



UL Standards Compliance

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Components Compliance

Rheia components meet rigorous industry standards. RHEIA engaged with UL to certify Rheia components under a new standard tailored to RHEIA's unique product line. UL developed a new standard, UL181C, to certify the Rheia components designated as 'fittings', (defined by UL as Rheia's Ferrule, Coupler and Elbow Extension). In May 2020, RHEIA achieved UL 181C certification¹; the only system on the market complying with UL181C (identified as Certified with the UL listing mark, file number MH64419). This standard requires that the fittings assembly passes the following tests:

Test	Description	Status
Impact Test	Evaluates the resistance to the impact of 15 lb. sand bag without a 20 percent reduction in cross-sectional area.	Pass
Tension Test	Evaluates the resistance to a force of a 25 lb. weight on an air duct and fitting when installed in accordance with the manufacturer's installation instructions. A 25 lb. Test duration of 24 hours. The start and end height difference from the floor is measured.	Pass
Torsion Test	Evaluates the resistance to torsion forces on an air duct and fitting when installed in accordance with the manufacturer's installation instructions. A torque of 25 ft.-lb., or sufficient torque to rotate the sample 180-deg, whichever occurs first.	Pass
Pressure Test	Evaluates the resistance to positive pressure on an air duct and fitting when installed in accordance with the accompanying installation instructions.	Pass
Leakage Test	Evaluates the resistance to leakage on an air duct and fitting when installed in accordance with the manufacturer's installation instructions.	Pass
Puncture Test	A puncture test is conducted on the assembly. The samples shall prevent the complete penetration through the wall of the sample of the plunger head falling through a distance of 20 inches.	Pass
Mold Growth and Humidity Test	Evaluates the components' resistance to material degradation due to exposure to mold and high humidity. Evaluates the materials ability to limit the growth of mold. There must be no visible growth after 60 days.	Pass
High and Low Temperature Test	Evaluates the components' resistance to material degradation due to exposure at high and low temperatures. Visual observation for deformation and deterioration. exposed to air maintained at not less than 125 deg. F on the exterior and not less than 265 deg. F on the interior and maintained for a period of 60 days.	Pass
Smoke and Heat Release Test	UL 2043 Fourth Edition, "Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Pass Accessories Installed in Air-Handling Spaces"	Pass

¹ Listing File no. MH64419



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Referenced in the International Mechanical Code, NFPA 90B 'Standard for the Installation of Warm Air Heating and Air-Conditioning Systems' defines 'fittings' as parts connecting the registers to the duct system and requires them to be either, metal, materials that comply with the requirements of Class 0 or Class 1 ducts in UL 181, or materials that comply with the requirements of UL 2043. Although UL 2043 was included as part of UL181C, Rheia took a cautious approach and in December 2019 independently certified the fittings assembly to standard UL 2043². UL 2043 certification was also obtained for a 4" Ferrule fitting in April 2021.

UL 2043 specifically tests the smoke and heat release of a discrete product (one that does not provide a continuous connection between rooms). Since UL 2043 is a critical test that addresses safety concerns of a discrete component located in an air plenum, RHEIA decided to independently pursue UL 2043 certification of the fittings prior to installation into any pilot homes, and received the ETL listing through the independent certification testing lab, Intertek.

The following table describes the material choices for each group of components based on their performance requirements.

Components	Material and Process
Elbow, Ferrule, Coupler	Injection Molded PC/ABS V-0 flammability rating certified to UL 181C and UL 2043
Register Boots and Dampers	Injection Molded PC/ABS V-0 flammability rating
Manifold Takeoffs	Injection Molded PC/ABS V-0 flammability rating
Wall and Ceiling Diffusers	Injection Molded UV stable ABS

Duct Compliance

The specified uninsulated duct is either 3" or 4" diameter ST-L product manufactured by Thermaflex in Abbeville, SC. The duct is a non-insulated UL181 certified, Class 1 flexible air duct constructed from a fiberglass cloth fabric bonded to a corrosion resistant spring steel wire helix.

UL's 181 requirements apply to materials for the fabrication of air duct and air connector systems for use in accordance with the International Mechanical Code (IMC), International Residential Code (IRC), and Uniform Mechanical Code (UMC), Standards of the National Fire Protection Association for the Installation of Air-Conditioning and Ventilating Systems, NFPA 90A, and the Installation of Warm Air Heating and Air-Conditioning Systems, NFPA 90B.

The duct is also Greenguard certified per UL standard 2818 - 2013 'Gold Standard for chemical Emissions for Building Materials, Finishes and Furnishing'.

² ETL Certification obtained through Intertek. Report no. 104174141SAT-002.