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# Concentric Complete Package Install Guide

Foremost HVAC Accessory Manufacturer

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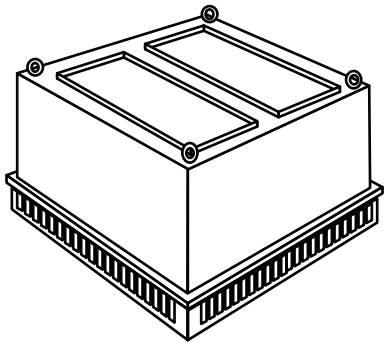
**IMPORTANT: Please read all installation instructions and safety precaustions before beginning. These installation instructions are to be used as a general quideline only!**

## UNPACK & INSPECT

Reference the Product Submittal for your specific part number. Unpack, and inspect your new Concentric Kit or pieces for missing parts or damges. Contract MicroMetl's Customer Service Department immediately with any questions or concerns. All hardware used for these assembly procedures is included with your concentric equipment or kit.

## GENERAL

MicroMetl's Concentric Equipment is offered as kits, or individual components.



## SAFETY PRECAUTIONS

Improper installation, adjustment(s), alteration(s), service or maintenance can cause property damage, injury or death. Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform basic maintenance functions such as replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, always observe precautions in the literature, tags and labels attached to the unit, and other safety precautions which may apply!

To avoid any property damage or personal injury, it is the installer's responsibility to be certain that the installation will not impair the function of the curb, or the unit to be installed. Check and disconnect all gas and electrical connections before installing associated HVAC accessories, and/or rooftop unit.

Once the roof curb is installed and roof cuts are made. It's time to install your concentric equipment. Due to the multitudes of ussues and obstacles an installer may encounter below the rooftop, it's important to understand that a wide variety of installation methods exists. It's imperative you hire a skilled contractor to complete the installtion in a safe and proper manner, and in accordance to all engineering specifications, and local codes.

This guide only addresses installation information which directly effects MicroMetl Product and Equipment.

## OBSERVE PROPER CLEARANCES AND OBSTRUCTIONS

Before installing Concentric Equipment, carefully check for clearances, and vertical distances required between concentric sections prior to installation. Use only a qualified contractor when confronting obstacles and issues which may obstruct and redirect your installation.

## CUTTING AN OPENING IN ROOF

**⚠ WARNING**

**To prevent injuries and rain damage, do not leave roof opening uncovered. If installation is not completed immediately after roof opening is cut and framed, provide an adequate temporary cover for the roof opening.**

Always use or consult a qualified contractor, and check all engineering specifications before arbitrarily cutting into your roof deck.

## What is a Concentric Diffuser System?

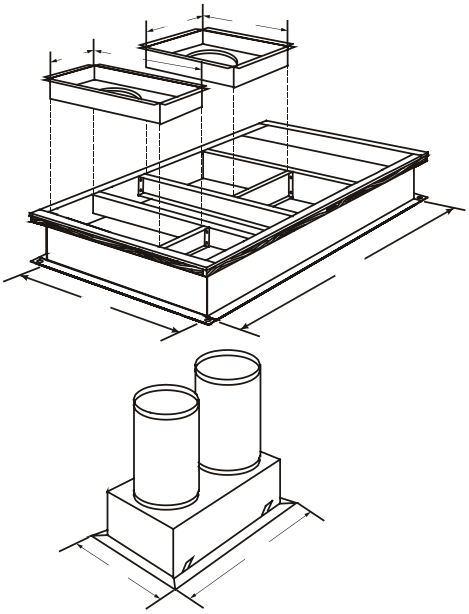
A Concentric Diffuser system is designed to provide a single point air distribution system.

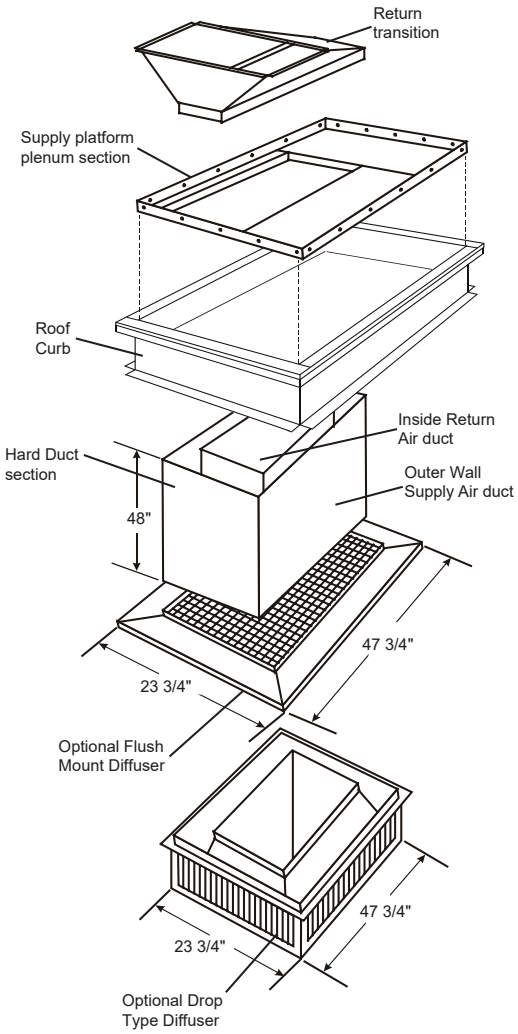
Climate control systems such as heating, ventilation and air-conditioning sometimes utilize ducts within the building to direct air from a climate control unit, to specific locations for further distribution.

