INSTALLATION GUIDELINES

Revision 010

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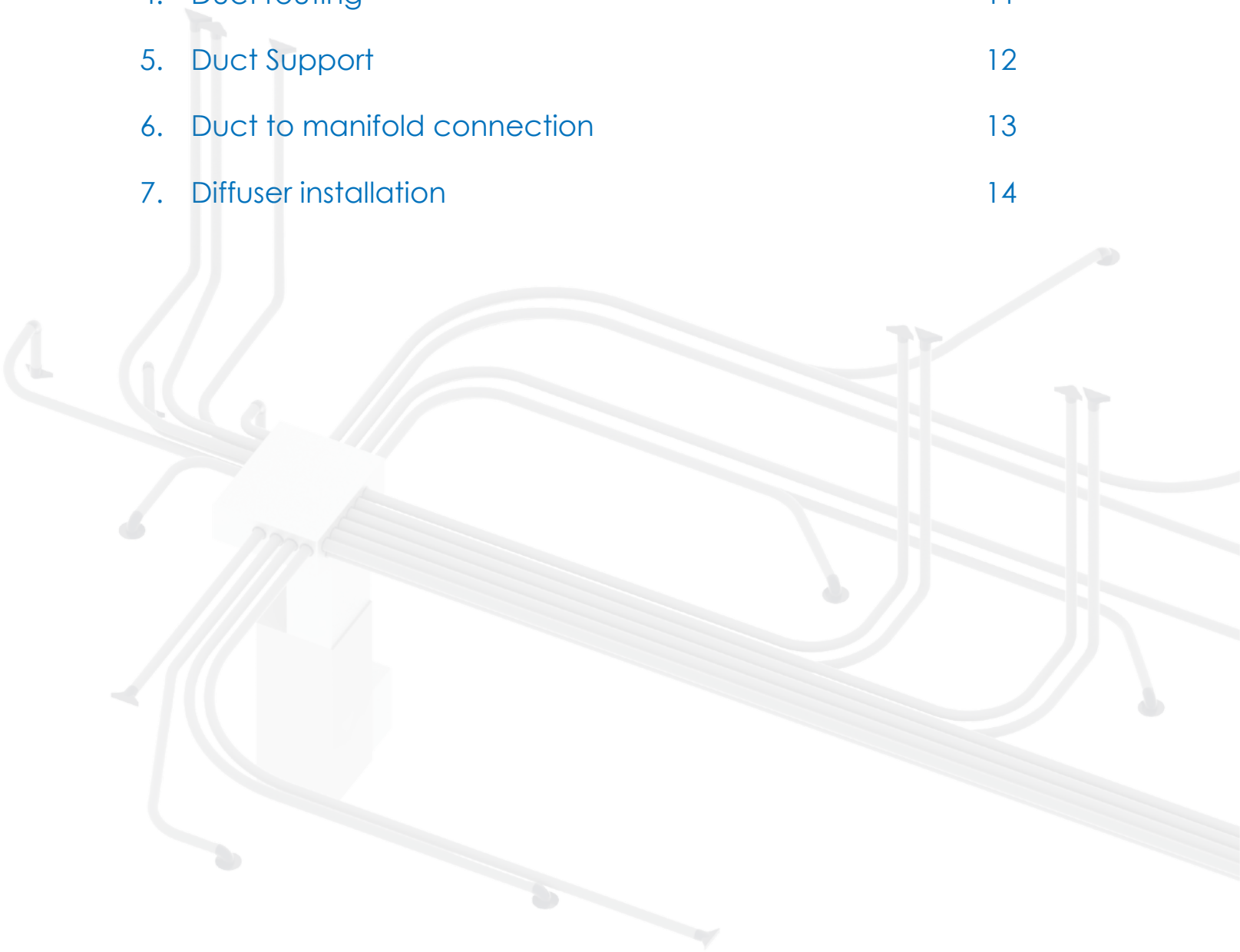
www.Rheiacomfort.com



INTRODUCTION

Rheia® is an innovative system designed to be easy to install. This Installation guide is published for HVAC technicians and installers, building officials, and construction professionals interested in the Rheia Air Distribution System. This document describes general installation recommendations of the Rheia components, duct, and accessories. Always follow local code requirements.

