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ICC-ES Report

PMG-1023

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EVALUATION SUBJECT:

AKDUCT® AND AKDUCT® PRIMIER

DIVISION:

23 00 00—HEATING, VENTILATION AND AIR CONDITIONING
(HVAC)

SECTION:

23 31 00—HVAC DUCTS AND CASINGS

Report Holder:

AQC INDUSTRIES LLC

4600 CHURCHILL STREET
SHOREVIEW, MN 55126



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ICC-ES PMG Listing

PMG-1023



Effective Date: October 2016

This listing is subject to re-examination in one year.

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CSI: DIVISION: 23 00 00—HEATING, VENTILATION AND AIR CONDITIONING (HVAC)
Section: 23 31 00—HVAC Ducts and Casings

Product certification system:

The ICC-ES product certification system includes testing samples taken from the market or supplier's stock, or a combination of both, to verify compliance with applicable codes and standards. The system also involves factory inspections, and assessment and surveillance of the supplier's quality system.

Product: AKDUCT® and AKDUCT® Premier

Listee: AQC Industries LLC
4600 Churchill St.
Shoreview, Minnesota 55126
www.blueduct.com

Compliance with the following codes:

2015, 2012 and 2009 *International Mechanical Code*® (IMC)
2015, 2012 and 2009 *International Residential Code*® (IRC)
2015, 2012 and 2009 *Uniform Mechanical Code*® (UMC)*
2016, 2013, 2010 and 2007 *California Mechanical Code*® (CMC)

* *Uniform Mechanical Code* is a copyrighted publication of the International Association of Plumbing and Mechanical Officials.

Compliance with the following standards:

ASTM D 2412-2011, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
ICC-ES LC1014, PMG Listing Criteria for Underground Plastic Air Ducts (Appv. June 2008, Rev. March 2014)
NSF Protocol P374-2010, Air Duct Thermal Efficiency Performance
UL 723, Test for Surface Burning Characteristics of Building Materials (Ed. 10)

Identification:

The AQC Industries AKDUCT® and AKDUCT® Premier duct and fittings described in this listing are identified by a stamp bearing the manufacturer's name (AQC Industries LLC) and/or trademark, the product name, model number and the ICC-ES PMG listing mark. The ICC-ES PMG listing mark must be placed on the listed product's packaging or installation instructions.

Installation:

Installation of AKDUCT® and AKDUCT® Premier duct and fittings must comply with the manufacturer's published installation instructions and the applicable codes.

Residential Sealing Method: Two sections of pipe (or pipe and fitting) are placed end to end. The adhesive backing is peeled off a gasket and the gasket is wrapped around the duct. The gasket should overlap approximately $\frac{1}{4}$ inch (6 mm). A clamp is placed around the gasket, with the clamp and gasket lined up. Tighten the clamp to 25" to 30" pounds then set screw gun/drill to match. Clamp ends do not have to meet each other to be airtight.

When installing, the clamp and gasket temperatures must be between 32° and 120° Fahrenheit. When above 90° Fahrenheit, use 6- $\frac{3}{4}$ " x $\frac{1}{4}$ " self-tapping sheet metal screws on each side of the clamp to stop slippage from heat.

Commercial Sealing Method: Two beads of AKDUCT AIRTITE sealant is applied to each flanged end and around the bolt holes. Two sections of pipe (or pipe and fitting) are placed end to end. The bolts, nuts and washer are installed through the predrilled template holes. Torque setting when ratcheting bolts must be set between 25 to 30 lbs. Bolts are tightened until they are flush. Sealant is used to cover both ends of each nut and bolt.

Underground Systems: After the excavation has been made, no special bedding needs to be used for AKDUCT®. It can be a direct burial with onsite compaction fill, sand, pea gravel, light aggregate or material taken from the trench if equivalent. Spread the backfill material evenly around the duct making sure there are no gaps. Plate tamping equipment is the recommended practice. No cement is needed to fill in around the duct, since the tamped fill holds the duct in place. AKDUCT® is resistant to any minerals or salt that may be in the backfilled soil. AKDUCT® should not "float" when backfilled to within 2" to the top of the duct. Your concrete slab is then poured so that all "tie-down" work is eliminated. In case of open site construction and possible rain storm it is recommended to flood the system with water to half of the depth of the pipe. After concrete is poured, sump the water and wipe with clean rag.

When backfilling or grading, care should be taken to not push heavy loads directly on the duct, nor should heavy equipment be allowed to run over the duct. The loading of the duct from wet concrete and/or soil above the duct must be limited so as not to produce deflections greater than 15 percent of the original duct diameter (see Table 1).

Models:

The AQC Industries AKDUCT® duct and fittings are an underground air duct and fitting system for use in forced-air heating and cooling systems in accordance with Section 603.8 of the IMC, Section M1601.1.2 of the IRC, or Section 602.0 of both the CMC and the UMC, as applicable. See Table 2, below.

