



GUIDE SPECIFICATION

Underground HDPE Ductwork System

DOCID#: BDGS09012026

The BlueDuct® – Engineered Underground Duct Solutions
AQC Industries, LLC – Blaine, MN

CSI Master Format Section [23 32 16] – Underground HDPE Air Duct
(Confirm section number against project Division 23/32 numbering convention)

TWO MANUFACTURER-LANGUAGE OPTIONS – SELECT ONE (Article 2.1)

OPTION A – Closed (sole-source) specification

OPTION B – Performance-based specification (public / competitive bid)

*Technical values in this document are drawn from AQC Industries' current published Full Specification.
Text shown in red italics indicates items to be confirmed or selected by the specifier prior to issuance.*

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes: Underground HDPE air ducts and associated fittings, sealants, gaskets, and accessories for buried HVAC air distribution.

1.3 REFERENCES

- A. ASTM D2412 – External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- B. ASTM E84 / UL 723 – Surface Burning Characteristics of Building Materials.
- C. UL 181B – Closure Systems for Use with Flexible Air Ducts and Air Connectors (mold/mildew resistance reference).
- D. BSS 7239-88 – Determination of Toxic Products of Combustion (radon-gas resistance reference as cited by manufacturer).
- E. NSF Protocol P374 – Thermal Performance of Insulated Duct Systems (integral R-value verification).
- F. SMACNA HVAC Air Duct Leakage Test Manual.
- G. ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality.
- H. International Mechanical Code (IMC) / *[State / Local Mechanical Code]*, current adopted edition, including provisions governing underground duct systems.

1.4 ACTION SUBMITTALS

- A. Provide Product Data: For each type of the following products, furnished specialties and accessories.
 - 1. Underground ducts
 - 2. Sealants and gaskets
- B. Shop Drawings: For underground ducts. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Burial and supports, including methods for duct burial and internal and external bracing if recommended by the manufacturer.

1.5 CLOSEOUT SUBMITTALS

- A. Installation and Maintenance Data: For underground ducts include installation and maintenance manuals.

1. Site conditions, excavation and preparation
2. Instructions for joining ducts
3. Instructions for proper backfilling and precautions.
4. Leak testing procedure

1.6 QUALITY ASSURANCE

- A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - “Systems and Equipment” and Section 7 - “Construction and System Start-Up.”
- B. Installer Qualifications: Installer must attend manufacturer’s installation guidelines training webinar prior to ductwork install.
- C. Single-Source Responsibility: Obtain the complete underground duct system, including all fittings, sealants, and gaskets, from a single manufacturer.

1.7 WARRANTY

- A. Provide manufacturer’s 10-year Limited Warranty against material and manufacturing defects

PART 2 - PRODUCTS – UNDERGROUND DUCTWORK

2.1 ACCEPTABLE MANUFACTURERS:

[OPTION A – CLOSED SPECIFICATION (Sole Source)]

- A. The BlueDuct® by AQC Industries, Blaine, MN 55014, (877-783-1520). www.aqcind.com and e-mail: team@aqcind.com. No substitutions.

[OPTION B – PERFORMANCE-BASED SPECIFICATION (Public / Competitive Bid)]

- A. Basis of Design: The BlueDuct® by AQC Industries, LLC, Blaine, MN
- B. Acceptable products shall be a purpose-engineered underground HDPE air duct system meeting all material, construction, joint, and performance requirements of Articles 2.2 through 2.5, including integral R-10 equivalent thermal insulation verified by an NSF P374 Thermal Testing Report and leakage performance tested by a licensed third-party professional using recognized test methodology and equipment such as SMACNA's dynamic testing methodology using DuctBlaster® equipment.
- C. Substitution Requests: Where the Contract Documents permit substitution, the proposing manufacturer shall submit, no later than ten (10) days prior to bid, independent third-party test data demonstrating compliance with every requirement of Articles 2.3, 2.4, and 2.5 — including the NSF P374 thermal verification and the leakage performance criterion. Submittals lacking independent verification of the thermal R-value and leakage performance will be rejected.

2.2 UNDERGROUND DUCT SYSTEM - GENERAL

- A. Complete duct system (including inlet plenums, round duct, run-outs, diffuser boots, etc.) must be from one manufacturer and be of the same material, construction and connection method throughout. Field made duct components are NOT acceptable.
- B. Provide elbows, ducts, diffuser boxes, plenums, clamp and gaskets, boots, saddle registers and caulk as required by drawings for underground installation.
- C. Unless otherwise noted, all duct and fittings shall be designed for use in systems with a maximum rated positive pressure equivalent to 10-inch water column and a maximum rated negative pressure of 2-inch water column in accordance with Section 603.3 of the IMC.

2.3 MATERIALS AND CONSTRUCTION

- A. Ductwork shall be fabricated from closed-cell plastic material that is recyclable, does not emit volatile organic compounds. Ductwork shall have been tested by licensed third party per ASTM-D2412.
- B. Ductwork shall be resistant to mildew, mold (per UL 181B), and radon gas (per BSS 7239-88). Ductwork shall not rust and will resist cracking under external stress or strain.

- C. Ductwork shall have integral R-10 equivalent thermal insulation value, without the use of external insulation, per NSF's P374 Protocol and verified by a NSF Thermal Testing Report.

2.4 JOINTS AND SEALING

- A. All joints shall be sealed via manufacturer provided clamps and gaskets or bolts and sealant.
- B. Clamps and gaskets shall be used on ductwork without flanges. Clamps shall be polyethylene with stainless steel plates and manufacturer provided stainless-steel screws. Gaskets shall comprise of ¼" thick butyl rubber sealant tape that is water and UV resistant. Gaskets shall comply with ASTM-E84 for flame and smoke spread.
- C. Flanged joints and duct branches shall use a co-polymer adhesive caulking sealant that is water and UV resistant. Flanges shall be connected with manufacturer provided stainless steel hardware.

2.5 PERFORMAMNCE AND ACCEPTABILITY

- A. Assembled ductwork shall be able to maintain pressure with no leakage.
- B. Fiberglass style (FRP) ductwork or PVC coated galvanized steel ductwork shall NOT be acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Follow provided manufacturer's installation instructions.
- B. Installer must attend manufacturer's installation guidelines training webinar prior to ductwork install.
- C. If it is anticipated that the duct can be exposed to groundwater or site water runoff, the project civil engineer should be consulted to ensure the duct is not exposed to hydrostatic pressure. The addition of drainage tile, sumps and pumping systems may be required.
- D. Excavate ductwork trench per project requirements. No bedding is required except for cases of bedrock or clay where sand or light aggregate may be used.
- E. Backfill material is recommended to consist of pea gravel, dry silica sand, crush rock 3/4" or less (if tumbled) or engineered fill.
- F. If loads larger than general foot traffic is anticipated to cross the duct, project structural engineer should be consulted to address need for slurry cap and/or flowable fill in lieu of recommended backfill. If flowable fill is required, consult manufacturer for recommended guidelines.
- G. The manufacturer provided sealant and gasket must be used as directed.

3.2 FIELD QUALITY CONTROL - TESTING

- A. The complete underground duct system shall be tested for leakage after final assembly before trench backfill. The system shall be tested a second time after backfilling.
- B. Duct system shall be leak tested by a licensed third-party professional using recognized test methodology and equipment such as SMACNA's dynamic testing methodology using DuctBlaster equipment.
- C. Allow 24 hours for ductwork sealant to cure after final assembly before testing the duct system. Additional curing time may be required in extreme ambient temperature conditions.

3.3 CLEANING

- A. Remove dust and debris from ductwork prior to occupancy.