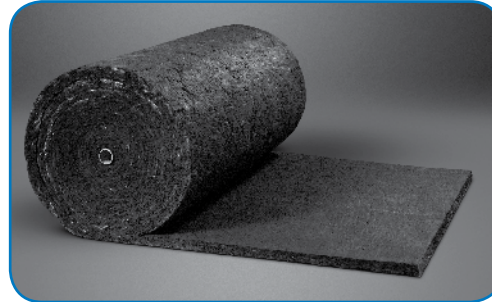


## ToughGard® T Textile Duct Liner

### PRODUCT DESCRIPTION

**Basic Use:** ToughGard® T Duct Liner is used primarily as an acoustical liner in HVAC sheet metal ducts to absorb unwanted crosstalk, equipment and air-rush noise.

This product can be used in most types of comfort heating and cooling duct systems, operating at velocities up to 6,000 fpm (30.5 m/s) and temperatures to 250°F (121°C).



**Benefits:** ToughGard T Duct Liner is more water repellent than standard duct liners. This product is durable, abuse resistant and easy to clean. In addition, ToughGard T Duct Liner provides excellent thermal properties, exhibits low air flow resistance and meets all applicable fire resistance standards and building code requirements. This product has a factory-applied edge coating that ensures sealing of the transverse edges as per SMACNA and NAIMA installation standards. The product can be precision cut using both manual and automatic cutting equipment.

**Composition and Materials:** Composed primarily of long, textile-type glass fibers (with an average of 75% recycled content) firmly bonded together with a thermosetting resin overlaid with an extremely tough and durable fire-resistant black composite surface on the airstream side. The airstream surface contains an EPA-registered antimicrobial agent in order to reduce the potential of microbial growth that may affect this product. The antimicrobial properties are intended to protect only this product.

**Limitations:** Insulation should be kept clean and dry during shipping, storage, installation and system operation.

### INSTALLATION

All duct liner products must be installed in accordance with the requirements of NAIMA Fibrous Glass Duct Liner Standards or SMACNA HVAC Duct Construction Standards and the project specification.

The products can be precision cut using both manual and automatic cutting equipment. The liner must be cut and fitted to ensure all joints are neatly and tightly butted with no interruptions or gaps.

All duct liner products must be adhered to the sheet metal ductwork using an adhesive meeting the requirements of ASTM C916. The adhesive film coverage must be a minimum 90% of the metal surface. Secure the duct liner to the sheet metal ductwork using mechanical fasteners (impact-driven or weld-secured). These fasteners vary in length and type. Mechanical fasteners of the specified type and length must be used, ensuring no greater than 10% compression of the liner thickness. Maximum fastener spacing must be in accordance with NAIMA or SMACNA standards.

ToughGard T Duct Liner provides clean “buttered” transverse edges. However, some circumstances will require the use of adhesive to butter raw exposed liner edges. Final job site buttering may be required to coat duct cut-ins and/or minor installation damage.

ToughGard T Duct Liner fabricated duct systems must be kept clean and dry from the point of fabrication through job site installation. Special precautions at the job site may be necessary to accomplish this. The installed lined ductwork must be protected to avoid contamination by water and dirt.

An HVAC system commissioning program should be considered to ensure proper start-up and purging of the duct system.

### Design Considerations:

- Butter all raw exposed edges.
- High in-duct air turbulence areas may require special procedures, i.e., perforated inner metal liner, etc.
- Metal nosings shall be securely installed over transversely oriented liner edges facing airstream at fan discharge and at any interval of lined duct preceded by unlined duct.