The AQC Industries AKDUCT® Premier duct and fittings are an above ground air duct and fitting system for use in forced-air heating and cooling systems in accordance with IRC Section M1601.1.1. See Table 2, below.

The AQC Industries AKDUCT® and AKDUCT® Premier duct and fittings are 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.

Flood Plain Elevation: Product was tested to withstand 8 feet water column pressure for 7 days with no leakage. Product may be installed right on the sub-grade of excavation without any further sub material being required except when it is bedrock then a sub soil such as sand or construction grade fill or pea gravel may be used under the duct.

Surface Burning Characteristics: AKDUCT® Premier has a flame spread index of 200 or less when tested in accordance with UL 723 (ASTM E 84).

Thermal Distribution Efficiency (TDE): When tested to NSF Protocol P374, the AKDUCT® and AKDUCT® Premier air duct, in 10 inches in diameter and greater, exhibited equivalent TDE to a coiled steel reference duct surrounded on all sides with R-10 rated insulation.

Conditions of Listing:

1. Designs using AKDUCT® duct and fittings must be limited to systems with a maximum air temperature of 150°F (66°C) at the discharge of the unit entering the duct system. Sizing must be in accordance with Section 603.2 of the IMC, Section M1601.1 of the IRC, or Section 601.2 of both the CMC and the UMC.

2. AKDUCT[®] duct and fittings can be installed underground or embedded within concrete slabs.
3. AKDUCT[®] Premier duct and fittings can be installed as part of an aboveground duct system in accordance with IRC Section M1601.1.1.
4. The design of concrete slabs with an embedded air duct is beyond the scope of this evaluation.
5. Underground air duct pipes located below the design flood elevation must be designed and installed to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation, in accordance with Section 603.13 of the IMC, Section M1601.3.8 of the IRC, or Section 604.6 of both the CMC and the UMC, as applicable.
6. The maximum depth below Base Flood Elevation (BFE) in which the duct can be installed flat on grade based on testing per LC1014 Section 4.3.2 is 48 inches (1219 mm). For installation beyond 48 inches below BFE, AKDUCT[®] shall have a minimum slope of 1/8 inch per foot (10.4mm/m) to allow drainage to a point provided with access.
7. The AQC Industries AKDUCT[®] duct and fittings are manufactured by AQC Industries LLC under a quality control program with annual surveillance inspections by ICC-ES.

TABLE 1—LOADING¹

PIPE DIAMETER (inches)	AVERAGE WALL THICKNESS AS TESTED (inch)	LOAD at 15% DEFLECTION (lbs/lineal ft)
6	0.429	205
8	0.507	353
10	0.416	102
12	0.575	117
14	0.700	135
16	0.472	189
18	0.692	208
20	0.460	433
24	0.770	390
30	0.693	400
36	0.850	383
48	0.750	258

For SI: 1 inch = 25.4 mm, 1 lb = 14.59 N/m.

¹ Loads are the results of ASTM 2412 testing without safety factors yielding a 15% deflection based on inside diameter.

TABLE 2—SYSTEM COMPONENTS

ITEM	DESCRIPTION	SIZE (inches)
ACCESSORIES:20-0027	Foam Trench Block	
ACCESSORIES:20-0030	Damper	
ACCESSORIES:20-0050	Boot Extension	4" x 12" - 16"
ACCESSORIES:20-0100A	Air Test Kit	13"
ACCESSORIES:20-0101A	Air Test Kit	8"
ACCESSORIES:20-0200	Boot Reducer	4" x 12" to 2 1/4" x 12"
ACCESSORIES:20-0300	Bolt with 1 nut & 2 washers (pkg of 12)	2 1/2" x 1/4"
ACCESSORIES:20-0711	Airtite Sealant	
BLUE:03-0090	Rubber Gasket for 3" HV	3"
BLUE:03-2510	Pipe	3"
BLUE:03-2511	End Cap	3"
BLUE:03-2530	90 Degree Elbow (Long Sweep)	3"
BLUE:03-2531	90 Degree Elbow (Short Sweep)	3"
BLUE:03-2532	45 Degree Elbow	3"
BLUE:03-2533	22.5 Degree Elbow	3"
BLUE:03-2534	Sound Attenuator	3"
BLUE:03-2535	Sound Attenuator Replacement Cartridge	3"
BLUE:03-2590	Saddle Take Off	3"
BLUE:06-2501	Offset Footer Boot	6"
BLUE:06-2502	90 Degree Boot (4 x 12)	6"