Concentric diffusers are useful to provide a single diffuser housing to supply ventilation to a space while also allowing for return air to be returned to the HVAC system.

***Concentric Systems are comprised of the following components.***

**Transition Sections** or **Adapter Inserts**. These sheet metal sections install inside a **Roof Curb** and direct the air into hard or flexible duct sections.






**SPECIAL NOTES:**

**Do Not Install Concentric Packages...**
**- Into Vibration Isolation Type Curbs.**
**- Into an Adjustable Pitch Curb if using a hard duct plenum**

The **Hard Duct** contains two separate pieces of duct, this can be side by side or duct in duct. In the case of duct in duct, the outer walls direct supply air from the rooftop unit down into a diffuser, the inside section collects air from a space via the diffuser, returning it to the HVAC unit. Side by side hard duct uses seperate isolated hard duct sections, one for the suppy and for the return air.

**Flexible Duct** uses two or more individual pieces of flexible duct to direct the supply air from the rooftop unit to diffuser, and return air from the diffuser to rooftop unit.

The **Diffuser** itself is the means of air distribution within your space. Regardless of the feed type from your rooftop unit, flexible or hard duct, two basic types are available – Drop Type & Flush Mount.

The **Drop Type Diffuser** is designed to disperse the supply air from its perimeter. Additionally, the blades surrounding the perimeter are adjustable both vertically and horizontally to allow optimal control of supply air direction and velocity. The air is returned through the center of the diffuser.

**Flush Mount Diffuser** also uses the outside of the flush mount section for supply air distribution. All blades are fixed and produce a slightly higher rate of static pressure due to less available supply and return area.

***Large Tonnage Micrometl Diffusers Do Not Accompany Accessory Support Such As Curb Inserts And Ducts.*** Please Note that Large tonnage MicroMetl diffusers are not supported, or available as system kits, and have no supporting accessories. MicroMetl does not provide ductwork, curb transitions, or adapters. Ductwork to and from an air source must be field provided, fabricated, and assembled.

***A Roof Curb Is Not Included With Any Concentric Packages and Must Be Purchased Separately***. For additional information on MicroMetl curbs, visit our www.micrometl.com, or blog.micrometl.com, for videos and articles on curb types and their uses. There you will discover videos, brochures, installation guides and links to assist you when choosing the specific curb to fit your job requirements.

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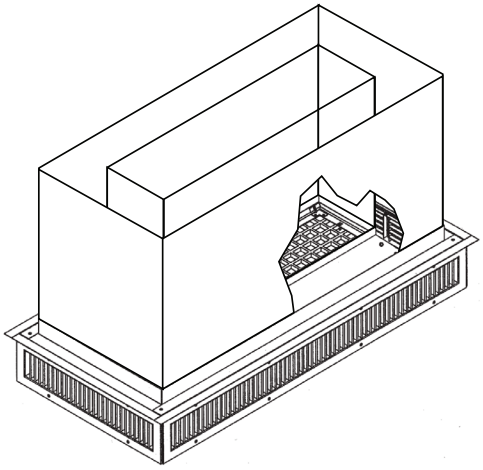
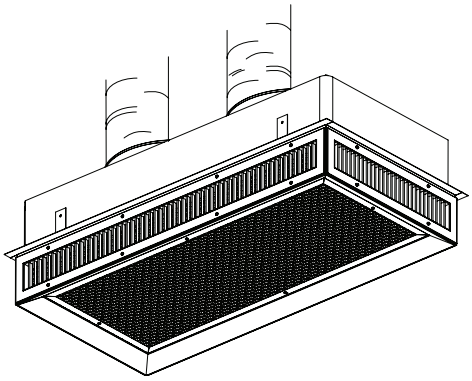
## Concentric Diffuser Kit Types

### A MICROMETL AIR DIFFUSER IS OFFERED IN FOUR DIFFERENT CONFIGURATIONS…

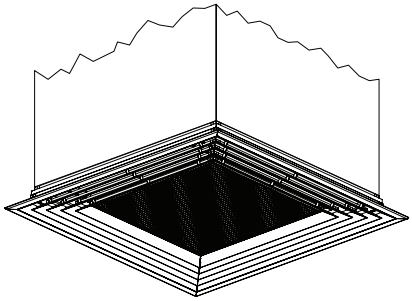
Type I - Drop Type Diffuser with Hard Duct Connection