<b>Product Name</b>	CertainTeed ToughGard® T Textile Duct Liner
<b>Manufacturer</b>	CertainTeed Corporation
<b>Address</b>	P.O. Box 860 Valley Forge, PA 19482-0105
<b>Phone</b>	610-341-7000 • 800-233-8990
<b>Fax</b>	610-341-7571
<b>Website</b>	<a href="http://www.certainteed.com/insulation">www.certainteed.com/insulation</a>

### TECHNICAL DATA

#### Applicable Standards

- Model Building Codes:
  - ICC
  - California Title 24
- Material Standards:
  - ASTM C1071
  - CAN/CGSB-51.11-92
- Fire Safety Standards:
  - NFPA 90A, NFPA 90B

#### Fire Resistance

- Fire Hazard Classification:
  - UL 723, ASTM E84
  - CAN/ULC-S102
  - Max. Flame Spread Index: 25
  - Max Smoke Developed Index: 50
- Limited Combustible: NFPA 259
  - < 3,500 Btu/lb

#### Physical/Chemical Properties

- Thermal Performance:
  - See table on other side
- Acoustical Performance:
  - See table on other side
- Operating Limits:
  - Temperature: ASTM C411
  - Max. 250°F (121°C)
  - Air Velocity: ASTM C1071, UL181
  - Max. 6,000 fpm (30.5 m/s)
- Water Vapor Sorption: ASTM C1104
  - ≤ 3% by weight
- Corrosiveness: ASTM C665
  - Pass test requirements
- Bacteria Resistance: ASTM G22
  - No growth
- Fungi Resistance: ASTM C1338 and ASTM G21
  - Pass test requirements; no growth
- Water Repellency Rating
  - > 4 (INDA IST 80.6-92)

#### Quality Assurance

CertainTeed's commitment to quality and environmental management has ensured the registration of the Athens, Chowchilla and Kansas City plants to ISO 9001:2000 and ISO 14001:2004 standards.

## AVAILABILITY AND COST

Manufactured and sold throughout the United States. For availability and cost contact your local distributor, or call CertainTeed Sales Support Group in Valley Forge, PA at 800-233-8990.

## WARRANTY

Refer to CertainTeed's Limited One-Year Warranty for ToughGard T Fiber Glass Duct Liner (30-29-047).

## MAINTENANCE

An inspection and preventative maintenance program for the HVAC system is recommended to ensure optimum performance. Use NAIMA guidelines for duct cleaning methods and procedures.

## TECHNICAL SERVICES

Technical assistance can be obtained either from your local CertainTeed sales representative, or by calling CertainTeed Sales Support Group in Valley Forge, PA at 800-233-8990.

## FILING SYSTEMS

- Sweet's Engineering & Retrofit Files
- CertainTeed Pub. No. 30-36-004
- Additional product information available upon request.

STANDARD SIZES							
Product Type		Nominal Thickness		Length		Width	
ToughGard T	ASTM <sup>1</sup>	in.	mm	ft.	m	in.	mm
150 Density: 1.6 pcf (25.6 kg/m <sup>3</sup> )	I	1	25	50 & 100	15.2 & 30.5	24 to 72 in ¼" increments <sup>2</sup>	610 to 1829 in 6 mm increments
		1½	38	100	30.5		
		2	51	50	15.2		
½		13	100	30.5			
200 Density: 2.0 pcf (32 kg/m <sup>3</sup> )		1	25	50 & 100	15.2 & 30.5		
		½	13	100	30.5		
300 Density: 3.0 pcf (48 kg/m <sup>3</sup> )	1	25	50 & 100	15.2 & 30.5			
	½	13	100	30.5			

<sup>1</sup>Classification per ASTM C107: Type I is roll form; Type II is sheet form.

<sup>2</sup>Not all widths between 24" and 72" are standard. Please contact CertainTeed for the standard sizes.

