

# OUTDOOR DUCT SYSTEM SPECIFICATION

## 1.1 SUMMARY

- A. When pressure / leakage testing is known to be necessary, the ductwork system shall be designed to the testing pressure.
- B. The contractor shall include for the manufacture, fabrication, supply, delivery and installation of materials necessary for the ductwork systems described in this specification.
- C. All materials and finishes shall be free from defects and maintained in good condition throughout the duration of the works.
- D. The materials used in the fabrication of Q Duct™ ductwork shall be from the Pal Phenolic Duct System and shall be suitable for continuous use throughout the range of operating temperatures and within the environment indicated.
- E. The fabrication and installation of the Q Duct ductwork system shall be carried out by certified fabricators and installers that have successfully completed specialist training courses provided by AQC, Industries.

## 1.2 SYSTEM DESCRIPTION

Q Duct is a double layered, double wall, pre-insulated, weatherproof outdoor duct system designed for exterior application. Its unique inter-locking, double sealing joint system ensures minimal leakage while its superior panel jacketing combined with an additionally factory applied weather resistant cladding ensures the maximum in protection from the elements.

Q Duct is suitable for use in the following exterior applications: exterior supply, return, fresh air and general exhaust ductwork.

## 1.3 SUBMITTALS

- A. Shop Drawings: CAD-generated showing fabrication and installation details for all ducts to include.
  - 1. Isometric view of duct assembly with duct sections indicated on drawing to match part number tagging on delivered duct sections.
  - 2. Fabrication and assembly instructions.
  - 3. Details for connecting to other components (i.e. curbs, rooftop units, mechanical room walls, etc.)
  - 4. Duct layout indicating sizes and pressure classes.
  - 5. Elevations of top and bottom of ducts.
  - 6. Dimensions of main duct runs from building grid lines.
  - 7. Reinforcement and spacing.
  - 8. Seam and joint construction.
  - 9. Equipment installation based on equipment being used on Project.

10. Duct accessories, including access doors and panels.

B. Field quality-control test reports.

#### 1.4 STANDARDS/REFERNCES

A. American Standards: ASTM C 518 2004

B. Standard Test Methods for Water Vapor Transmission of Materials: ASTM E 84-08a

C. Standard Test Method for Surface Burning Characteristics of Building Materials: UL 723

D. Test for Surface Burning Characteristics of Building Materials: NFPA 90A

E. Standard for the Installation of Air Conditioning and Ventilating Systems: NFPA 90B

F. Standard for the Installation of Warm Air Heating and Air-Conditioning Systems: UL/ULC 181

G. SMACNA HVAC Phenolic Duct Construction Standards

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. AQC Industries, 4600 Churchill St, Shoreview MN 55126, 877-783-1520

### 2.2 OUTDOOR, PRE-INSULATED DUCT SYSTEM

A. Q Duct Exterior Ductwork is to be a double layered duct system using the Pal Phenolic Duct panels pre-fabricated and assembled into inter-locking sections, otherwise known as Q Duct supplied by AQC Industries. Q Duct is available in **(specifiers selection)**:

1. 2.5" thick: R-12

2. 2.0" thick: R-10

B. The panels used in the fabrication of the Q Duct ductwork system shall Pal Phenolic Duct rigid Phenolic insulation panels with a thermal conductivity of 0.1977 BTU-in/hr•ft<sup>2</sup> °F and a minimum compressive strength of 29 psi, as manufactured by Pal International.

C. Pal Phenolic Duct rigid Phenolic insulation panels shall comprise a 3.4–3.75 pcf nominal density CFC/HCFC-free rigid Phenolic insulation core with zero Ozone Depletion Potential (ODP), autohesively bonded on both sides: 60 micron aluminum internal liner and a 200 micron aluminum external liner. Both liners are to be solid aluminum with no perforations.

- D. All other components required for the fabrication of the Q Duct system shall be from the Pal Phenolic Duct System guidelines including the sealant, contact adhesive, aluminum tape, self-adhesive gasket, ductwork reinforcements, closures, connectors and flanges or alternate as approved / supplied by AQC Industries.
- E. Exterior cladding shall be 5 ply, puncture resistant, tear resistant, flexible, and meet UL1709.

### 2.3 FIRE AND SMOKE PERFORMANCE

- A. The rigid Phenolic insulation panels used in the fabrication of the Q Duct system shall be from the Pal Phenolic Duct System and shall achieve the following fire and smoke performance requirements:
  - 1. ASTM E 84—low contribution to fire growth not exceeding 25 Flame Spread and 50 Smoke Developed indices;
  - 2. UL 723 —low contribution to fire growth not exceeding 25 Flame Spread and 50 Smoke Developed indices; and
  - 3. UL 181 – UL/ULC classification as a Class 1 Air Duct to NFPA Standards 90A & 90B.

### 2.4 SEALANT MATERIALS

- A. All internal seams must be fully sealed with an unbroken layer of Pal Phenolic sealant.
- B. Each ductwork section must be duly connected with an inter-locking, double sealed jointing system as supplied by AQC Industries. Sufficient sealant should be applied to each layer in order to seal the rigid Phenolic insulation panels and ensure minimum air leakage.
- C. Ductwork reinforcement, if necessary, shall be applied to protect against side deformation from both positive and negative pressure.
- D. All external seams where two separate panels join must be tiger clipped, taped and jacketed in watershed fashion whenever possible to achieve a permanent bond with weather protection and a smooth appearance.

## PART 3 - EXECUTION

### 3.1 Installation of Ductwork

- A. Installation of the Q Duct ducting system to be in strict accordance with AQC Industries Installation Guide Lines.
- B. All Q Duct ductwork shall be fabricated in accordance with methods as approved for Q Duct by AQC Industries.

### 3.2 Air Leakage

- A. Ductwork system air leakage shall be in accordance with the requirements of the relevant jurisdiction. (Consult the DOE (US Department of Energy) ComCheck / ResCheck or the relevant authority for applicable codes / standards).

### 3.3 SUPPORT

- A. It shall be the responsibility of the installer to ensure that the ductwork system is properly and adequately supported. A number of support systems are approved for use by AQC Industries. It shall be the responsibility of the installer to ensure that the chosen method of support is compatible with ductwork fabricated from the Pal Phenolic Duct System and AQC Industries.
- B. Supports on straight runs of the Q Duct ductwork System shall be positioned at center's not exceeding 10 ft for ductwork sections fabricated in 10 ft lengths, and 13 ft for ductwork sections fabricated in 13 ft lengths.
- C. Additionally, ductwork shall be supported at changes of direction, at branch duct connections, tee fittings and etc.
- D. All ductwork accessories such as dampers shall be independently supported.

### 3.4 HANGERS AND SUPPORTS

- A. Hanger Materials: SMACNA Approved duct supports shall be utilized in accordance with SMACNA Standards for Phenolic Duct.
- B. Penetration into the Q Duct system duct is not permitted.
- C. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.
- D. Exterior Duct Supports:
  1. To meet all SMACNA and ASHRA requirements.
  2. Supports to be installed on the outside finished Q Duct System
  3. Supports to be manufactured by PHP System/Design, Miro or Approved Equal.

### 3.5 STORAGE AND HANDLING

- A. Care shall be exercised in the handling and transportation of Q Duct ductwork sections in order to prevent physical damage.
- B. All Q Duct ductwork sections shall be stored under cover, clear of the ground or roof and protected from the weather and sunlight by an opaque and light colored waterproof material. In cases where the ductwork sections are to be stored for prolonged periods, the open ends of the ductwork sections shall be sealed with a polythene sheet or other suitable material to prevent the ingress of foreign matter.