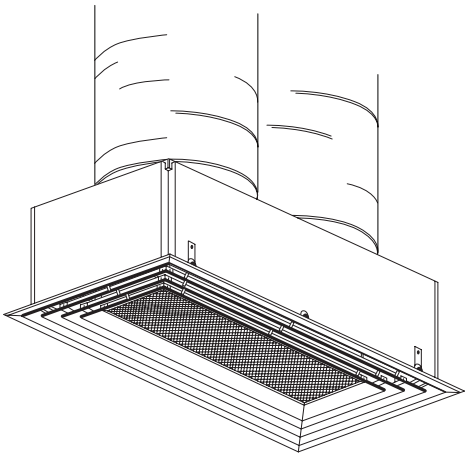
Type II - Drop Type Diffuser with Flexible Duct Connection



Type III – Flush Mount Diffuser with Hard Duct Connection



Type IV - Flush Mount Diffuser with Flexible Duct Connection



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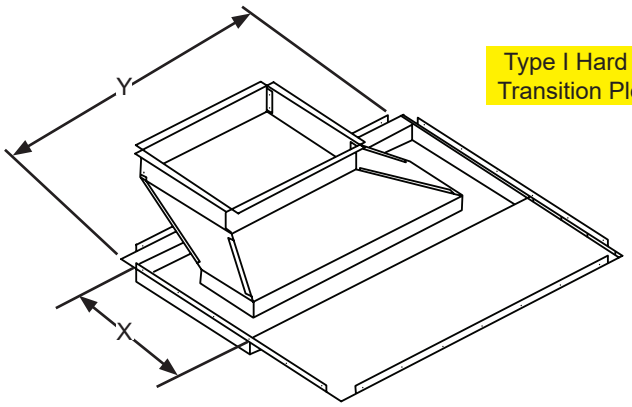
## HARD DUCT OPENING

### *Type I Hard Duct Transition Plenum*

When Installing a Type I Hard Duct Plenum as shown below, It is suggested to cut roof opening two inchs wider than the supply hard duct size.

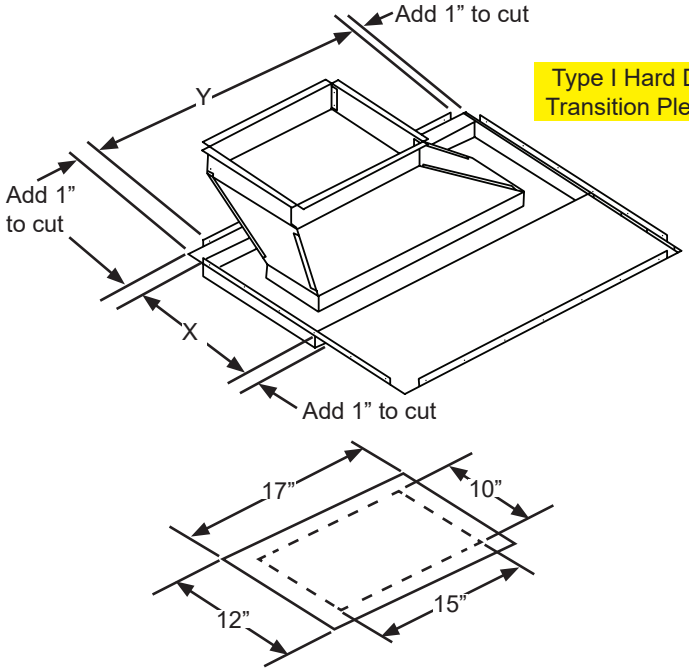
Please refer to the appropriate submittal for dimensional information.




Type I Hard Duct Transition Plenum

Referring to a submittal to obtain dimensions “X” & “Y,” cut roof open two inches larger. Cut one inch wider in each direction as seen below.

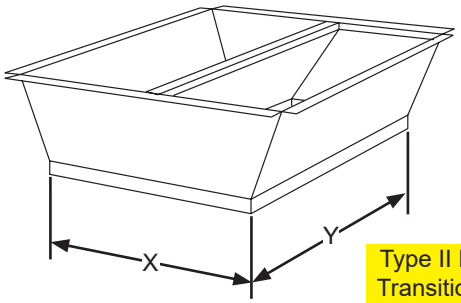
**Example:** If the dimension of “X” is 10 inches, and “Y” is 15 inches, your cut should be 12 X 17 as seen illustrated below.




Type I Hard Duct Transition Plenum

### *Type II Hard Duct Transition Plenum*

When Installing a Type II Hard Duct Transition shown in illustration below, it is suggested to cut the rooftop opening one inch wider than the supply hard duct size. Please refer to the appropriate submittal for dimensional information.

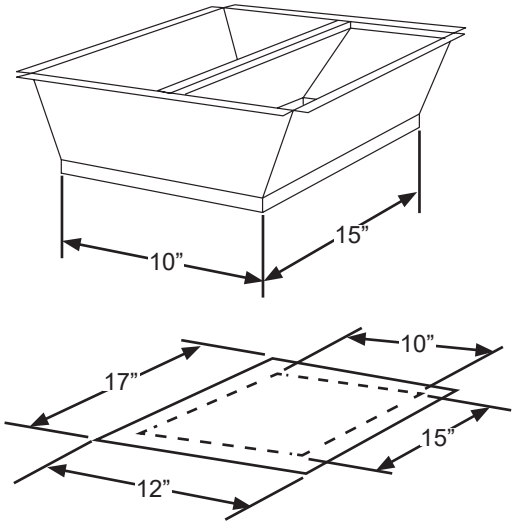



Type II Hard Duct Transition Plenum

The Return Air Transition will always fit within the Supply Air Transition, therefore, for the minimum, most esthetic cut, always create your cut according to the supply opening.

