



Performance+

Air Duct Board with ECOSE® Technology

Product Data Sheet

05/2024

Description

Performance+™ Air Duct Board with ECOSE® Technology is a rigid fiberglass board faced on one side with a foil-scrim-kraft (FSK) vapor retarder and a lightweight non-woven mat on the airstream surface. It is used to fabricate rectangular or Max10 air duct systems for temperature control and noise absorption.

Application

- Commercial and residential air handling installations
- Cooling, heating or dual-temperature service

Certifications



Contractor: _____

Job: _____

Date: _____

Specification Compliance

U.S.

- UL 181; Class 1
- ASTM C1136; Type II (FSK facing)
- ASTM G21
- Corps of Engineers Guide Specifications
- International Mechanical Code
- International Building Code
- NFPA 90A and 90B
- California Title 24
- ASHRAE 62

Indoor Air Quality

- **asthma & allergy friendly®**
- Verified Healthier Air™
- UL Environment
 - GREENGUARD Certified
 - GREENGUARD Gold Certified
 - Validated to be Formaldehyde-Free
- Does not contain polybrominated diphenyl ethers (PBDE) such as: Penta – BDE, Octa – BDE or Deca – BDE
- EUCB Certified

Forms Available

Type	Size*	Edge	Pieces / Carton **
El-475	1" (25mm)	48" x 96" (1219mm x 2438 mm)	8
El-800		48" x 120" (1219 mm x 3048 mm)	6
El-800	1.5" (38mm)	48" x 120" (1219 mm x 3048 mm)	4
	2" (51mm)	48" x 120" (1219 mm x 3048 mm)	3

*Other lengths available on custom order basis.

**Palletized packaging available on request

Technical Data

Property (Unit)	Test	Performance
Corrosiveness	ASTM C665	Does not accelerate corrosion of steel (Insulation)
Corrosion	ASTM C1617	Pass (Insulation)
Maximum Service Temperature	ASTM C411	250° F (121° C) (Insulation)
Water Vapor Permeance	ASTM E96, Procedure A	0.02 perms or less
Water Vapor Sorption (by weight)	ASTM C1104	Less than 5%
Flexural Rigidity	NAIMA AHS-100-74	Available in 2 stiffness values: El-475 and El-800; Flexural rigidity (EI) is the product of Young's modulus of elasticity (E) and moment of inertia (I)
Maximum Air Velocity*	UL 181	Max. 5,000 ft./min. (1,524 m/min.)
Internal Static Pressure	UL 181	Maximum ±2" w.g. (498 pascals [Pa])
Microbial Growth	ASTM C1338, ASTM G21, UL 181	Pass, does not support the growth of fungi or bacteria
Surface Burning Characteristics (flame spread/smoke developed)	ASTM E84, UL 723	FHC 25/50; UL Listed

*Tested at 12,500 ft./min per UL 181 - 2.5 times certified velocity rating

Sound Absorption Coefficients & Noise Reduction Coefficient | ASTM C423, Type A Mounting

Thickness	Octave Band Center Frequency (Cycles / Sec.)						NRC
	125	250	500	1000	2000	4000	
1" (25 mm)	0.03	0.25	0.62	0.92	1.03	0.97	0.70
1.5" (38 mm)	0.02	0.44	0.96	1.17	1.16	1.12	0.95
2" (51 mm)	0.19	0.64	1.08	1.13	1.06	1.06	1.00

Recommended Maximum Duct Dimensions Without Reinforcement*

Internal Pressure Inches of Water	EI-475-1"			EI-800-1", 1½", 2"			1¾"	
	0.5 (125) [†]	1.0 (249) [†]	2.0 (498) [†]	0.5 (125) [†]	1.0 (249) [†]	2.0 (498) [†]	0.5 (125) [†]	1.0 (249) [†]
Positive	36" (914 mm)	24" (610 mm)	15" (381 mm)	36" (914 mm)	24" (610 mm)	18" (457 mm)	-	22" (558 mm)
Negative	34" (864 mm)	24" (610 mm)	14" (356 mm)	36" (914 mm)	24" (610 mm)	18" (457 mm)	22" (558 mm)	-

*This table summarizes span/pressure limitations for unreinforced duct. For larger ducts, refer to NAIMA's "Fibrous Glass Duct Construction Standard," [†](Pressure—Pascals [Pa])

Thermal Resistance R | ASTM C518 Mean Temperature 75° F (24° C)

Thickness	R-Value (R.S.I.)
1" (25 mm)	4.3 (0.76)
1.5" (38 mm)	6.5 (1.14)
2" (51 mm)	8.7 (1.53)