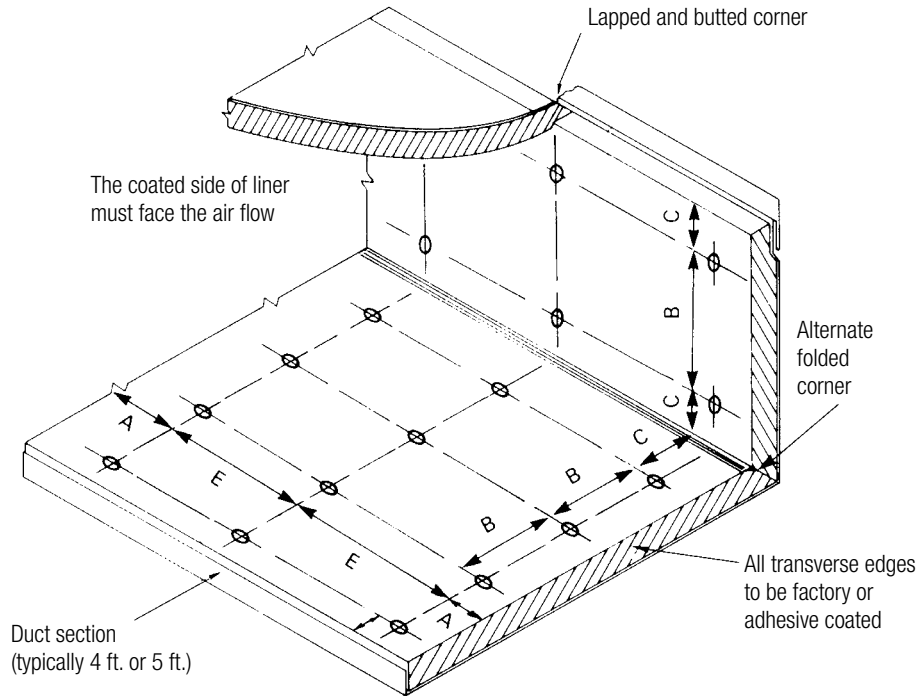
NOTE: Made-to-order sizes are available and subject to an upcharge, additional lead time and minimum quantities.

THERMAL PERFORMANCE								
Type	Product		K-Value		C-Value		R-Value	
	Nominal Thickness*		Btu•in h•ft <sup>2</sup> •°F	W m•°C	Btu h•ft <sup>2</sup> •°F	W m <sup>2</sup> •°C	h•ft <sup>2</sup> •°F Btu	m <sup>2</sup> •°C W
	in.	mm						
150	1	25	0.26	0.038	0.25	1.42	4.0	0.70
	1½	38	0.27	0.039	0.17	0.95	6.0	1.06
	2	51	0.26	0.038	0.13	0.71	8.0	1.41
200	½	13	0.25	0.036	0.5	2.84	2.0	0.35
	1	25			0.24	1.35	4.2	0.74
	1½	38			0.17	0.95	6.0	1.06
	2	51			0.13	0.71	8.0	1.41
300	½	13	0.24	0.035	0.48	2.73	2.1	0.37
	1	25			0.23	1.30	4.4	0.77
	1½	38			0.16	0.91	6.3	1.10
	2	51			0.12	0.68	8.3	1.47

Thermal conductance (C) and resistance (R) values are derived from the material thermal conductivity (k) value. Tested in accordance with ASTM C518 and/or ASTM C177 at 75°F (24°C) mean temperature.

\*Actual finished thicknesses are 1.05" thick (nominal 1.0"), actual 1.6" (nominal 1.5", Type 150), actual 2.1" (nominal 2", Type 150).

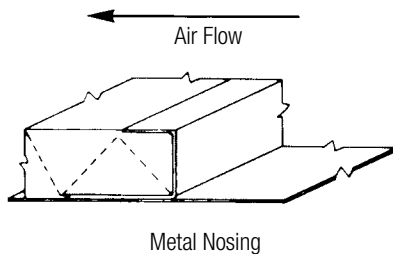
**FASTENER SPACING**



Velocity	Dimensions			
	A	B	C	E
0-2500 FPM	3"	12"	4"	18"
2501-6000 FPM	3"	6"	4"	16"

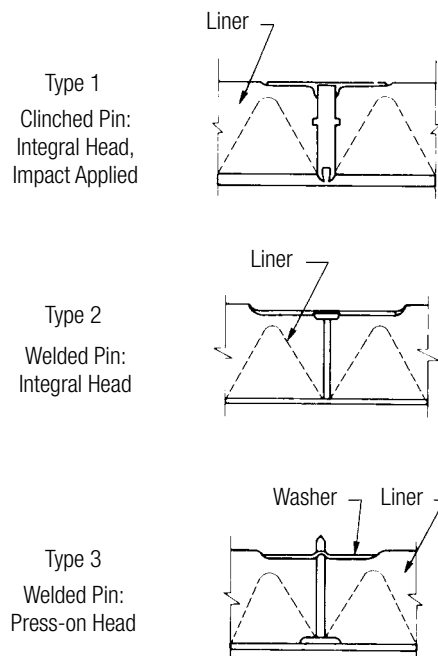
Maximum spacing for fasteners. Actual intervals are approximate.

