ICC EVALUATION SERVICE®

ICC-ES Evaluation Report

ESR-1681

Effective Date: December 2023

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

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DIVISION: 23 00 00 — HEATING VENTILATING, AND AIR-CONDITIONING (HVAC)
Section: 23 31 16.16 — Thermoset Fiberglass-Reinforced Plastic Ducts

REPORT HOLDER:

SPUNSTRAND INC.
www.spunstrand.com

EVALUATION SUBJECT:

Spunstrand Standard and Insulated Underslab Ducts

1. EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012, 2009 and 2006 *International Residential Code*® (IRC)
- 2024, 2021, 2018, 2015, 2012, 2009 and 2006 *International Mechanical Code*® (IMC)
- 2024, 2021, 2018, 2015, 2012, 2009 and 2006 *Uniform Mechanical Code*® (UMC)
- 2022, 2019, 2016, 2013, 2010 and 2007 *California Mechanical Code*® (CMC)

Compliance with following standards:

- ICC-ES LC 1014-2016 PMG Listing Criteria for Underground Plastic Air Ducts
- UL 181 (11th Ed.) Standard for Safety for Factory-Made Air Ducts and Connectors
- NSF Protocol P374-2010, Air Duct Thermal Efficiency Performance

2. USES

The Spunstrand Standard and Insulated Underslab ducts described in this report are used as Class 1 air ducts with a maximum rated positive pressure equivalent to 10-inch water column, a maximum rated negative pressure of 4.8-inch water column and a maximum velocity of 2,500 feet per minute.

3. DESCRIPTION

This report covers ducts that are manufactured in 4-inch through 86-inch diameters. The 4-inch through 54-inch ducts are available in 20-foot lengths and the larger sizes in 10-foot lengths.

The standard (non-insulated) duct is constructed with filament-wound, polyester resin-impregnated, continuous fiberglass strands wound over an inner liner of a Underwriters Laboratories Inc. (UL) listed Class 1 duct liner identified as Foil-Scrim-Kraft liner.

For underground applications and at the request of the engineer, the standard duct is available without the Class 1 FSK liner.

Also available is an insulated duct using the same UL listed Class 1 duct liner. The insulation is identified as isocyanurate foam and having a 1.9-pcf density and a Class 1 flame-spread classification when tested in accordance with ASTM E 84.

The same filament-wound manufacturing method described above, with sandwich-type construction providing fiberglass reinforced plastic on both sides of the insulation, is used for the insulated ducts.

All duct sizes listed in this report were evaluated for the following:

R-Value: Ducts with insulation values of R-4, R-6, R-7, R-8, R-10 and R-12, when tested in accordance with ASTM C518, are standard products that are covered in this evaluation and listing.

Thermal Distribution Efficiency (TDE): When tested to NSF Protocol P374, the Spunstrand Standard, non-insulated duct, in 10 inches in diameter and greater, exhibited equivalent TDE to a spiral steel reference duct surrounded on all sides with R-10 rated insulation.

Straight sections of the duct are joined by using a 6-inch-wide internal sheet metal sleeve of No. 26 gage to No. 22 gage (0.0187 inch to 0.0296 inch thick) galvanized steel, depending upon the duct size. The sleeve is first screw-attached to one section of pipe to be joined using no fewer than three equally spaced sheet metal screws for ducts through 24-inch diameter, 5 screws for ducts through 36-inch diameter and 16 screws for ducts larger than 36 inches. A bead of Presstite No. 579.6 Waterproof Mastic is applied around the circumference at the end of the duct. The adjacent section of duct is slipped over the sleeve and pressed tightly against the mastic, forming a waterproof seal.

Sheet metal screws then secure the second section of duct to the sleeve. Finally, the joint is wrapped with Nashua Type 357 duct closure tape. As an alternate to the Nashua 357 duct tape, a single wrap of 4-inch-wide Polyken 260 Foilastic tape with P-29 primer provided by Spunstrand Inc. may be used. If ground water causing any hydrostatic loading is possible or anticipated, the mastic and tape portions of the above instructions must be replaced by a rigid fiberglass joining system. Surfaces of the duct to be joined must be clean and properly sanded prior to application of the fiberglass joining materials.

Manufacturer's specific instructions for application of this material must be strictly adhered to. At the engineer's option, couplings may be used in lieu of internal sheet metal sleeves and wet lay-up joints.

Couplings 2 - 24 inches in diameter shall be filament wound to a minimum thickness of the duct diameter's structural layer.

An internal seat shall keep the coupling from sliding past center and align both sides equally. Sealing adhesive is to be a 2-part epoxy-based system that cures permanently and water-tight. Couplings have been factory tested to an internal design pressure of 5 psi for one hour. To confirm a 5 to 1 safety factor, couplings were tested by an accredited laboratory to a pressure of 25 psi and showed no signs of leakage or failure after 5 minutes. Couplings are manufactured by Spunstrand under two (2) trade names:

Strand-Tite – for use with underslab FSK, TDE and all insulated ducts.

Strand-Lock – for use with SMACNA thermoset industrial ducts

Standard fittings similarly constructed, such as elbows, wyes, tees, crosses, branches, and concentric and eccentric reducers are available. Attachment procedures of these fittings are similar to those for straight sections. Trenches are dug for the duct on the desired locations, allowing for cover around the duct for a minimum of 4 inches of pea gravel or other select fill material approved by the building official. After all joint connections are made as described above and the duct system is lowered into position, backfilling is completed, and the concrete slab is poured on top. The top of the duct should be a minimum of $2^1/_2$ inches and a maximum of 5 feet below the concrete slab.

4. INSTALLATION

4.1 General:

Installation must be in accordance with the manufacturer's published installation instructions and Section 603 of the *International Mechanical Code*® (IMC).

Ducts evaluated in this report shall only be installed underground or embedded and shall not be used in exposed applications.

4.2 Duct Sizing:

Ducts must be sized in accordance with Section 603.2 (Duct Sizing) of the *International Mechanical Code*® (IMC).

5. CONDITIONS OF USE

Spunstrand Standard and Insulated Underslab Ducts described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1 of this report, subject to the following conditions:

5.1 Ducts must be installed in accordance with manufacturer's published installation instructions.

5.2 The maximum temperature for air conveyed by the ducts in this report shall be 150 °F (66°C) at the discharge of the unit entering the system.

5.3 Ducts shall have a minimum slope of 1/8 inch per foot (10.4mm/m) to allow drainage to a point provided with access.

5.4 The design of concrete slabs with embedded air duct pipe is beyond the scope of this report.

5.5 Underground air duct located below the base flood elevation shall be designed and installed to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of the flooding to the design floor elevation, in accordance with Section 603.13 (Flood hazard areas) of IMC.

5.6 The maximum depth Below Flood Elevation at which the duct can be installed, based on testing in accordance with Section 4.3.2 of LC1014.

5.7 Spunstrand Standard and Insulated Underslab Ducts and Couplings are under a quality control program with annual surveillance inspections by ICC-ES.

6. IDENTIFICATION

6.1 Each piece of The Spunstrand Standard and Insulated Underslab Ducts must be permanently and legibly marked at intervals of not greater than 10 feet (3.0 m) with following items:

- Manufacturer's name or trademark
- The rated air velocity
- The rated negative and positive pressure
- ICC-ES PMG mark of conformity.

6.2 The report holder's contact information is the following:

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