Referring to the submittal for dimensions “X” & “Y,”, cut roof open two inches larger. Cut one inch wider in each direction.

**Example:** If the dimension of “X” is 10 inches, and “Y” is 15 inches, your cut should be 12 X 17 as seen in illustration below.



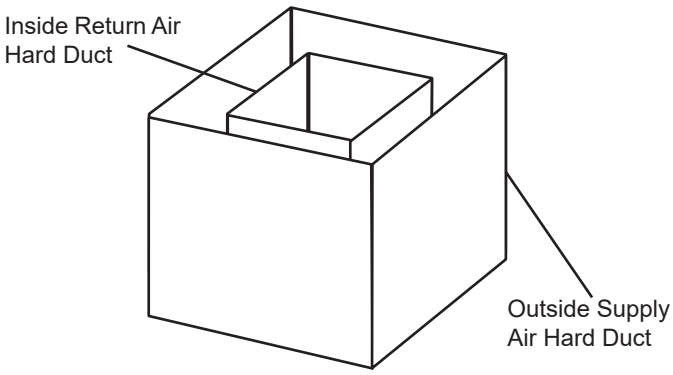
## HARD DUCT ASSEMBLY SECTION

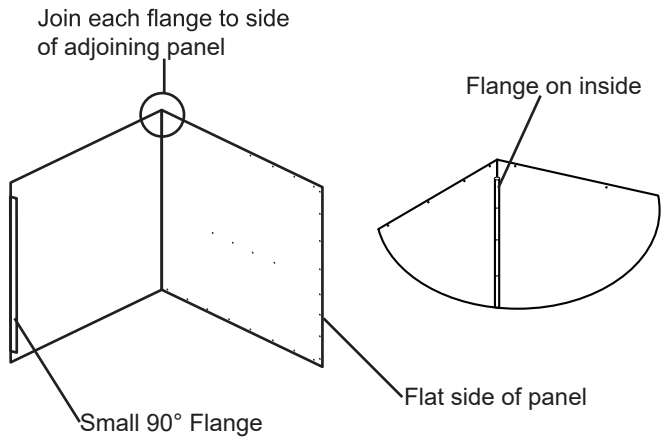
**ALL Hard Duct Transitions begin with MicroMetl Part Number 0903.**

A standard forty-eight inch Hard Duct connection is offered from MicroMetl to fit between the curb, and diffuser. The Hard Duct contains two separate pieces of duct, one inside the other. The outer walls direct supply air from the rooftop unit down into a diffuser, the inside section collects air from a space via the diffuser, returning it to the HVAC unit. Both ducts should be sealed to prevent air leakage and secured.

Each hard duct panel is shipped separately (eight panels), and must be field assembled. The panels are insulated on the inside and each contains a small ninety degree flange. The flange contains pre-punched holes assuring proper construction and alignment. See Illustration #17. Align the panel flange to the flat area of the adjoining panel. MicroMetl provides self-drilling screws which install from the outside wall. Be certain to keep all flanges on the inside of the hard duct section when assembly is complete.

Construct the return air (inside) hard duct section, set it to the side. Do not assemble the outside supply air panels at this time.



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## Hard Duct Transitions Defined

### ASSEMBLE TRANSITIONS FOR HARD DUCT INSTALLATION

Two styles of return & supply transitional curb inserts exist, and are used when constructing a Hard Duct Concentric System.

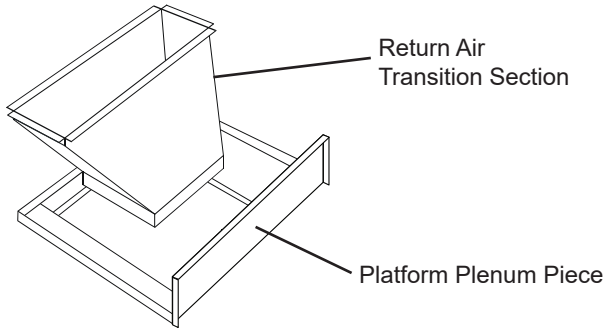
### HARD DUCT CURB TRANSITIONAL INSERT TYPES DEFINED

Two styles of return & supply transitional curb inserts exist, and are used when constructing a Hard Duct Concentric System.

**ALL Curb Transitional Inserts begin with MicroMetl Part Number 0816.**

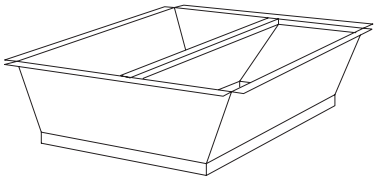
***Type I Defined*** – Requires the installation of a platform plenum piece of sheet metal. This section is used to create a plenum within the curb. The platform blanks off the bottom of the curb, while creating a wall, or divider within the curb. Once an RTU is placed upon the curb, a plenum chamber for the supply air is created. The plenum directs the supply air to the outside chamber of the hard duct connection.