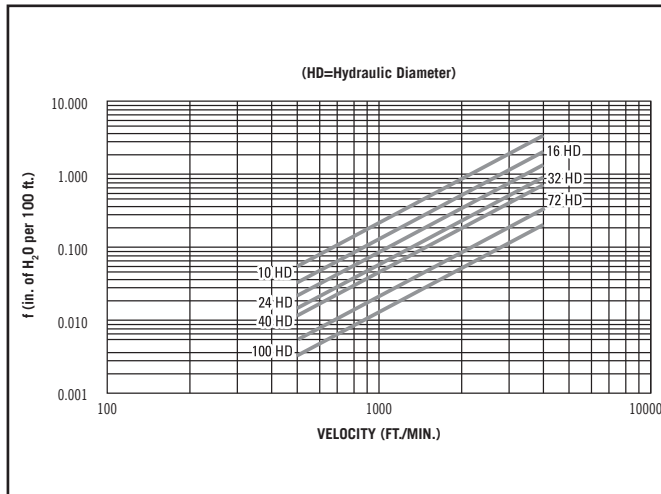
"R" Units $\frac{\text{ft}^2 \cdot \text{hr} \cdot ^\circ\text{F}}{\text{BTU}}$ $\left(\frac{\text{m}^2 \cdot ^\circ\text{C}}{\text{W}} \right)$

Thermal Conductivity k | ASTM C177 Mean Temperature 75° F (24° C)

k-Value	
EI-475 and EI-800	0.23 (.033)

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

Friction Loss | Inches of water per 100'



Ft. / Min. Velocity	Hydraulic Diameter						
	10"	16"	24"	32"	40"	72"	100"
500	0.056	0.031	0.018	0.013	0.010	0.005	0.003
600	0.080	0.044	0.026	0.018	0.014	0.007	0.004
700	0.108	0.059	0.035	0.025	0.019	0.009	0.006
800	0.140	0.077	0.046	0.032	0.024	0.012	0.008
900	0.176	0.096	0.058	0.040	0.031	0.015	0.010
1000	0.216	0.118	0.071	0.050	0.038	0.018	0.012
2000	0.845	0.463	0.278	0.194	0.147	0.071	0.048
3000	1.887	1.034	0.620	0.432	0.328	0.159	0.106
4000	3.340	1.831	1.097	0.765	0.580	0.281	0.188
5000	5.206	2.854	1.710	1.193	0.904	0.438	0.293

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," or "2" Fabrication Manual" or with SMACNA's "Fibrous Glass Duct Construction Standards" 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) min. width heat sealable tape or 2" (51 mm) min. 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.
 - *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

- *Pressure Sensitive Tape*
 - *All longitudinal and circumferential joints must be stapled with outward clinching, ½" (13 mm) min. length staples 2" (51 mm) on centers.*
 - *If necessary, follow the recommendations of the tape manufacturer for cleaning the surface to be taped.*
 - *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.*
 - *A heat-sealing iron must be used to warm the surface of the board before applying the tape to assure a good bond when installed below 50° F (10° C).*
 - *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.*

■ Heat Sealable Tape

- *All longitudinal and circumferential joints must be stapled with outward clinching, ½" (13 mm) minimum length staples 2" (51 mm) on centers.*
- *If necessary, follow the recommendations of the tape manufacturer for cleaning the surface to be taped.*
- *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.*
- *Press down entire length of tape with iron using a smearing action to get a good bond. Be sure edges are sealed.*
- *Staples may be omitted when an automatic closure machine such as the Glassmaster Closemaster is used. In this case, iron temperature must be set at 650° F (343° C) min. Continuous production may require periodic pauses to allow sealing iron temperature to recover to the 650° F (343° C) min.*
- *Allow joint to cool before stressing.*

■ Mastic and Glass Fabric

- *All longitudinal and circumferential joints must be stapled with outward clinching, ½" (13 mm) min. length staples 2" (51 mm) on centers.*
- *Brush approved mastic onto joint and embed 3" (76 mm) wide glass fabric in mastic.*
- *Brush second coat of mastic over glass fabric until mesh is completely filled.*
- *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 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 NAIMA standards.

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. If necessary, can be cleaned in accordance with NAIMA's "Cleaning Fibrous Glass Insulated Air Duct Systems Recommended Practices" (AH122)

Fiberglass and Mold

The Fiberglass 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. Insulation used in direct contact with air streams that provide conditioning to occupied spaces must be discarded if exposed to water.

Sustainability

Knauf Insulation products with ECOSE® Technology are made using our patented, bio-based binder - a smarter alternative to the phenol/formaldehyde (PF) binder traditionally used in fiberglass products. The bio-based binder holds our product together, gives the product its unique appearance and makes it formaldehyde-free. All of our products are made from sustainable resources, such as recycled glass and sand. And we're proud to be putting glass bottles back to work rather than into landfills. Our products are made with a minimum of 50% recycled glass—totaling an average of 26 million bottles.

Notes

When used in accordance with NAIMA's application instructions, the closure systems described herein meet UL 181 requirements, and the resulting system carries a Class 1 Air Duct rating. This data 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," "2" Fabrication Manual." Application and installation procedure is at the discretion of and is the responsibility of the Design Engineer to meet specific job requirements.

Check with your Knauf Insulation Territory Manager to ensure information is current.

The chemical and physical properties of this product represent average values determined in accordance with accepted test methods. The data is subject to normal manufacturing 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.

This product is covered by one or more U.S. and/or other patents.

See patent www.knaufnorthamerica.com/patents

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