Rheia has made all reasonable efforts to ensure this manual contains the most up-to-date, accurate information. Enhancements to the Rheia system may result in modification of features and or specifications without notice.

To ensure you are referring to the latest version of this manual, please visit rheiacomfort.com/resources.

Rheia is not liable for installation practices that deviate from this manual or are not acceptable practices within the industry.

Prior to installing the Rheia system, Rheia recommends all installers review the Pro series training videos and support information provided on rheiacomfort.com.

Rheia's compact duct and components are designed to be installed in the conditioned space of the home. When required, insulated ducts can be used without changing any other part of the system.

The Rheia system comprises:

- UL 181-listed, 3' and 4' diameter duct
- UL 181C / UL 2043 listed Connector Components (Ferrule, Coupler, and Elbow)
- UL 94 V-0 rated Distribution Components (take-offs, wall, ceiling and floor boots)
- UV stabilized ceiling and wall diffusers
- Metal accessories and floor diffuser

When storing and handling:

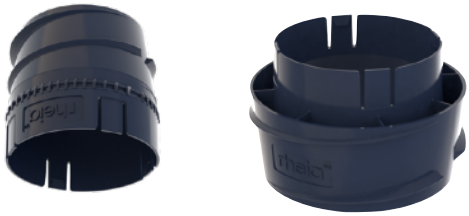
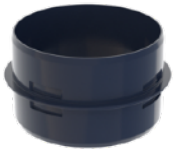
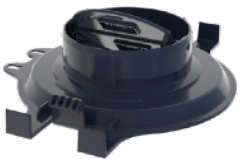
- Do not store outdoors
- Do not weld, glue, or apply tapes or adhesives, unless UL 181-listed
- Do not store below -40 deg. F or above 160 deg. F ambient temperature
- Do not install underground

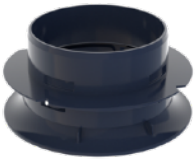
For more information on the Rheia system visit: www.rheiacomfort.com

Access Rheia's Library of free installation training videos: https://bit.ly/rheia-training

Before starting an installation, review Rheia's library of training resources, carefully read these guidelines, and assemble all the required tools

RHEIA COMPONENT LIST

No.	Name	Image
1	3" Ferrule 4" Ferrule UL 2043 certified connector UL 181C certified connector	
2	Elbow UL 2043 certified connector UL 181C certified connector Two 45-deg. Elbows make up 90-deg. transition	
3	Coupler UL 2043 certified connector UL 181C certified connector	
4	High-Sidewall Boot Assembly UL 94 V-0 flammability rated ABS material Damper and adjustment strap are pre-assembled	
5	Pass-Through Boot Assembly UL 94 V-0 flammability rated ABS material Damper is pre-assembled	
6	Ceiling Boot Assembly UL 94 V-0 flammability rated ABS material Damper is pre-assembled	

7	Manifold Take Offs (Inner and Outer) UL 94 V-0 flammability rated ABS material Two parts for assembly into duct board manifold	
8	Slotted Diffuser UV light stable ABS material Color: White Snap fits to High-Sidewall or Pass-Through Boots after drywall installation	
9	Ceiling Diffuser Large / Ceiling Diffuser Small UV light stable ABS material Color: White Snap fits to Ceiling Boot after drywall installation	
10	Hanger Bar Assembly Galvanized 24-gauge steel Telescoping design fits 12" to 24" stud spacing	
11	3"Duct 4" Duct Coated steel wire helix with a durable glass fiber-reinforced PVC skin. UL 181 Class 1 listed air duct	
	4" x 10" Floor Boot Assembly UL 94 V-0 flammability rated ABS material Damper is pre-assembled	
	4" x 10" Floor Diffuser Painted Steel (without adjustable damper) Colors: Beige, Grey, White	