The return air section once field constructed, covers the opening of the return air section of the RTU. It draws return air from your space below through the center or inside chamber of the hard duct connection. Only the return section pieces are insulated. All insulated pieces will face the inside of the return air section.




***Type II Defined*** – This type requires the individual construction of two separate transition pieces. Unlike the supply air platform design used in Type I, all sides of the transition are angled and insulated.

**Refer to the proper Hard Duct Transition Submittal for dimensional and visual construction information.**



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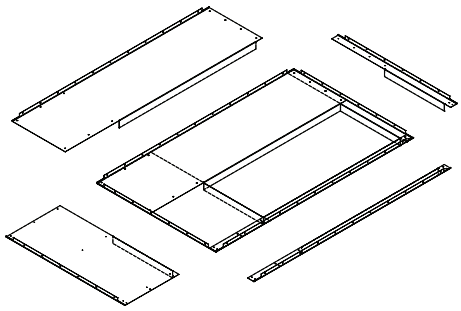
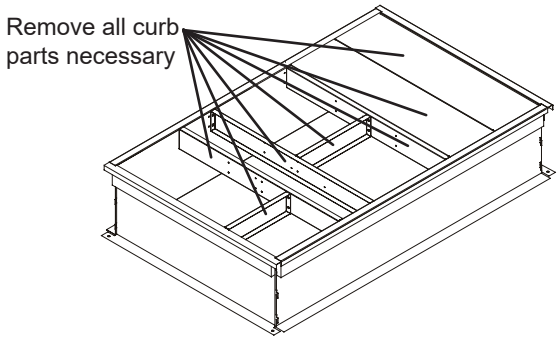
## Hard Duct Transition Assembly (Type I)

### ASSEMBLE TYPE I - PLATFORM PLENUM TYPE TRANSITIONS

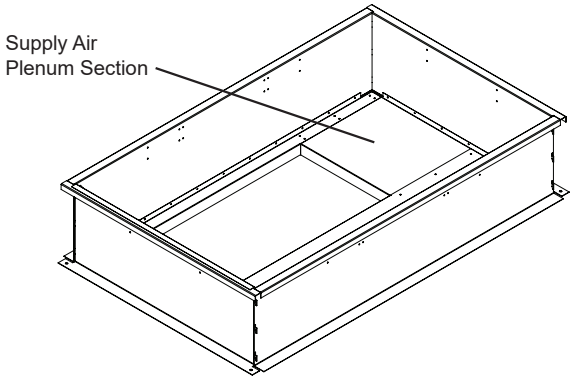
To install the Platform Plenum Section: Assemble the sheet metal pieces which comprise the Platform Plenum Section – Refer to submittal. All pieces possess pre-punched holes which can be used to align the parts. Using factory provided self-drilling screws, assemble, and secure all pieces. These pieces are not insulated.



Remove all obstructing curb support pieces. CAUTION: Depending upon the size fo the supply plenum section, not all curb supports and/or deck panels must be removed. Do not discard the supports, depending upon your specific installation. Some or all deck pans and supports MAY be reused. Refer to your submittal as a visual aide.




Lower the plenum platform into the curb. Using the MicroMetl factory provided self-drilling screws. Secure the section into the curb perimeter.

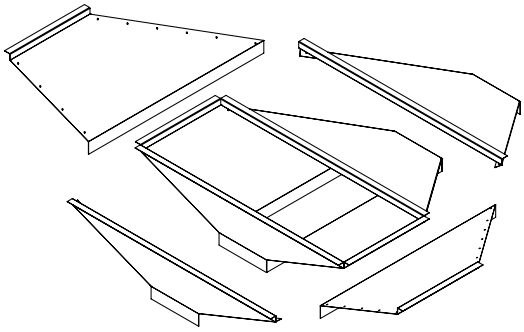



### NOTE: INSTALL SUPPLY AIR HARD DUCT

Following our suggested method of installation, the Supply Hard Duct will be installed proceeding the securing and placement of the diffuser. See Installing Supply Air Hard Duct to Diffuser.

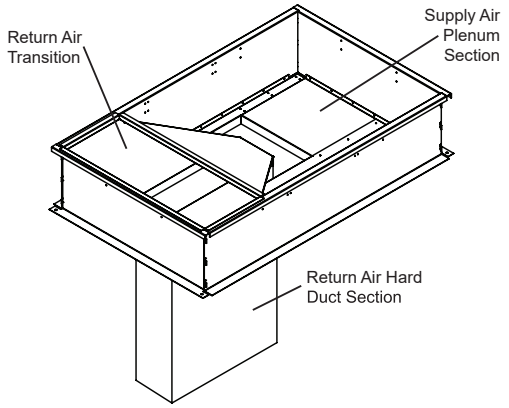
### INSTALL RETURN AIR TRANSITION AND DUCT

Assemble the several sheet metal pieces which comprise the Return Transition Section – Refer to submittal. All pieces possess pre-punched holes which can be used to align the parts. Using factory provided self-drilling screws, assemble, and secure all pieces. All Return Transition pieces are fully factory insulated.



