\left(\frac{\text{m}^2 \cdot ^\circ\text{C}}{\text{W}} \right)$