thermaduct®
ARCHITECTURAL PRODUCTS

WHAT ARE THERMADUCT® ARCHITECTURAL PRODUCTS?

For over two decades, Thermaduct® has delivered high-efficiency duct solutions that help contractors meet insulation requirements without adding extra steps in the field. Thermaduct® Architectural, using our patented phenolic duct liner system (see thermaduct.com/patents), offers a non-fibrous interior and high R-values, making it ideal for clean air applications like healthcare, labs, and commercial interiors.

Thermaduct® Architectural is lightweight and factory-formed, helping reduce labor time, eliminate external insulation, and simplify coordination with other trades. Whether your job calls for a finished appearance or just faster turnarounds, this fully encapsulated solution is available in both rectangular and round configurations—with optional exterior colors to meet exposed design requirements when needed.

DESIGNED FOR AESTHETICS, ENGINEERED TO PERFORM FOR YOUR APPLICATION

Thermaduct® Architectural ductwork combines the energy-saving benefits of phenolic insulation with the durability of a metal exterior. Unlike traditional liner installations that require glue or mechanical fasteners, Thermaduct® Architectural uses our patented Airtruss® system to mechanically secure the insulation in place. Available in multiple thicknesses and R-values, our Thermatuff® phenolic liner delivers exceptional thermal performance while minimizing air leakage, sound transmission, and vibration across the system.

Whether your application is commercial, industrial, healthcare or food grade, Thermaduct® Architectural products are an excellent choice for any insulated duct need!

Please refer to both the **SMACNA Duct Construction Standards** and Thermaduct® Architectural instructions for reference in your installation.

THERMADUCT® ARCHITECTURAL PRODUCT INSULATED VALUES

With our use of ASTM E84 25/50 compliant Thermatuff® phenolic insulation, our duct systems reach high insulated values with very limited insulation thickness. Whatever duct shape your application needs, Thermaduct® Architectural products can provide high thermal values.

Rectangular R-values:

- R8 *(1x 1 ⅜" Panel)*
- R12 *(1x 1 ⅞" Panel)*
- R16 *(2x 1 ⅜" Panel)*
- R20 *(1x 1 ⅜" Panel, 1x 1 ⅞" Panel)*
- R24 *(2x 1 ⅞" Panel)*

Round R-values:

- R12 *(2x 1" Panel)*
- R18 *(3x 1" Panel)*
- R24 *(4x 1" Panel)*

R-value is determined by ASTM C518 in accordance with with FTC Rule (16 CFR, Part 460) and ASTM C1126 -sec. 13.7.2

COMPLIANCE

Thermaduct® Architectural products are fabricated using construction practices that exceed SMACNA standards and deliver a systems that not only perform, but install the way you'd expect. The duct assemblies are built from ASTM E84 25/50 compliant phenolic panels and reinforced using our patented Airtruss® mechanical retention system, eliminating the need for glue without compromising structure or safety.

Kynar materials are available in 24 gauge galvalume treated steel and reinforced by Thermaduct® fabrication standards. Traditional duct materials are also available in different gauges and are built per SMACNA Duct Construction Standards utilizing Thermaduct® Airtruss® reinforcement.

Thermaduct® Architectural Systems are fully compliant with NFPA 90A and 90B requirements. Thermaduct® Architectural offers a clean, pre-lined solution that aligns with code requirements and jobsite expectations. Whether you're coordinating with inspectors or balancing trades, you can trust that this system meets the standards the field depends on.

SOUND PERFORMANCE

Thermaduct® Architectural products utilize phenolic insulation, which while not intended to absorb sound to the extent of a fiberglass liner, phenolic offers a durable, non-fibrous alternative with the added benefit of minimizing resonance and vibration. Acoustic performance values are provided in the table below from the manufacturer.

125	250	500	1000	2000	4000	NRC
0.00	0.02	0.02	0.11	0.15	0.13	0.05

Coefficients were tested in accordance with ASTM C423. Results listed in Hz. Typical values for 7/8" panel thickness, also applicable to other panel thicknesses.

FLANGED CONNECTIONS

Thermaduct® Architectural duct systems are constructed to exceed SMACNA Duct Construction Standards and are reinforced to support long-term system integrity. All duct assemblies are fabricated using conventional sheet metal flange systems, including TDC or TDF (rolled-on), 4-bolt connection profiles, or spiral duct flanges, depending on the application and geometry.

