

SECTION 23 NON-FIBROUS, CLOSED CELL, PRE-INSULATED ROUND AND
FLAT OVAL DUCTWORK

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:

1. Thermaduct InspiralR round ducts and fittings by Thermaduct, LLC.

855-809-6903

2. Thermaduct Floval flat oval ducts and fittings by Thermaduct, LLC.

855-809-6903

B. This section does include:

1. Air passages rated over a continuous internal static pressure of 10" w.g.
positive, 8" negative documented on product labeling.

1.2 SUBMITTALS

A. Product data: For each type of product indicated.

B. Shop drawings: Fabrication, assembly, and installation, including plans,
elevations, sections, components, and attachments to other work including:

1. Duct layout indicating sizes and pressure classes.

2. Elevation of top of ducts.

3. Dimensions of main duct runs from building grid lines.

4. Fittings.

5. Penetrations through fire-rated and other partitions.

C. Coordination Drawings: Plans, drawn to scale, showing coordination general construction, building components, and other building services.

1.3 QUALITY ASSURANCE

A. Installer Qualifications:

1. InspiraIR and Floval can be installed by competent field mechanics who demonstrate competence in the HVAC industry and that have completed Thermaduct, LLC's online training course available at training.thermaduct.com. Installation practices must adhere to Thermaduct's Contractor Installation Manual that is current at the time of product installation.

1.4 SPECIFICATION COMPLIANCE

A. SMACNA leakage, Class 1 or less

B. UL (C-UL) 181 Standard for Safety Listed, Class 1 system, with included testing and passing the following;

1. Test for Surface Burning Characteristics
2. Flame Penetration Test
3. Burning Test
4. Mold Growth and Humidity Test
5. Low Temperature Test and High Temperature Test
6. Puncture Test
7. Static Load Test
8. Impact Test

9. Pressure Test and Collapse (negative pressure) Test

10. High Temperature and Humidity for 90 days

11. Cone Calorimeter

C. ASTM E2257 Standard Test Method for Room Fire Test of Wall and Ceiling Materials and Assemblies

D. ASTM E 84 tested, Tunnel Test, Does not exceed 25 flame spread, 50 smoke developed

E. DW144, Class B

F. NRTL product approval, (Subpart S of 29 CFR Part 1910, OSHA)

G. ASTM C 423 noise reduction

H. ASTM E 96/E 96M Procedure A for permeability

I. ASTM C 1071 for erosion

J. ASTM C 518: 2004, Standard Test Method for Steady–State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

K. UL 723, Test for Surface Burning Characteristics of Building Materials

L. NFPA Compliance:

1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."

2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

3. NFPA 255, "Standard Method of Test of Surface Burning Characteristics of Building Materials"

1.5 PRODUCT DELIVERY AND STORAGE

A. Prevent objectionable aesthetic damage to the outer surface of duct segments during transport and storage.

B. Store duct segments under cover and protect from environment.

PART 2 – PRODUCTS

2.1 THERMADUCT INSPIRALR & FLOVAL - DUCT AND FITTINGS

A. Product:

1. Thermaduct InspiralR and Floval – Pre-Insulated Round Duct Systems by Thermaduct, LLC. 855-809-6903.

B. The panel shall be manufactured of CFC-free >90% closed cell rigid thermoset resin thermally bonded on both sides to a factory applied .001" (25 micron) aluminum foil facing reinforced with a fiberglass scrim.

C. The thermal conductivity shall be no greater than $0.146 \text{ BTU} \cdot \text{in}/\text{Hr} \cdot \text{ft}^2 \cdot ^\circ\text{F}$ ($.021 \text{ W}/\text{m} \cdot ^\circ\text{C}$)

D. The density of the phenolic foam shall not be less than 3.5 pcf (56 Kg/m³) with a minimum compressive strength of 29 psi (200 kPa).

E. The standard panel is 7/8" (22 mm) thick with an R-6.0 (1.2 RSI).

1. Maximum Temperature: Continuous rating of 185 deg F (70 deg C) inside ducts or ambient temperature surrounding ducts.
2. Maximum Thermal Conductivity: $0.146 \text{ Btu} \cdot \text{in.}/\text{h} \cdot \text{sq. ft.} \cdot \text{deg F}$ at 75 deg F mean temperature.
3. Permeability: 0.02 perms maximum when tested according to ASTM E 96/E 96M, Procedure A.
4. Antimicrobial performance: System shall be UL 181 listed and have passed the UL Mold Growth Test.