Multiple options are feasible when installing the remainder of the concentric parts. One option is to assemble all return air insulated transition sheet metal parts as per the submittal. Attach the smaller, inside section of the hard duct to the lower flange of the Return Air Transition Section using provided self-drilling screws. Carefully lower the return air transition with the hard duct section securely attached.

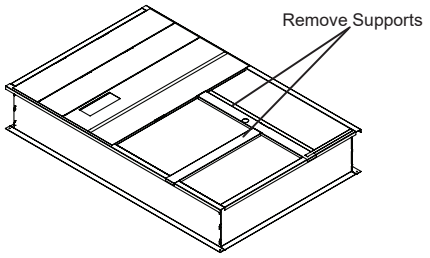
Use only site approved and adequate lifting equipment. Use extreme caution while lowering, securing, and lifting into place.



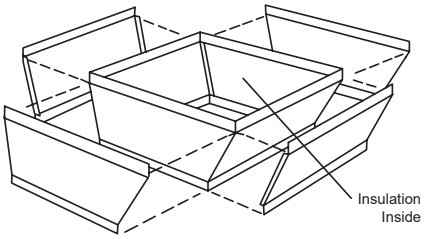

The return air transition section is designed to rest upon the top of the curb and does not require the section to be fastened. Should you decide to fasten this section, do not attach with screws on the top flange. Secure with self-drilling screws below the top of the curb wherever possible. Be certain to measure and place the section as displayed and dimensioned on your submittal.

## ASSEMBLE TYPE II – INDIVIDUAL SUPPLY & RETURN TRANSITION SECTIONS

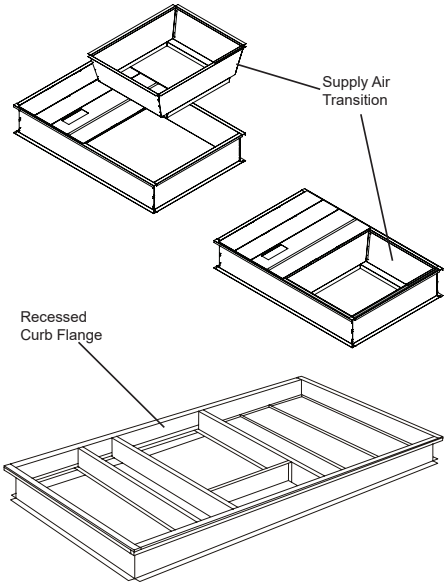
To install the Supply Air Section: Remove all obstructing curb support pieces. CAUTION: Depending upon the size fo the supply plenum section, not all curb supports and/or deck panels must be removed. Do not discard the supports, depending upon your specific installation. Some or all deck pans and supports MAY be reused. Refer to your submittal as a visual aide.




Assemble the several sheet metal pieces which comprise the Supply Air Transition Section – Refer to submittal. All pieces possess pre-punched holes which can be used to align the parts. Using factory provided self-drilling screws, assemble, and secure all pieces. All insulation face the inside of the transition.

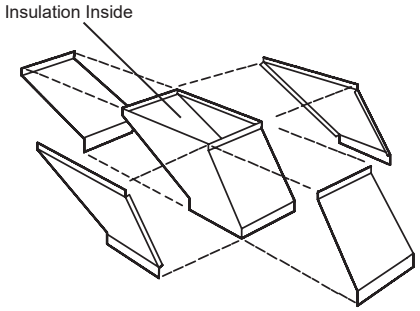



The Supply Section is designed to rest upon the top of the curb and does not require fastening. Should you decide to fasten this section, do not attach with screws on the top flange. Secure with self-drilling screws below the top of the curb wherever possible.



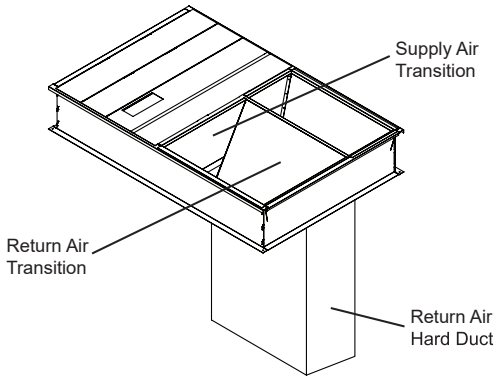

If the existing curb has recessed flanges as marked here, they should not be removed unless the accompanied submittal specifically requests the removal

To install the Return Air Section: Assemble all insulated sheet metal parts as per the submittal. Assemble the Return Air Transition Section. All pieces possess pre-punched holes which can be used to align the parts. Using factory provided self-drilling screws, assemble, and secure all pieces.