This ensures full compatibility with standard sheet metal practices, hardware, and sealing methods with no proprietary tools or unfamiliar connection details are required. Joints are designed to maintain low-leakage performance in accordance with SMACNA pressure class ratings. Installers should follow all connection and assembly procedures as outlined in the Thermaduct® Architectural Installation Manual and relevant SMACNA guidelines.

FITTINGS AND TRANSITIONS

Rectangular:

- All Duct Sections are Fully Assembled
- Pressure Class +10" w.g., -8" w.g. (as specified)
- Materials: G90, G60, Paint-Grip, Kynar, Stainless
- End Treatments: TDC, TDF, J-Flange or H-Flange (on cut-joints)
- Seal: Gasketed Flanged Connections, Sealed Seams
- Covers: Covers Over All Flange Connections and Reinforcement
- All Dimensions Are Clear Inside Dimensions

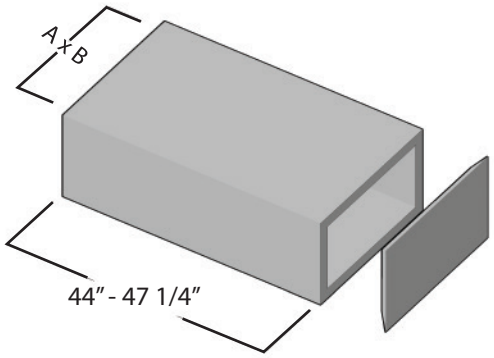
Round:

- All Duct Sections are Fully Assembled
- Pressure Class +10" w.g., -8" w.g. (as specified)
- Materials: G90, G60, Paint-Grip, Kynar, Stainless
- End Treatments: Spiral Flange
- Seal: Gasketed Flanged Connections, Sealed Seams
- Covers: Barrel Connectors over Flange
- All Dimensions Are Clear Inside Dimensions

Additional Standards can be found on the following pages for individual fitting types. For information not found in these guidelines, contact Thermaduct® for design criteria.

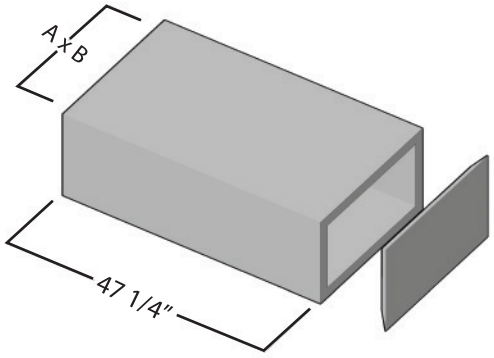
RECTANGULAR MINIMAL STANDARDS

Straight Ductwork:



Straights - Kynar:

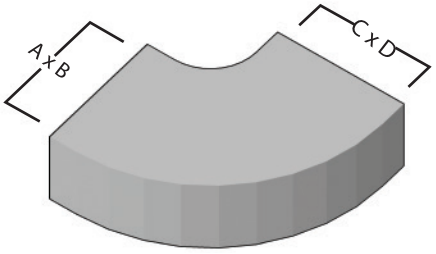
- Standard Length is 44" to 47.25" depending on colors
- Minimum Length is 9"
- Field Cut-Joints are Furnished with a Slide-on Flange



Straights - All Other Metal Exteriors:

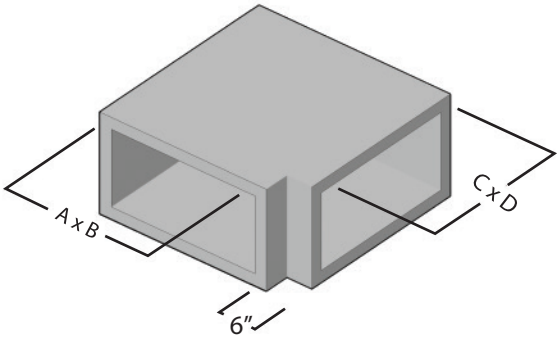
- Standard Length is 47.25"
- Minimum Length is 9"
- Field Cut-Joints are Furnished with a Slide-on Flange

Elbows:



Radius Elbows:

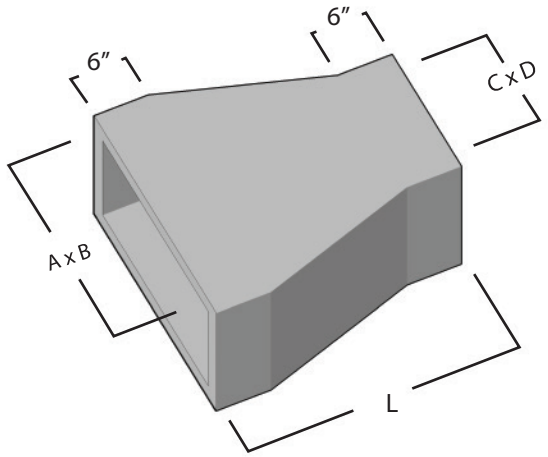
- Minimum Radius is 1.5x Centerline
- Larger Radius Elbows will be Multi-Gore
- "A and C" are the Cheek Dimensions
- Radius Elbows Can Only CHange In The A to C Dimension
- Minimum of 6" Straight In and Out is Required
- Minimum Angle is 15 Degrees



Square Elbows:

- Square Elbows Include Turning Vane When Noted/Ordered
- Larger Square Elbows WIll Be Multi-Gore
- "A and C" Are the Cheek Dimensions
- Minimum of 6" Straight In and 6" Straight Out (Measured
- from ID to Flange)
- No Cut Joints for Square Elbows

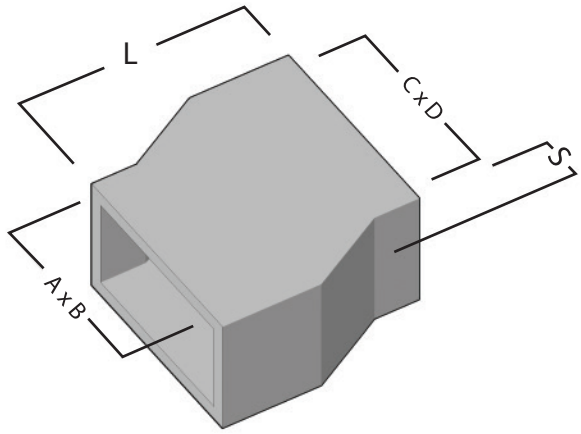
Transitions:



Transitions:

- Length Minimum is 30″
- "A and C" are the Cheek Dimension
- Minimum of 6" Straight-In and Out
- Maximum Slope is 30 Degrees
- Specify Length or Right Hand Set (if not centerline)

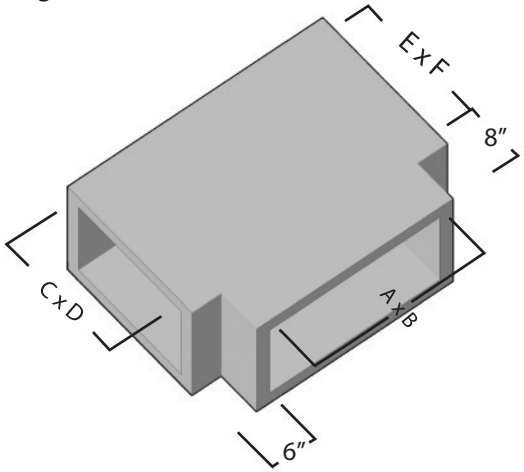
Offsets:



Offsets:

- Length Minimum is 30″
- Radius Offsets are Not Available
- Minimum of 6" Straight In and Out Required
- Specify Right or Left Hand Set Dimension

Tee Fittings:



Tees:

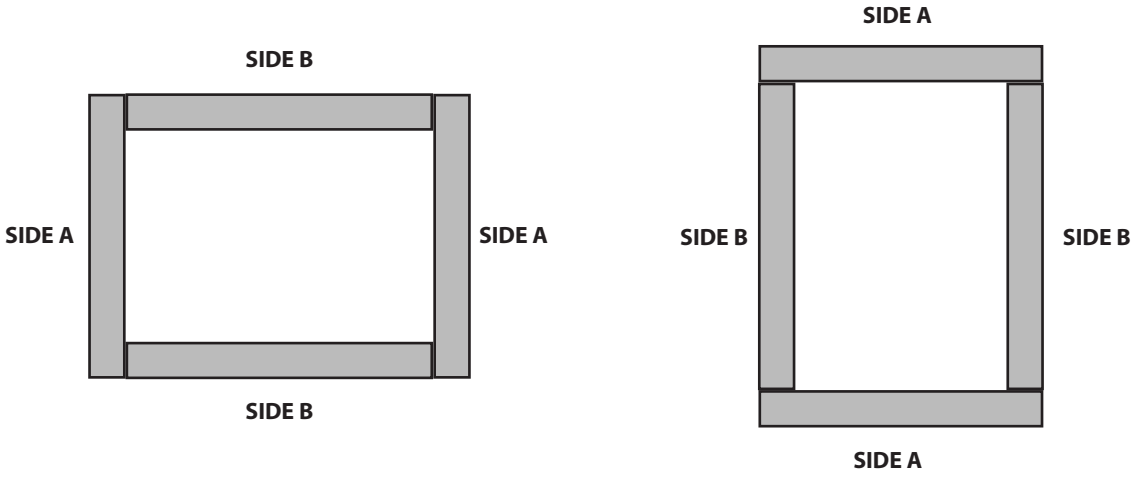
- Tee Includes Turning Vane (standard)
- Minimum Throat is 6″
- Recommended 8" Straight In for A x B

THERMADUCT® ARCHITECTURAL - APPLICATION OF PHENOLIC PANELS (RECTANGULAR)

Phenolic will be applied to metal duct sections in a factory environment, dry and free of any dust, debris, grease or other materials that could impede a consistent application.

Panels can be cut using a variety of methods, including but not limited to handtools, CNC machinery, water jet and table saw. Panels should fit inside the interior of the duct with no gaps to ensure a good connection. Phenolic should be applied as detailed below, with some portions of the phenolic overlapping, with panel fasteners or our Airtruss ribs retaining the insulation in place without the use of glues, solvents or adhesives.

PRECUT SECTIONS OF PHENOLIC PANELS LAYOUT INTO THE METAL DUCT SYSTEM. IN THE EXAMPLE BELOW, THE FABRICATION STARTS WITH SIDES AND FINISH WITH THE TOP AND BOTTOM.



Phenolic panels on Side A of the ductwork will be retained in place by Side B panels. Utilizing our liner retention clips or Airtruss® system will retain side B into place. On larger sizes of ductwork, Side A phenolic panels may require retention clips as well to secure over a longer span.

THERMADUCT®'S LINER RETENTION CLIP FREQUENCY AND INSTALLATION METHODS

For smaller sized ductwork and lower pressure systems, Tuff-lock® liner retention clips may be used to secure phenolic panels to the metal ductwork by securing to the TDC or TDF flange. Max spacing for liner retention clips will depend on the duct dimensions and should not exceed 12" centers from duct corners.

- The Tuff-lock® panel fastener's teeth should be installed into the phenolic. Secure into place by folding the clip's end around the TDC or TDF flange.
- Use UL 181 approved tape to provide vapor barrier for retaining clips.
- Apply UL 181 approved tape to cover all exposed areas of phenolic and seal to TDF Flange.
- Seal internal seams between insulation with a continuous bead of Thermaduct supplied sealant.