RECOMMENDED TOOLS I MATERIALS

No.	Name	Image
1	Side Cutting Pliers Used to clip the wire helix of the duct	
2	Utility Knife I Duct Knife I Duct Cutter Used to cut the duct to length	 
3	Power Drill & Driver I 31/4" Hole Saw/ Hole Auger Used to cut the wall bottom plate for duct routing and fro installing the hanger bars, boots and for locking the boot to the hanger bar	 
4	1/2" min. Sheet Metal Screws 3/4" min. General Purpose Screws Self-drilling, used to lock the ceiling, pass-through, or high-sidewall boot to the hanger bar Used to attach the boots and bracket to framing	 
5	Tape Measure I Carpenters Pencil Used to locate the boot position in the ceiling, walls, and floors	 
6	Bullet Level Used to check the level of High-Sidewall and Pass-Through Boots	
7	Fabric Duct Strap Used to secure ducts with spacing as required by code	

INSTALLATION GUIDELINES

1. Boot location and installation

Locate and install ceiling, wall and floor boots using basic tools and techniques. Refer to the mechanical duct layout drawing to identify the location of all boots throughout the house.

1.1. Installing High-Sidewall and Pass-Through Boots:

1.1.1. Decide if the boot is to be attached directly to the framing structure or using the adjustable Hanger Bars.

1.1.2. For attachment of the boot directly to framing:

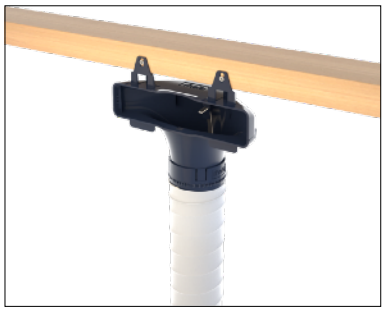
1. Confirm the distance from the wall top plate to the boot is per the construction drawings.
2. Mark the distance from the top of the top plate down to the top of the Hanger Bar mounting tab.
3. Make sure the boot is level and on the measurement marks.
4. Use two general purpose screws in the mounting holes provided to attach the boot to the framing.

1.1.3. For attachment of the boot using Hanger Bars:

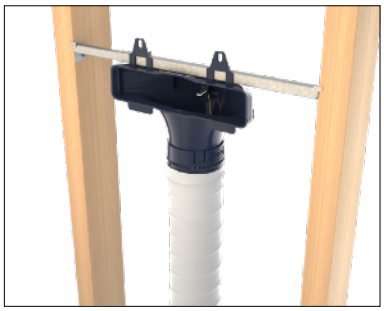
1. Confirm the distance from the wall top plate to the boot is per the construction drawings.
2. Mark the distance from the top of the top plate down to the top of the Hanger Bar mounting tab.
3. Separate the Hanger Bar parts insert through each opening on the left and right side of the boot.
4. Slide the Hanger Bar halves back into each other.
5. Set the Hanger Bar in position to span across the stud bay.
6. The Hanger Bar mounting tabs can be attached to the front face of the framing or can be folded back for mounting on the inside face of the framing.
7. Position the Hanger Bar on the mark and secure with drive one or two general purpose screws.
8. Make sure the boot is level and on the measurement marks.
9. Drive one or two general purpose screws through the remaining Hanger Bar tab into the framing.
10. Slide the boot along the hanger bar to its final position.
11. Secure the boot in position to the Hanger Bar using a sheet metal screw.

PRO TIP:

The minimum dropped ceiling depth that can accommodate Rheia ducts is 7". This includes the framing and drywall. This allows for routing through non load-bearing walls with a single top plate. For load bearing walls with a double plate an additional 1.5" is required. If there is no wall in the path of the duct, then a 6" drop is acceptable.