5. Noise-Reduction Coefficient: 0.05 minimum when tested according to ASTM C 423, Mounting A.
6. Required Markings: UL label and other markings required by UL 181 on each full sheet of duct panel; UL ratings for closure materials.
7. All insulation materials shall be closed cell with a closed cell content of >90%.
8. R-value:
 - a. 7/8 inch (22 mm) thick panel: R6.0

F. Closure Materials:

1. Adhesive: Silicone (at seams only).
2. Pressure-Sensitive Tape: Comply with UL 181A; imprinted by the manufacturer with the coding "181A-P," the manufacturer's name, and a date code.
 - a. Tape: Aluminum foil tape imprinted with listing information.
 - b. Minimum Tape Width: 2 7/8" inches (75 mm).
 - c. Water resistant.
 - d. Mold and mildew resistant.
3. Polymeric Sealing System:
 - a. Structural Membrane: Aluminum scrim with woven glass fiber.
 - b. Minimum Tape Width: 2 7/8" inches (75 mm)
 - c. Sealant: Low VOC.
 - d. Water resistant.
 - e. Mold and mildew resistant.

4. Duct Connectors:

a. Flanged Connections

G. Indoor Cladding

1. Aluminum Clad Ductwork for Indoor Installations: Duct segments shall incorporate 0.025" (.6 mm) Minimum thickness aluminum sheet which is introduced during the fabrication process with an autohesively bonded (no glue) process.

H. Weight

1. InspiralR and Floval shall provide low weight stresses on the building framing and support members. The maximum weight for R-6 ductwork is 1.0 lbs. per square foot with couplings and drawbands included. Hangers are to be field provided per the manufacturer's installation guidelines but not exceeding 13' between hangers and designed to carry the weight of the ductwork.

PART 3 – EXECUTION

3.1 Shop Fabrication

A. Factory Certification:

1. Ducts shall be manufactured in accordance with the Therma duct InspiralR and Floval manufacturing guidelines.

B. Fabrication:

1. Fabricate joints, seams, transitions, reinforcement, elbows, branch connections, access doors and panels, and damage repairs according to manufacturer's written instructions.
2. Prefabricated 90-degree gored elbows.
3. Prefabricated duct segments in accordance with manufacturer's written design guide.
4. Tape external and internal seams. Install and seal coupling in accordance with manufacturer's design guide. Duct reinforcement will be added (when required) to protect against side deformation from both positive and negative pressure per manufacturer's guidelines based on ductwork size and system pressure prescribed by the design engineer.
5. Both positive and negative ductwork and fittings shall be constructed to be UL Listed as a Class 1 air duct to Standard for Safety UL 181.

3.2 DUCT INSTALLATION

A. Install ducts and fittings to comply with manufacturer's written system design guide and as follows:

1. Install ducts with fewest possible joints.
2. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

3. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
4. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges. Overlap openings on four sides by at least 1-1/2 inches (38 mm).
5. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.
6. Protect duct interiors from the moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

C. Air Leakage: Duct air leakage rates to be in compliance with "SMACNA Phenolic Duct Construction Standards" latest version per applicable leakage class based on pressure.

3.3 HANGER AND SUPPORT INSTALLATION

- A. Contractor to ensure that the ductwork system is properly and adequately supported.
 1. Ensure that the chosen method is compatible with the specific ductwork system per InspiralR and Floval design guide.

2. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used

B. Supports on straight runs of ductwork shall be positioned at centers not exceeding 12 feet for duct sections when fabricated in 94.5” to 154.75” lengths with duct ID circumference less than 12”, 8 feet for duct sections when fabricated in 47 ¾” lengths with duct ID circumference less than 36”. Larger duct sizes and short segments with duct circumference greater than 36” are to be supported at 6-foot centers or less, in accordance with the Thermaduct Contractor Installation Manual details provided prior to work commencement.

C. Ductwork shall be supported at changes of direction, at branch duct connections, tee fittings, and all duct accessories such as dampers, etc.

D. The load of such accessories to the ductwork shall be neutralized by the accessory support independent of the duct itself.

3.4 FIELD QUALITY CONTROL

A. Inspection: Contractor will provide Thermaduct, LLC fully completed post installation forms with jobsite photos to review e-mailed to warranty@thermaduct.com.

1. Remove and replace duct system where initial post installation submission indicate that it does not comply with specified requirements.

B. Perform additional testing, at Installing Contractor's expense, to determine compliance with specified requirements.