

****NOTE TO SPECIFIER****

This section is based on the products and services of AQC Industries, which is located at:
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Abstract: This document is an engineering specification template for the Q-Duct Pre-Insulated Outdoor Duct System. The purpose of this document is to provide a starting point from which an engineer will develop his/her own specification. This engineering specification is written as a generic template and information will need to be removed or added by the specifying engineer depending upon the project application. Additionally, there are product specifications that are (Optional) and they are shown in red. Please make sure to remove unrequired product specifications from this document when finalizing your specification.

****NOTE TO SPECIFIER**** Delete any sections below not relevant to this project, add other where required. ******

PART 1 GENERAL**1.1 SECTION INCLUDES**

- A. Pre-Insulated Outdoor HVAC ductwork system.

1.2 RELATED SECTIONS

- A. Section 23 05 00- Common Work Results for HVAC

1.3 REFERENCES

- A. ASTM International (ASTM)
 - 1. ASTM C518- Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 2. ASTM E84- Standard Test Method for the Surface Burning Characteristics of Building Materials.
- B. American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)
 - 1. ASHRAE Design Fundamentals Handbook.
 - 2. ASHRAE 90.1- Energy Standard for Buildings Except for Low-Rise Residential Buildings.
- C. National Fire Protection Agency (NFPA)
 - 1. NFPA 90A- Standard for the Installation of Air-Conditioning and Ventilating Systems.
 - 2. NFPA 90B- Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.
- D. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
 - 1. SMACNA HVAC Air Duct Leakage Test Manual.
 - 2. SMACNA Phenolic Duct Construction Standards.
 - 3. SMACNA HVAC Duct System Design Manual.
- E. Underwriters Laboratories (UL)
 - 1. UL 181- Standards for Factory Made Air Ducts and Air Connectors.
 - 2. UL 723- Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 – Administrative Requirements
- B. Product Documentation: Manufacturer’s documentation on each product to be used, including:
 - 1. Technical Data Sheets.
 - 2. Material Safety Data Sheets.
 - 3. Installation and Maintenance Manual.
- C. Shop Drawings & Production Submittal: CAD drawings and production release documentation to including the following.
 - 1. Plan & Elevation views: Scaled and annotated with duct sizes, lengths, and elevations dimensions.
 - 2. Isometric Views: 3D layout drawing of system with item numbering for part identification.
 - 3. Item Shop Drawing: Shop drawings for each duct item, displaying plan, elevation and isometric views. Detailed duct information including dimensions, connector type, seam type, duct specification, and accessories.
 - 4. Item summary: line item list indicating part numbers, duct types, specifications, and duct size.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Contractor to source primary materials from a single manufacturer.
- B. Installer Qualifications: Contractor to receive webinar installation training or onsite installation training as provided by manufacturer.

1.6 PRE-INSTALLATION MEETINGS

- A. Convene with the manufacturer’s authorized technical representative, general contractor, and related trades minimum of 2 weeks prior to starting execution of this section to discuss timeline, project conditions, and manufacturer’s installation procedures.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer’s original packaging until ready for installation.
- B. Follow manufacturers procedures for proper storage and handling upon delivery.
- C. Duct Products shall be shipped with open ends covered to protect interior from dust, debris, & moisture.

1.8 PROJECT CONDITIONS

- A. Ensure environmental conditions (temperature, humidity, ventilation) during installation are within limits recommended by the manufacturer.
- B. Do not install products under environmental conditions outside of manufacturer’s recommendations.

1.9 SEQUENCING

- A. Ensure that products of this section are supplied to trades in time to prevent interruption of construction process.
- B. Verify production lead times with product manufacturer prior to scheduling installation of this section.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design

1. QDuct by AQC Industries; 2920 Centre Pointe Dr, Roseville, MN 55113; Tel: (651)-209-0050; Email: team@aqcind.com; Web: www.aqcind.com

2.2 PRE-INSULATED OUTDOOR HVAC DUCTWORK SYSTEM

A. Pre-Insulated Outdoor HVAC Ductwork system:

1. Q-Duct System by AQC Industries

- a Q-Duct System for supply, return, and hvac exhaust air ductwork as shown on layout drawings.
- b System shall include pre-insulated panels, insulation, sealants, coupling systems, and accessories to meet the following performance criteria.

2. Materials

a Ductwork

- Pre-Insulated Duct Panels: UL 181 listed rigid thermoset phenolic duct panel
 - Minimum internal facing: 2.3 mil (60 micron) embossed aluminum
 - Minimum external facing: 7.9 mil (200 micron) embossed aluminum
 - Nominal Density: 4.05 lbs/ft³ (60 kg/m³)
 - *Closed Cell Content: Minimum 90%
 - *Compressive Strength: Minimum 29 psi (200 kPa) at 10% compression
 - Cladding: UL 181 listed multi-layered aluminum laminate cladding
 - Minimum cladding thickness 19.7 (500 micron) mil
 - Tape: UL 181 listed foil mastic sealant tape
- ###### b Metal Accessories
- Corrosion Resistant Construction
 - Turning vanes, reinforcement, support mounts, and connector material to be fabricated from corrosion resistant galvanized steel.
 - ***Non-Ferrous Construction***
 - ***Turning vanes, reinforcement, support mounts, and connector material to be fabricated from non-ferrous aluminum alloy.***

3. Air Leakage

a Duct shall achieve a SMACNA Air Leakage Class 1

- Design Pressure @ 1" WG = 1 cfm/100 sqft
- Design Pressure @ 2" WG= 1.6 cfm/100 sqft
- Design Pressure @ 3" WG= 2.1 cfm/100 sqft
- Design Pressure @ 4" WG= 2.5 cfm/100 sqft
- ***Design Pressure @ 5" WG= 2.9 cfm/100 sqft***
- ***Design Pressure @ 6" WG= 3.2 cfm/100 sqft***
- ***Design Pressure @ 7" WG= 3.6 cfm/100 sqft***

4. Air Velocity

a Maximum 6890 fpm (35 m/s)

5. Design Pressure Reinforcement Specification

a Duct shall be reinforced to meet the 4" WG Pressure Class

- Maximum Positive 4" WG (1000 Pa)
- Maximum Negative 4" WG (1000 Pa)

1. 90-degree rectangular elbows shall include turning vanes per SMACNA Phenolic Duct Construction Standards.
2. Duct reinforcement shall meet or exceed SMACNA Phenolic Duct Construction Standards.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until roof substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify the Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Ensure interior & exterior surfaces of product are clean of dirt, debris and moisture prior to installation.
- B. Ensure work site is clear of obstructions to allow for safe handling of material during installation process.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instruction manual.
- B. Installing contractor is responsible for properly supporting duct system in accordance with manufacturer's instructions. Support and install materials are to be checked for compatibility with duct system.
- C. Join and seal sections in accordance with manufacturer's specifications.
- D. Refer to manufacturer's instructions for field modifications of duct system.
- E. Ensure products are properly protected until completion of project.
- F. Touch-up, repair or replace damaged products before substantial completion of installation.

3.4 FIELD QUALITY CONTROL

- A. Commissioning: Testing and verification of operational performance at intended pressure and temperature ranges. Commission test pressure is not to exceed design pressure.
- B. Air Leakage Testing: Test in accordance with SMACNA HVAC Air Duct Leakage Test Manual on at least 10% of the total installed duct area. Ensure duct system achieves SMACNA Air leakage Class 1.