ITEM	DESCRIPTION	SIZE (inches)
BLUE:06-2510	Pipe	6" x 8'
BLUE:06-2511	End Cap	6"
BLUE:06-2530	90/45 degree Elbow	6"
BLUE:06-2531	22.5 Degree Elbow	6"
BLUE:06-2532	15 Degree Elbow	6"
BLUE:06-2533	11.25 Degree Elbow	6"
BLUE:06-2560	Plenum Adapter with Screws	6"
BLUE:06-2570	Center Saddle - 4" x 12" Boot with screws	6"
BLUE:08-2502	90 Degree Boot (4 x 12)	8"
BLUE:08-2510	Pipe	8" x 8'
BLUE:08-2511	End Cap	8"
BLUE:08-2520	Tee	8"
BLUE:08-2525	Tee Reducer	8" x 8" x 8" - 6"
BLUE:08-2530	90/45 Degree Elbow	8"
BLUE:08-2531	22.5 Degree Elbow	8"
BLUE:08-2532	15 Degree Elbow	8"
BLUE:08-2533	11.25 Degree Elbow	8"
BLUE:08-2540	Reducer	8" x 6"
BLUE:08-2560	Plenum Adapter with Screws	8"
BLUE:08-2565	Plenum Adapter with 12" piece & End Cap	8"
BLUE:08-2570	Center Saddle - 4" x 12" Boot with screws	8"
BLUE:10-2510	Pipe	10" x 8'
BLUE:10-2511	End Cap	10"
BLUE:10-2515	Inline Boot (4 x 12)	10"
BLUE:10-2520	Tee	10"
BLUE:10-2530	90/45 degree Elbow	10"
BLUE:10-2531	22.5 Degree Elbow	10"
BLUE:10-2532	15 Degree Elbow	10"
BLUE:10-2533	11.25 Degree Elbow	10"
BLUE:10-2540	Round Reducer	10" x 8"
BLUE:10-2545	Round Reducer	10" x 8" x 6"
BLUE:10-2550	Offset Saddle - 4" x 12" Boot with screws. Fits 10" pipe	10"
BLUE:10-2560	Plenum Adapter with Screws	10"
BLUE:10-2570	Center Saddle - 4 x 12 boot with screws	10"
BLUE:10-2578	Saddle Reducer (with screws) Fits 10" & 12" Pipe	10" - 8" x 6"
BLUE:12-2510	Pipe	12" x 8'
BLUE:12-2511	End Cap	12"
BLUE:12-2520	Tee	12"
BLUE:12-2530	90/45 Degree Elbow	12"
BLUE:12-2531	22.5 Degree Elbow	12"
BLUE:12-2532	15 Degree Elbow	12"
BLUE:12-2533	11.25 Degree Elbow	12"
BLUE:12-2540	Reducer	12" x 10"
BLUE:12-2547	Reducer	12" x 10" x 8" x 6"
BLUE:12-2550	Offset Saddle - 4 x 12 Boot with screws. Fits 12", 14", 16" & 18" Pipe	12"
BLUE:12-2551	Offset Saddle - 4" x 24" Boot with screws	12"
BLUE:12-2560	Plenum Adapter with Screws	12"
BLUE:12-2577	Saddle Reducer	12" x 10"
BLUE:14-2510	Pipe	14" x 8'
BLUE:14-2511	End Cap	14"
BLUE:14-2530	90/45 Degree Elbow	14"