The Return Air Transition is designed to rest upon the top of the curb and does not require the section to be fastened. Should you decide to fasten this section, do not attach with screws on the top flange. Secure with self-drilling screws below the top of the curb wherever possible. Be certain to measure and place the section as displayed and dimensioned on your submittal.

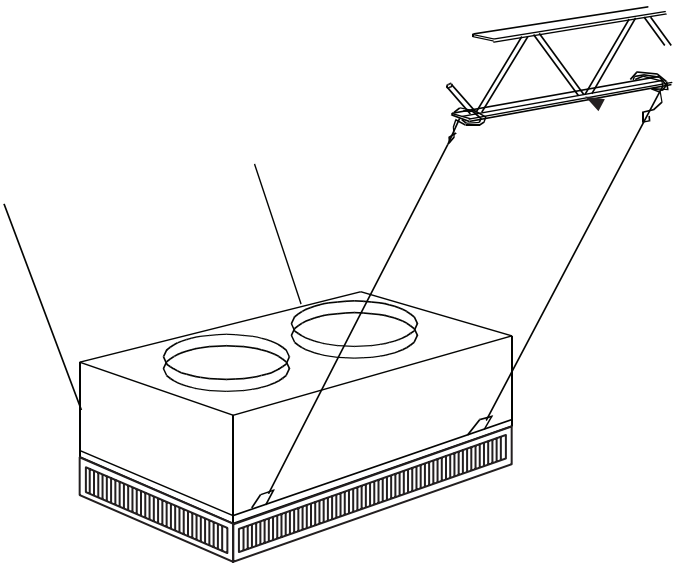
Consider attaching the smaller inside Return Air section of the hard duct to the lower flange of the Return Air Transition before setting it into the curb. Utilize only site approved and adequate lifting equipment, and use extreme caution while securing and lifting into place.




Following our suggested method of installation, the Supply Hard Duct will be installed proceeding the securing and placement of the diffuser. See Installing Supply Air Hard Duct to Diffuser.

## DIFFUSER INSTALLATION

All Diffuser types must be independently field secured. Secure the diffuser box to the ceiling joists or the rafters with hanging wire or the like. Hanging clips are factory provided on all diffuser boxes.



***Flex Duct Diffuser Drop Type***

***Drop Type, FLEX DUCT Diffuser Stand-Alone Installation*** Secure the diffuser box to the ceiling joists or the rafters with hanging wire or the like. Hanging clips are factory provided on the sides of the diffuser box.

***When Installing Into a Ceiling Grid***, although it is not recommended to be installed in a drop ceiling, if installing into a ceiling grid, push the drop type diffuser box up through grid and lay in place over the ceiling grid and secure the diffuser box to the ceiling joists or the rafters with hanging wire or the like. Hanging clips are factory provided on the sides of the diffuser box. Support from the flex duct connections, or ceiling grid is not sufficient to support the weight of any diffuser, and should never be a method for securing & supporting diffusers.

Be certain to label and connect the proper ducts to the diffusers. Supply should always feed air to the outside perimeter or edges of the diffuser, and return should always connect to the center of the diffuser.

Slip ends of flexible duct over the collars on the diffuser box. Refer to - FLEX DUCT INFORMATION section, for suggested flex duct installation method.

***Hard Duct Diffuser - Drop Type***

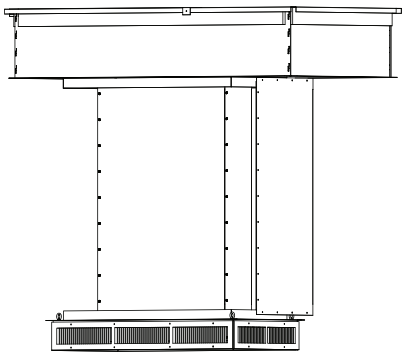
***Drop Type, HARD DUCT Diffuser Stand-Alone Installation*** - The hard duct connection alone, is not sufficient to support the weight of any diffuser, and should never be a method for securing & supporting diffusers. Secure the diffuser box to the ceiling joists or the rafters with hanging wire or the like. Hanging clips are factory provided on the sides of the diffuser box.

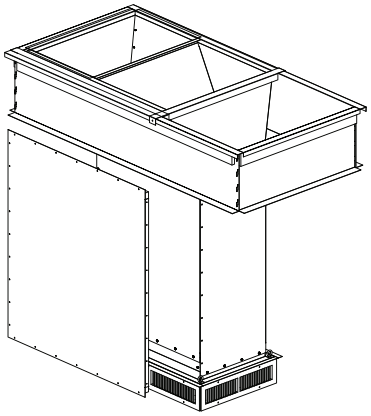
***When Installing Into a Ceiling Grid*** - a full perimeter flange is provided on diffuser to be rested upon the ceiling grid. Secure the diffuser box to the ceiling joists or the rafters with hanging wire or the like. Hanging clips are factory provided on the sides of the diffuser box.

Be certain to label and connect the proper ducts to the diffusers. Supply should always feed air to the outside perimeter or edges of the diffuser, and return should always connect to the center of the diffuser.