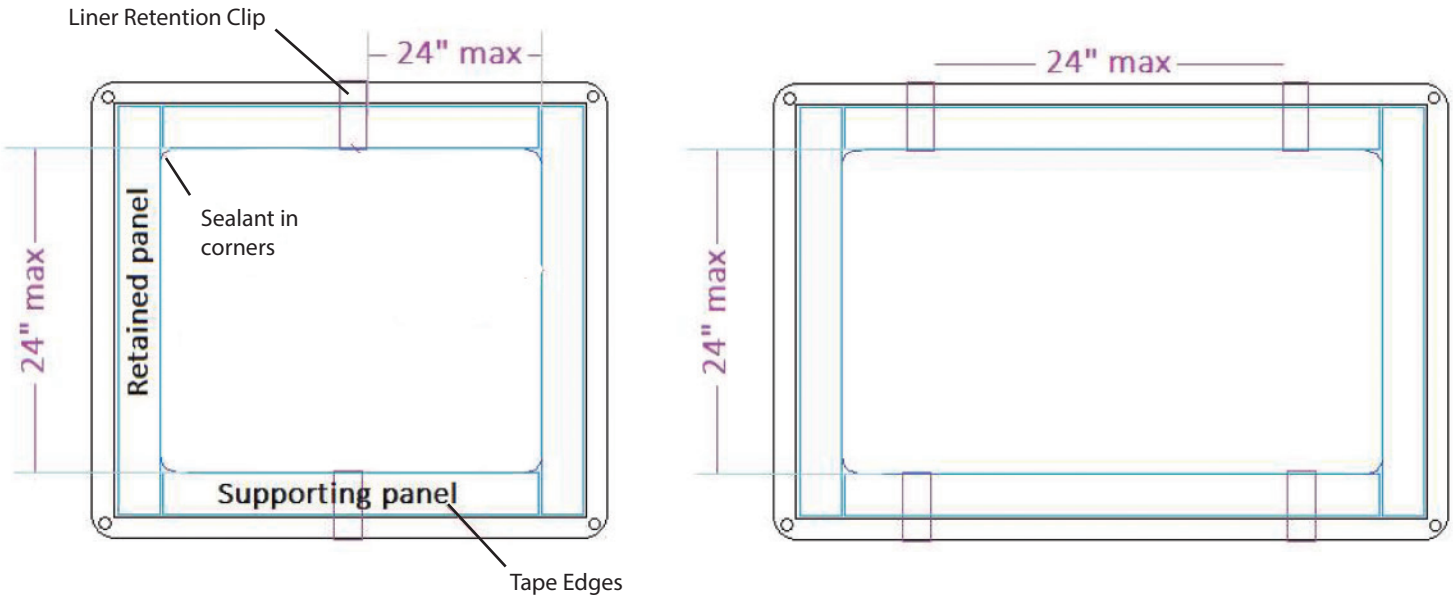
47.25" DUCT SECTIONS

SIDE W or H (inches)	# OF FASTENERS
4-24	1
25-42	2
43-60	3
61-78	4

Video instructions of these installation methods can be viewed by going to: https://vimeo.com/thermaduct/phenolic-liner

Larger ductwork that will require reinforcement will utilize Thermaduct®'s Airtruss® system to secure phenolic insulation across larger duct surfaces.

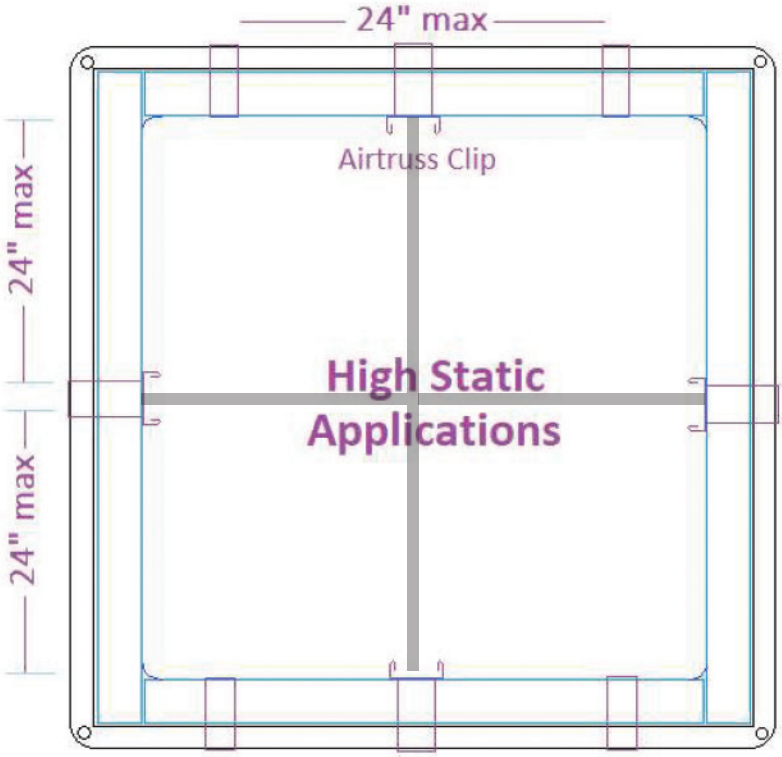
EXAMPLES OF TUFF-LOCK® LINER RETENTION APPLICATION