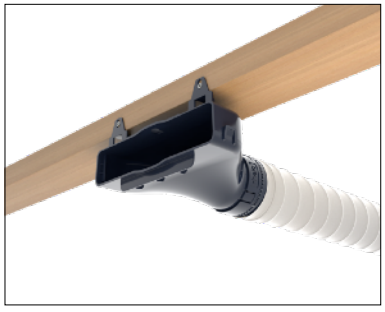
High-Sidewall Boot (framing mount)



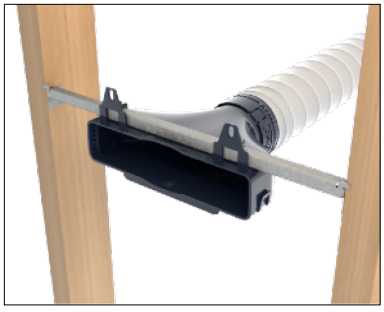
High-Sidewall Boot (1 Hanger Bar)

PRO TIP:

Be consistent with the distance from the top plate to the Hanger Bar when installing High Sidewall and Pass Through Boots. This will ensure all boots are set the same distance from the top plate, and all diffusers will visually align when installed later.



Pass-Through Boot (framing mount)



Pass-Through Boot (1 Hanger Bar)

1.2. Installing Ceiling Boots:

1.2.1. Decide if the boot is to be attached directly to the framing structure or using the adjustable Hanger Bars.

1.2.2. For attachment of the boot directly to framing:

1. Review the construction drawings to locate the position of the Ceiling Boot.
2. Mark the locations of the Hanger Bars on the framing.
3. Make sure the center of the boot is per the construction drawings.
4. Use two general purpose screws in the mounting holes provided to attach the boot to the framing.

1.2.3. For attachment of the boot using Hanger Bars:

1. Review the construction drawings to locate the position of the Ceiling Boot.
2. Mark the locations of the Hanger Bars on the framing.
3. Position each hanger bar above the snap-fit arms and press the hanger bar assembly firmly into place. An audible click indicated the hanger bar is locked to the boot.
4. Set the Hanger Bar width to span across the stud bay.
5. The Hanger Bar mounting tabs can be attached to the front face of the framing or can be folded back for mounting on the inside face of the framing.
6. To mount the Hanger bar to the framing, on one side of the Hanger Bar drive one or two general purpose screws through the Hanger Bar tab into the framing.
7. Slide the boot along the hanger bar to its final position, and confirm the center of the boot is per the construction drawings.
8. Secure the boot in position to the Hanger Bar using a sheet metal screw.

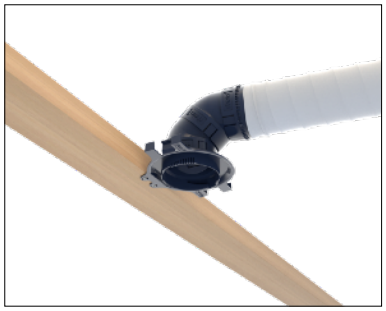
1.2.4. Use at least one Elbow to transition the Ceiling Boot to the duct.

PRO TIP:

TIP: Pay close attention to the lighting layout of the room and follow any guidelines for aligning Ceiling Boots with the ceiling lighting pattern and layout.

Ceiling Boot (2 Hanger Bars)

The number of elbows required is based on the installation situation



Ceiling Boot (framing only)

The number of elbows required is based on the installation situation

1.3. Installing Floor Boots:

1.3.1. For attachment of the boot to the floor deck:

1. Review the construction drawings to locate the position of the Floor Boot.
2. Mark the location of the Floor Boot cut out on the floor deck. The cut out dimensions are 10.375" (+/- 0.125") x 4.375" (+/- 0.125").
3. Set the Floor Boot into the opening.
4. Use a minimum of four general purpose screws in the mounting holes provided to attach the boot to the flor deck.
5. Use at least one Elbow to transition the Floor Boot to the duct.

2. Duct-to-Ferrule connections

The Rheia system uses a patent-pending threaded Ferrule to connect duct lengths to other components. Each component is designed to be interchangeable and connect with any other component.

2.1. To prepare a duct for installation, start by adding a Ferrule to each length of duct.

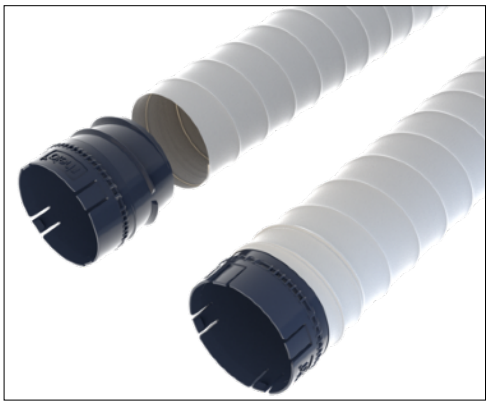
2.1.1. Check the end of the duct and trim off any excess using a knife. If the duct and wire are separated, use side cutting pliers to trim back the wire, then trim the duct fabric square.