**METAL NOSING**



When velocity exceeds 4000 FPM, use metal nosing on every leading edge. Nosing may be formed on duct or be channel or zee attached by screws, rivets or welds.

**LINER FASTENERS**



**ACOUSTICAL PERFORMANCE**

Type	Product		Sound Absorption Coefficients @ Octave Frequencies (Hz)						NRC
	Nominal Thickness in.	mm	125	250	500	1000	2000	4000	
150	1	25	0.14	0.29	0.55	0.77	0.94	0.94	0.65
	1½	38	0.16	0.47	0.77	0.96	1.04	1.00	0.80
	2	51	0.23	0.62	1.01	1.04	1.00	1.01	0.90
200	½	13	0.06	0.15	0.33	0.56	0.76	0.91	0.45
	1	25	0.10	0.33	0.65	0.86	0.94	0.96	0.70
	1½	38	0.16	0.47	0.77	0.96	1.04	1.00	0.80
300	2	51	0.24	0.57	0.90	0.95	0.95	0.96	0.85
	½	13	0.06	0.15	0.33	0.56	0.76	0.91	0.45
	1	25	0.10	0.33	0.65	0.86	0.94	0.96	0.70
	1½	38	0.20	0.46	0.82	0.94	0.95	0.91	0.80
	2	51	0.27	0.72	1.04	1.02	0.96	0.92	0.95

Sound absorption tested in accordance with ASTM C423 using Type A mounting per ASTM E795.

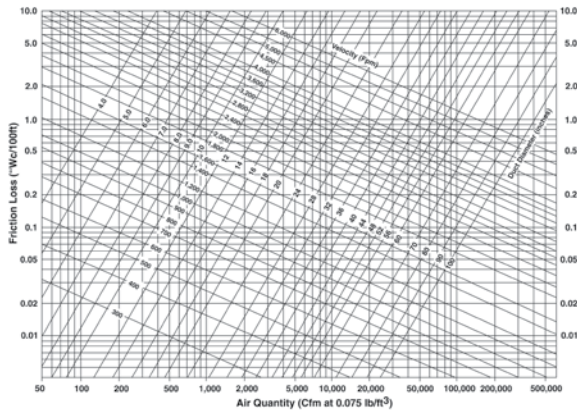
**INSERTION LOSS, DB PER FT OF LINED DUCT**

P/A, ft/ft²	1" Liner						2" Liner					
	Octave Band Center Frequencies (Hz)						Octave Band Center Frequencies (Hz)					
	125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
8	0.6	1.5	2.7	5.8	7.4	4.3	0.8	2.9	4.9	7.2	7.4	4.3
6	0.5	1.2	2.3	5.0	5.8	3.6	0.6	2.3	4.2	6.2	5.8	3.6
4	0.4	0.8	1.9	4.0	4.1	2.8	0.5	1.6	3.5	5.0	4.1	2.8
2	0.2	0.5	1.4	2.8	2.2	1.8	0.3	0.8	2.3	3.3	2.0	1.7
1	0.1	0.3	1.0	2.0	1.2	1.2	0.2	0.5	1.8	2.3	1.1	1.1

Duct Liner Insertions Loss—Data extracted from ASHRAE Handbook, HVAC Applications, Chapter 46, 1999. P/A = duct perimeter, ft/duct cross sectional area (ft²). Example: 12"x12", P/A = 4 (1/ft).

**TOUGHGARD T DUCT LINER AIR FRICTION CHART**

This chart is to be used in place of the standard friction loss chart published in the ASHRAE Handbook of Fundamentals. For conversion of round equivalents to rectangular sizes, use Table 2 "Equivalent Rectangular Duct Dimensions" from the same reference. Test conducted in accordance with ASHRAE 120P



CertainTeed ToughGard T Duct Liner



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