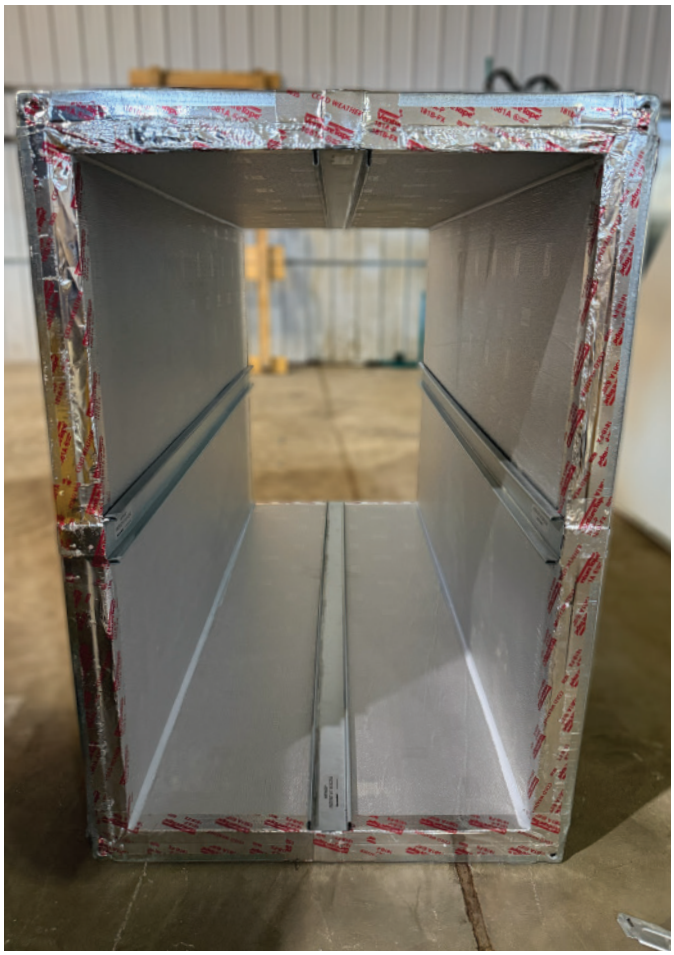


LARGE OR HIGH STATIC DUCT APPLICATION METHODS

Our Airtruss® reinforcement system will be utilized for larger duct sizes or high static pressures. These will be utilized with conduit by Thermaduct® standards to maintain the performance of the duct system for both static and dynamic loads experienced in operation.

Assembly and finishing methods should follow the same fabrication process, with sealant and UL approved tapes covering all exposed phenolic material.





OPERATING RECOMMENDATIONS

Limitations:

It is recommended that the application of Thermaduct® Architectural ductwork be utilized for operation as a supply, return, fresh air and exhaust air ductwork applications for heating, ventilation, and air conditioning applications.

Air Velocity (Max)	6000 fpm / 30.4 m/s
Design Pressure (Max)	10 inches water gauge positive* 8 inches water gauge negative*
Temperature	Internal; Continious -15 to +185 degrees F
Size	Any size*

* *Thermaduct® Architectural products utilize phenolic as the internal insulation layer; however, all duct sizing, pressure classifications, and reinforcement requirements are based on Thermaduct® standards to exceed standard SMACNA Duct Construction practices.*

Thermaduct® Architectural products employ phenolic panels which should not be used in the following applications:

- *Grease or Kitchen exhaust ductwork*
- *Air temperatures exceed 185 degrees Fahrenheit continuous*
- *Air velocity exceeds 6000 fpm continuous*
- *Static pressure may exceed 10" positive*
- *Rectangular Air static pressure exceeds 10" negative (Thermaduct®)*
- *Round Air static pressure exceeds 8" negative (Thermaround®)*
- *Indoor applications (See Below)*
- *Where you are conveying solids*
- *In application without maximum temperature control*
- *For chemical, fume or smoke exhaust (consult Thermaduct)*
- *Not for use as conduit for sprinker lines or conduit*

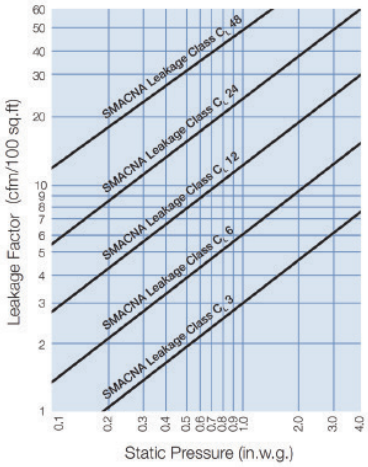
Fire and Smoke Performance:

Thermaduct Architectural products are engineered to comply with NFPA 90A and 90B standards, ensuring safety and performance in HVAC installations. Utilizing ASTM E84 compliant phenolic insulation and glueless Airtruss® installation methods, these systems meet the flame spread and smoke developed indices of ≤25 and ≤50, respectively, as required by ASTM E84 and UL 723. This compliance ensures that the materials contribute minimally to fire hazards and smoke production.