2.1.2. With the duct in one had, use the other hand to spread the duct fabric with fingers.

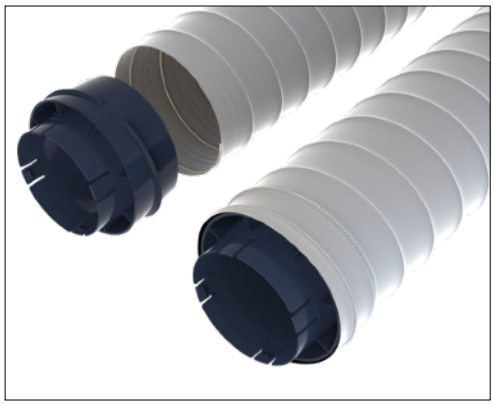
2.1.3. Insert the Ferrule into the duct and twist clockwise until the Ferrule catches the duct's wire helix.

2.1.3.1. For 3" ducts, twist the Ferrule until the duct fabric reaches the ribbed exterior surface of the Ferrule at the end of the threaded section.

2.1.3.2. For 4" ducts, twist the Ferrule until the duct fabric passes the exterior edge of the threaded area.



3" duct and Ferrule (before and after)



4" duct and Ferrule (before and after)

2.1.4. Pull the Ferrule away from the duct to check for a tight connection. The Ferrule to duct connection is tight enough when it will not easily twist apart by hand.

2.1.5. Overlapping of the duct fabric as it screws onto the Ferrule is an acceptable practice.

PRO TIP:

Cut end of the duct as cleanly as possible to ensure a quicker installation of the Ferrule.

3. Ferrule connections to other components

Rheia's connection system uses a simple snap-fit system to connect and seal all components together. A fully assembled system will comply with industry standards for air leakage. Additional sealing with tape or mastic is not required.

3.1. To connect any two components of the system push the male and female components together.

3.2. An audible "click" will be heard when the two components are properly connected. If the snap fit is not aligned, slightly wist one of the parts to lock them together an d you hear an audible click.

3.3. Pull the two components in opposite directions to confirm they are connected.

3.4. To separate the components, twist one component less than a quarter turn and pull apart.

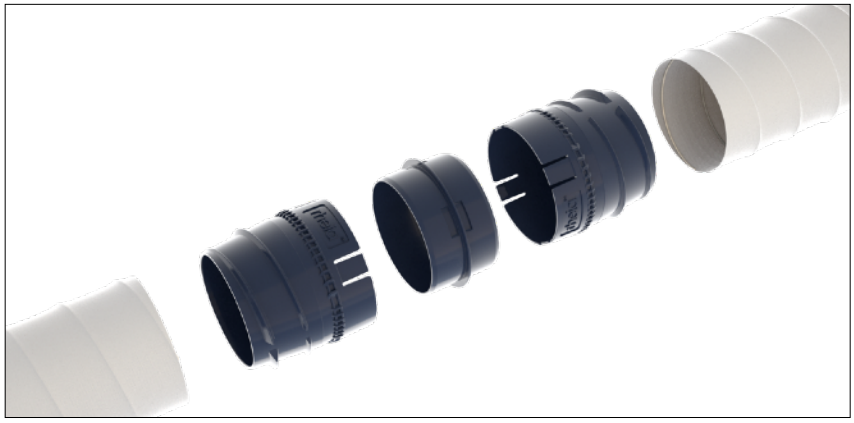
3.5. If the duct is not long enough to reach the intended location, a Coupler with two Ferrules should be used to attach a new length of duct (shown below) and extend the duct run. There is not a total duct length limit to any duct run.