ITEM	DESCRIPTION	SIZE (inches)
BLUE:14-2531	22.5 Degree Elbow	14"
BLUE:14-2532	15 Degree Elbow	14"
BLUE:14-2533	11.25 Degree Elbow	14"
BLUE:14-2560	Plenum Adapter with Screws	14"
BLUE:14-2575	Wye	14"
BLUE:14-2577	Saddle Reducer - Fits 14", 16", & 18" Pipe	14" x 12"
BLUE:16-2510	Pipe	16" x 8'
BLUE:16-2511	End Cap	16"
BLUE:16-2530	90/45 Degree Elbow	16"
BLUE:16-2531	22.5 Degree Elbow	16"
BLUE:16-2532	15 Degree Elbow	16"
BLUE:16-2533	11.25 Degree Elbow	16"
BLUE:16-2540	Reducer	16" x 14"
BLUE:16-2547	Reducer	16" x 14" x 12" x 10"
BLUE:16-2560	Plenum Adapter with Screws	16"
BLUE:16-2575	Wye	16"
BLUE:16-2577	Saddle Reducer - Round - Fits 16" & 18" Pipe	16" x 14"
BLUE:16-3510F	Pipe with Flange	16" x 8'
BLUE:18-2510	Pipe	18" x 8'
BLUE:18-2511	End Cap	18"
BLUE:18-2530	90/45 Degree Elbow	18"
BLUE:18-2531	22.5 Degree Elbow	18"
BLUE:18-2532	15 Degree Elbow	18"
BLUE:18-2533	11.25 Degree Elbow	18"
BLUE:18-2540	Eccentric Reducer	18" x 16" x 14" x 12"
BLUE:18-2560	Plenum Adapter with Screws	18"
BLUE:18-2577	Saddle Reducer - Round	18" x 16"
BLUE:18-3510F	Pipe with Flange	18" x 8'
BLUE:18-3541F	Eccentric Reducer with Flange	18" x 16"
BLUE:20-0010	Plenum	20" x 24" x 36"
BLUE:20-0015	Plenum	25" x 30" x 48"
BLUE:20-0050	Boot Extension	4x12 - 16"
BLUE:20-0060	Universal Linear Diffuser Adapter	
BLUE:20-0061	Linear Diffuser 49" x 7" x 8" O.D.	48"
BLUE:20-0062	Linear Diffused 37" x 7" x 8" O.D.	36"
BLUE:20-0063	Linear Diffuser 25" x 7" x 8" O.D.	24"
BLUE:20-3510F	Pipe with Flange	20" x 8'
BLUE:20-3530F	90/45 Degree Elbow with Flange	20"
BLUE:20-3531F	22.5 Degree Elbow	20"
BLUE:20-3532F	15 Degree Elbow	20"
BLUE:20-3533F	11.25 Degree Elbow	20"
BLUE:20-3541F	Eccentric Reducer with Flange	20" x 18"
BLUE:20-3542F	Eccentric Reducer	20" x 18" x 16"
BLUE:20-3575F	Tee/Wye	20"
BLUE:24-3510F	Pipe with Flange	24" x 8'
BLUE:24-3530F	90/45 Degree Elbow with Flange	24"
BLUE:24-3531F	22.5 Degree Elbow	24"
BLUE:24-3532F	15 Degree Elbow	24"
BLUE:24-3533F	11.25 Degree Elbow	24"
BLUE:24-3541F	Eccentric Reducer with Flange	24" x 20"
BLUE:24-3575F	Tee/Wye	24"
BLUE:24-3542F	Eccentric Reducer with Flange	24" x 20" x 18"

ITEM	DESCRIPTION	SIZE (inches)
BLUE:24-3543F	Eccentric Reducer with Flange	24" x 20" x 18" x 16"
BLUE:30-3510F	Pipe with Flange	30" x 8'
BLUE:30-3530F	90/45 Degree Elbow with Flange	30"
BLUE:30-3531F	22.5 Degree Elbow	30"
BLUE:30-3532F	15 Degree Elbow	30"
BLUE:30-3533F	11.25 Degree Elbow	30"
BLUE:30-3575F	Tee/Wye	30"
BLUE:30-3542F	Eccentric Reducer	30" x 24"
BLUE: 36-3510F	Pipe with Flange	36" x 8'
BLUE:36-3530F	90/45 Degree Elbow with Flange	36"
BLUE:36-3531F	22.5 Degree Elbow	36"
BLUE:36-3532F	15 Degree Elbow	36"
BLUE:36-3533F	11.25 Degree Elbow	36"
BLUE:36-3575F	Tee/Wye	36"
BLUE:36-3543F	Eccentric Reducer	36" x 30" x 24"
BLUE:48-3510F	Pipe with Flange	48" x 6'
BLUE:48-3530F	90/45 Degree Elbow with Flange	48"
BLUE:48-3531F	22.5 Degree Elbow	48"
BLUE:48-3532F	15 Degree Elbow	48"
BLUE:48-3533F	11.25 Degree Elbow	48"
BLUE:48-3534F	7.5 Degree Elbow	48"
BLUE:48-3575F	Tee/Wye	48"
CLAMPS:03-0080	Stainless Steel Clamp	3"
CLAMPS:06-0080	Clamps & Gasket Set	6"
CLAMPS:08-0080	Clamps & Gasket Set	8"
CLAMPS:10-0080	Clamps & Gasket Set	10"
CLAMPS:12-0081	Clamps & Gasket Set	12"
CLAMPS:14-0081	Clamps & Gasket Set	14"
CLAMPS:16-0081	Clamps & Gasket Set	16"
CLAMPS:16-0100	Steel Clamp	16"
CLAMPS:16-0912	wide W6403 Gasket	12"
CLAMPS:18-0081	Clamps & Gasket Set	18"
CLAMPS:18-0100	SS Clamp	18"
CLAMPS:18-0912	wide W6403 Gasket	12"
CLAMPS: 20-0081	Clamps & Gasket Set	20"
CLAMPS: 24-0081	Clamps & Gasket Set	24"
CLAMPS: 30-0081	Clamps & Gasket Set	30"
CLAMPS: 36-0081	Clamps & Gasket Set	36"
CLAMPS: 48-0081	Clamps & Gasket Set	48"