Components Performance Overview

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Performance Standards

The Rheia system is designed and engineered for durability and longevity in the homebuilding environment. Rheia established a series of engineering specifications to ensure the components will perform under typical environmental conditions. These specifications are driven by industry standards UL 2043 and UL 181C, and Rheia's own requirements based on their experience in the homebuilding industry. Combined, the Rheia system embodies the following performance characteristics:

Durability

Prior to, during, and after installation, components need to be durable enough to handle rough treatment on the job site and are able to withstand potential damage from typical handling and installation activities:

- Can withstand drops onto concrete surfaces.
- Duct fabric is reinforced with glass fiber making it highly resistant to tearing during installation.
- Has impact resistance from an accidental blows from tools and other materials.
- Able to withstand contact from an approved drywall trim bit.
- Dimensional integrity allowing components to be connected and still achieve the desired air tightness at the required temperature range.
- Able to assemble and achieve air tightness after being deformed.

Air Tightness and Airflow

Rheia's airflow performance comes in part from engineering parts that are optimized for airflow and airtightness:

- The friction fit between the connector components provides a near airtight seal at operating pressure.
- The system components do not require the addition of mastic or tape to seal the connections and when assembled can pass industry-standard duct leakage tests.
- The components' smooth interior geometry does not negatively impact airflow, minimizes pressure loss and is quiet under operation.

Environmental Characteristics

Products designed to operate in a homebuilding environment face a unique set of environmental conditions that must be accounted for in the materials specification:

- The specified material is designed to withstand the wide temperature range typically found on job sites year round.
- Rheia components do not support mold growth.
- Rheia components are resistant to material degradation at high temperature exposure.
- Rheia components comply with the industry-specified heat release and smoke development restrictions.
- The specified thermoplastic materials have been evaluated for its resistance to chemicals commonly seen on the job site.

Mechanical Performance

Product quality over the long-term is achieved through thoughtful design and engineering:

- The Rheia connector components pass the UL181C leakage test.
- The connector components are able to withstand a pull force without separating.
- The connector and duct assemblies are resistant to torsion forces to ensure the duct to component connections do not separate during installation.

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Material Specifications

Duct

The flexible duct in the Rheia system is a nominal 3" or 4" uninsulated flexible duct manufactured by Thermaflex, in Abbeville, SC. The duct is Class 1 rated to UL 181 by Underwriters Laboratory (UL).

Hanger Bars

The hanger bars are manufactured using 22 ga. steel. The steel is protected from corrosion during transportation and storage.

Connector Components

The injection molded Ferrule, Coupler and Elbow Extension connector components are specified in a PC/ABS engineered thermoplastic. These parts meets UL 2043 "Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces" designed for high heat applications, and UL 181C "Non-Metal Joining Accessories for Flexible Air Ducts and Air Connector." These components are also known as 'fittings' when using AHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) industry terminology.

Distribution Components

The injection molded ceiling, pass-through and high-sidewall boot assemblies, and manifold takeoffs are also specified in a PC/ABS engineered thermoplastic. These components have been specified in the same material family as the connectors. The ceiling, pass-through and high-sidewall boot assemblies are also known as 'registers' when using AHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) industry terminology.

Diffuser Components

The injection molded slotted and ceiling diffusers are specified in a UV stable engineered ABS that have molded in color. UV stability is necessary to maintain a consistent look over time and avoid discoloration due to UV light exposure..