3.6. The addition of Elbows at connections is at the discretion of the installer, with the following exception:

3.6.1. Transitions from duct to other components that have an inside radius of less than the duct diameter must use at least one Elbow.

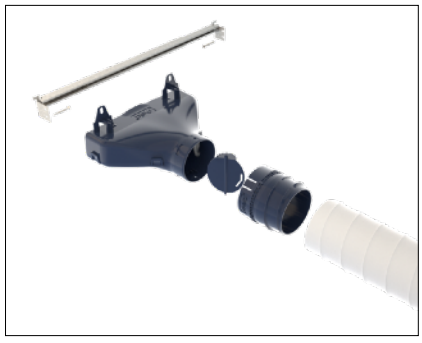
PRO TIP:

Adjustment to the direction of the Elbow can be made by twisting it a quarter turn at a time until it clicks into the next position.



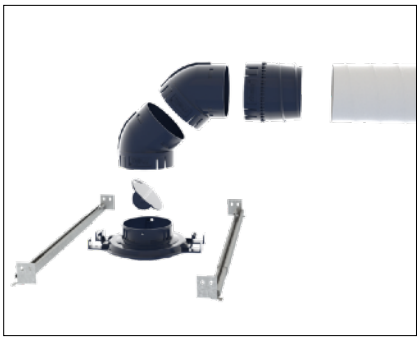
Duct-to-duct connection using two Ferrules and a coupler

90 deg. corner using two 45-deg. Elbows



Pass-Through Boot Assembly

High-Sidewall Boot Assembly



Ceiling Boot Assembly

(elbows are optional based on installation situation)

4. Duct routing

Rheia's duct can be routed within 2x4, 2x6, and 2x8 walls, floor joists and other cavities. Standard-sized I-joists can be pre-cut or field cut to accommodate the routing of bundles of ducts. Follow all manufacturer's and building code requirements when cutting structural framing components.

The Rheia design process allows for variability in duct tightness, corner transitions and minor routing changes based on job site conditions, without impacting the system's performance.

4.1. Uninsulated 3" and 4" duct must be installed inside the building's thermal envelope.

4.2. Follow the duct routing plan and boot locations per the construction drawings.

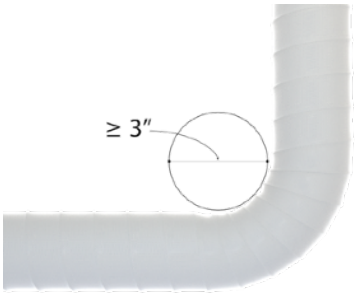
4.3. Route ducts so that the total length, number of bends, and severity of bends are minimized.

4.4. Check duct bends. If the inside bend radius is less than the diameter of the duct, insert a minimum of one Elbow to replace compressed duct with a smoother transition.

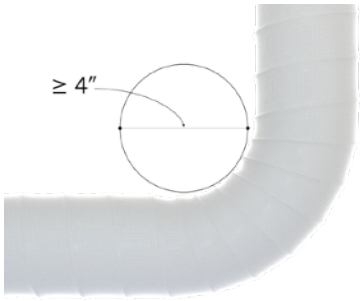
4.5. Duct bends that have an inside bend radius no less than the diameter of the duct are acceptable.

PRO TIP:

Note that the wire helix pitch of the duct varies in manufacturing so this is an approximate measurement intended as a guide.



3" duct: min. inside bend radius is 3"



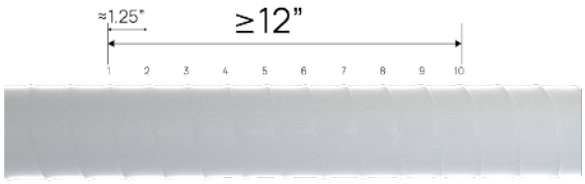
4" duct: min. inside bend radius is 4"

4.6. Use one or two 45-degree Elbows at any 90-degree transition between a wall top plate and floor structure where the inside radius of the curve is less than the diameter of the duct.