Thermaduct® ensures our phenolic panels are continiously testing for all fire and smoke performance requirements through third-party testing, providing confidence in code compliance.

Leakage Class:

Thermaduct® Architectural duct systems are engineered to maintain structural integrity under continuous positive static pressures up to 10 in. w.g. and negative pressures up to 8 in. w.g. When fabricated and assembled using the Thermaduct system methods, the duct is designed to perform below SMACNA Air-Leakage Class 3 thresholds, supporting tight envelope control in high-performance applications.



This chart is based on SMACNA HVAC Air Duct Leakage Test Manual, 1985 Edition found in Figure 4-1 under "Duct Leakage Classification".

For detailed joint construction guidance, refer to the Thermaduct® Architectural Installation Manual.

Frictional Properties:

Thermaduct® Architectural products are factory-fabricated air distribution systems constructed with a smooth aluminum interior surface that closely matches the frictional characteristics of galvanized sheet metal duct. As a result, standard friction loss data for galvanized ductwork, as published in ASHRAE (RP 1764) and SMACNA references, may be used when calculating pressure drop and sizing Thermaduct® systems.

Health & Safety:

Thermaduct® Architectural outdoor duct systems feature a rigid, non-fibrous insulation core that is odorless, non-particulating, chemically stable, and suitable for use in environments requiring clean, low-maintenance air distribution.

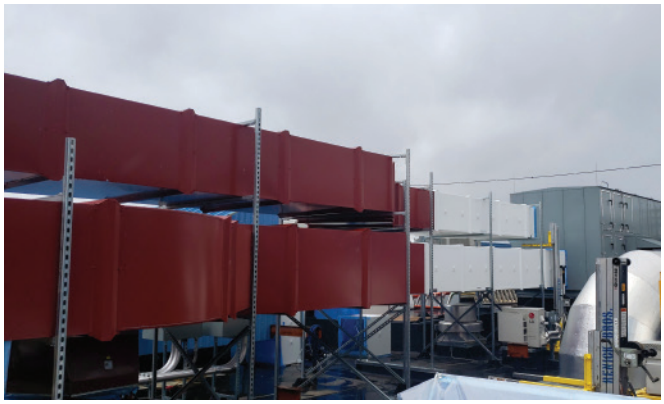
Code Compliance:

Thermaduct® Architectural Products meet or exceed all applicable energy performance requirements outlined in the International Mechanical Code (IMC), IECC, and ASHRAE 90.1 (2016 and later) for both supply and return air ductwork. These systems are designed to support energy code compliance in commercial and residential applications, providing a high-efficiency, pre-insulated solution that aligns with current mechanical and building standards

EXTERIOR FINISHES

Thermaduct® Architectural products offer a clean, finished appearance that complements the quality of your installation. Available with a Kynar-coated metal exterior in a wide range of color options, these systems give you the flexibility to match project aesthetics without compromising performance. For jobs that call for a specific material spec, ductwork can also be fabricated from paint grip galvanized, aluminum, or stainless steel to meet a variety of environmental and design requirements.

Refer to the below Thermaduct® Architectural color options to select the best finish for your application and leave a final product that looks as solid as it performs!



Metal Exterior Options:

- Kynar
- G90
- G60
- Paint-Grip
- Stainless

Kynar Color Options:

REGAL WHITE - STANDARD COLOR

SURREY BEIGE

SANDSTONE

ALMOND

BUCKSKIN

ASH GRAY

SLATE GRAY

CHARCOAL

MATTE BLACK

MEDIUM BRONZE

DARK BRONZE

PATINA GREEN

HEMLOCK GREEN

EVERGREEN

MANSARD BROWN

COLONIAL RED

ROMAN BLUE

PATRICIAN BRONZE

TERRA COTTA

BRITE RED

REGAL BLUE

BRANDYWINE

HARTFORD GREEN

* Duct Finishes of Kynar are covered under Thermduct's 10 Year Limited Warranty. ** Finish colors may vary from digital representations shown.
** Lead times may vary.