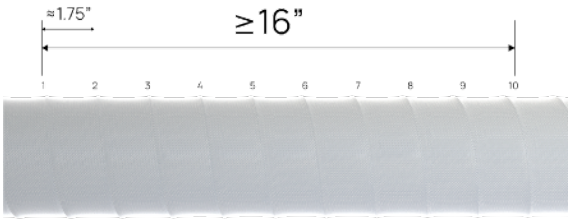
4.7. On straight runs, assess the duct stretch visually, or by measuring the pitch of the wire helix:

4.7.1. 3" ducts should have approximately a minimum 1.25 in. spacing between the wire coils.

4.7.2. 4" ducts should have approximately a minimum 1.75 in. spacing between the wire .



3" duct approximate wire helix pitch



4" duct approximate wire helix pitch

4.8. Avoid over-crowding ducts through the same gaps or holes causing them to be compressed or deformed, especially if they are pinching the ducts. Ducts can be clustered together in any quantity.

4.9. To minimize duct length, take a direct route through trusses rather than adding turns. Try to maintain straight duct runs where possible. Avoid crossing ducts over each other, run ducts side-by-side where possible.

4.10. Refer to the **Rheia Standard Details** document for detailed drawings of common assemblies. The document is located here: https://rheiacomfort.com/designers-resources/

5. Duct Support

Requirements for supporting Rheia ducts are based on the relevant sections from:

> Air Duct Council: Flexible Duct Performance & Installation Standards, 6th Edition.
>
> Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA): HVAC Duct Construction Standards Metal and Flexible, 4th Edition..

Rheia does not specify the products or materials required to support Rheia ducts within walls, floors, and interstitial spaces. Follow these requirements when installing Rheia flexible duct:

5.1. Individual ducts or duct bundles installed in horizontal applications shall be supported using flexible strapping or rigid supports.

5.2. Rheia requires horizontal duct to be supported at least every 4 ft (1.5 m). A connection to another duct, a manifold, or a boot termination point is considered a support point.

5.3. The maximum permissible sag between supports is 1/2" in. per foot (41.7 mm/m).

5.4. A connection to another duct or equipment is considered a support point.

5.5. Framing or other structural components are permissible as duct supports.

5.6. Electrical wiring or supply plumbing must not be used as a support for ducts.

5.7. Bundles of ducts can be secured using a single strap.

5.8. The width of a flexible strap or rigid support retaining a duct or bundle of ducts should be no less than 1/2".

5.9. Ducts can be supported by other ducts within any floor, wall cavity, or interstitial space where duct installation is permitted.

5.10. Flexible duct straps and rigid supports shall be attached to the building structure to support the weight of the installed ducts.

6. Duct to manifold connection

The manifold assembly is pre-constructed prior to the installation process. It is built from dimensions provided by Rheia, and is constructed from 1" or 1.5" duct board, or galvanized sheet metal depending on the region of the country of the installation.

PRO TIP:

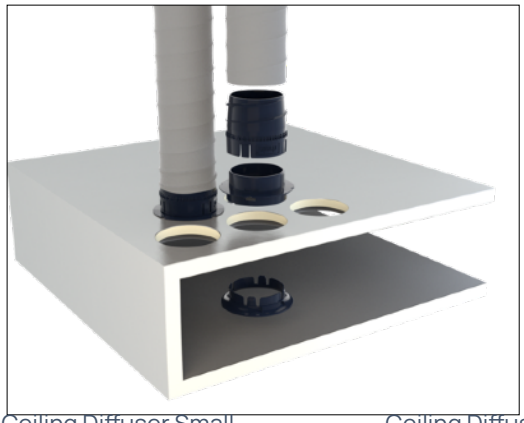
In some regions the use of a sheet metal manifold is acceptable. Consult with an HVAC Design Engineer to confirm if a sheet metal manifold is acceptable in your region. For this application a Manifold Take Off Outer is installed to the sheet metal Manifold with an approved sealed to ensure an airtight connection.

6.1. Duct Board Manifold Assembly:

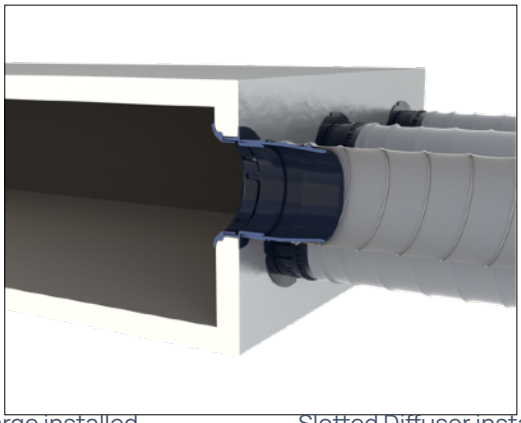
6.1.1. The duct board manifold is engineered to distribute the conditioned air into the duct runs. It requires the installation of Inside and Outside Take Offs. Manifolds can be pre-built, or built on site following NAIMA's (North American Insulated Manufacturer's Association) Fibrous Glass Duct Construction Standards.

6.1.2. The take-off assembly creates a seal to the duct board. Additional sealing with tape or mastic is not required.

6.1.3. To attach the duct to the manifold, pull the duct tight and mark the coil that reaches the selected Take Off on the Manifold. Use a utility knife or duct knife and wire cutters to cut the duct at the mark.



Ceiling Diffuser Small
Take-Off assembly to duct board manifold



Ceiling Diffuser Large installed
Ferrule to duct board manifold assembly

Slotted Diffuser installed

6.1.4. Screw a Ferrule into the end of the duct using the method explained in the 'Duct-to-Ferrule connections' section of this document.

6.1.5. Attach the ducts in an organized manner.

6.1.6. Begin with the locations that are harder to access and work outwards.

6.1.7. Route ducts in layers so that those connecting at the center of the manifold lay above those at the edges. Make use of vertical space as much as possible.

6.1.8. Connect ducts on the same side of the manifold as the most direct route away from the air handler.

6.1.9. Use Elbows where needed, and when the duct bend radius is less than the diameter of the duct.

6.1.10. The final arrangement should allow each duct its own clear route from the manifold with minimal turns.

PRO TIP:

TIP: Consult with the HVAC Design Engineer before adding or removing ducts from the system. Changing the duct count of a Rheia system can adversely affect the comfort performance of the home.

7. Diffuser installation

Rheia diffusers are designed to efficiently and effectively distribute air into a room. The number of and locations of diffusers are pre-determined by the HVAC designer and must be followed.

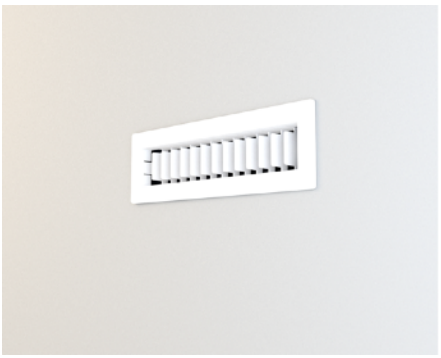
7.1. Refer to the architectural drawings determine installation pattern and locations of the boots.

7.2. To install Slotted Diffusers to High-Sidewall and Pass-Through Boots:

- 7.2.1. Align the diffuser to the boot and press firmly to engage the diffuser snap fits.
- 7.2.2. An audible clicking sound will be heard as the two parts engage.
- 7.2.3. Continue pressing the diffuser into the boot until it is flush with the drywall surface.

7.3. To install Ceiling Diffusers to Ceiling Boots:

- 7.3.1. Align the diffuser to the boot such that the peg on the diffuser enters the slot in the Ceiling Boot.
- 7.3.2. Push and twist the diffuser clockwise.
- 7.3.3. An audible clicking sound will be heard as the two parts engage.
- 7.3.4. The diffuser will be drawn upwards to meet the ceiling surface.
- 7.3.5. Continue turning the diffuser into the boot until it is flush with the drywall surface.



PRO TIP:

There are two types of Ceiling Diffusers available. The Small Ceiling Diffuser is for regions of the country that are heating dominated, The Large Ceiling Diffuser is for regions that are Cooling dominated. Confirm with your HVAC Design Engineer which Diffuser is right for your applications.