## DIFFUSER HARD DUCT INSTALLATION

If you have followed the installation as shown in Illustration #24. Be certain to secure and seal the return duct section completely before beginning the install of the supply duct, otherwise, you will have no means of sealing and properly securing the return air section to the transition and diffuser. Install the supply panels one at a time. Install, secure, and seal all 4 panels.





## Flush Mount Diffuser - Hard Duct Connection - Complete Kit Information!

| Diffuser Model Number | CFM | Minimum Throw Distance In Feet | Maximum Throw Distance In Feet | Static Drop 0902 Diffuser | Static Drop 0902 Return Hard Duct Section | Static Drop 0902 Supply Hard Duct Section | Static Drop 0816 Curb Transition | Sound In Decibels | Diffuser Face Return Area In Sq. Feet | Diffuser Face Supply Area In Sq. Feet |
|---|---|---|---|---|---|---|---|---|---|---|
| 0902-0012 | 1,000 | 9 | 12 | 0.18 | 0.02 | 0.05 | 0.02 | 20 | 2.10 | 3.37 |
| | 1,200 | 12 | 16 | 0.25 | 0.03 | 0.06 | 0.02 | 25 | 2.10 | 3.37 |
| | 1,400 | 15 | 20 | 0.33 | 0.04 | 0.08 | 0.03 | 30 | 2.10 | 3.37 |
| | 1,600 | 17 | 23 | 0.42 | 0.06 | 0.09 | 0.04 | 30 | 2.10 | 3.37 |
| | 1,800 | 20 | 26 | 0.53 | 0.07 | 0.11 | 0.05 | 35 | 2.10 | 3.37 |
| | 2,000 | 22 | 29 | 0.64 | 0.08 | 0.12 | 0.06 | 40 | 2.10 | 3.37 |
| | 2,400 | 25 | 32 | 0.68 | 0.11 | 0.14 | 0.06 | 45 | 2.10 | 3.37 |
| 0902-0013 | 2,600 | 17 | 24 | 0.49 | 0.04 | 0.14 | 0.06 | 35 | 3.48 | 3.76 |
| | 2,800 | 18 | 28 | 0.55 | 0.05 | 0.15 | 0.05 | 35 | 3.48 | 3.76 |
| | 3,000 | 20 | 30 | 0.62 | 0.06 | 0.16 | 0.06 | 35 | 3.48 | 3.76 |
| | 3,200 | 22 | 33 | 0.69 | 0.06 | 0.17 | 0.07 | 40 | 3.48 | 3.76 |
| | 3,400 | 23 | 37 | 0.77 | 0.07 | 0.18 | 0.08 | 40 | 3.48 | 3.76 |
| 0902-0005 | 4,000 | 16 | 37 | 0.80 | 0.06 | 0.21 | 0.06 | 30 | 4.05 | 4.72 |
| 0902-0006 | 5,000 | 16 | 32 | 0.70 | 0.03 | 0.17 | 0.06 | 40 | 6.30 | 5.68 |
| 0902-0007 | 6,000 | 16 | 32 | 0.63 | 0.02 | 0.14 | 0.06 | 40 | 7.61 | 8.08 |
| | 7,200 | 22 | 44 | 0.92 | 0.02 | 0.21 | 0.08 | 45 | 7.61 | 8.08 |
| 0902-0008 | 7,200 | 47 | 80 | 0.41 | Field Supplied | Field Supplied | Field Supplied | 39 | 9.04 | 10.86 |
| | 8,000 | 51 | 84 | 0.50 | Field Supplied | Field Supplied | Field Supplied | 45 | 9.04 | 10.86 |
| 0902-0014 | 10,000 | 21 | 45 | 0.52 | Field Supplied | Field Supplied | Field Supplied | 45 | 14.13 | 10.48 |

**Performance Notes:**

- All engineering data is based upon interpolated data and should be used for reference only. Actual readings may vary.
- All pressure values are in inches of water.
- Throw values are given for the terminal velocities of 150 fpm (min throw) and 50 fpm (max throw)
- Each NC value represents the noise criterion curve which will not be exceeded by the sound pressure in any of the octave bands, 2nd through 7th. Each NC value is based on a room absorption of 10 db, re 10 - 12 watts.
- The NC value is based upon an “A” weighting (Human Ear Listening Response).

## Drop Type Diffuser - Hard Duct Connection - Complete Kit Information!

| Diffuser Model Number | CFM | Minimum Throw Distance In Feet | Maximum Throw Distance In Feet | Static Drop 1818 Diffuser | Static Drop 0902 Return Hard Duct Section | Static Drop 0902 Supply Hard Duct Section | Static Drop 0816 Curb Transition | Sound In Decibels | Diffuser Face Return Area In Sq. Feet | Diffuser Face Supply Area In Sq. Feet |
|---|---|---|---|---|---|---|---|---|---|---|
| 1818-200A | 1,000 | 9 | 23 | 0.07 | 0.01 | 0.01 | 0.07 | 12 | 4.06 | 2.82 |
| | 1,200 | 10 | 24 | 0.11 | 0.01 | 0.01 | 0.11 | 15 | 4.06 | 2.82 |
| | 1,400 | 12 | 26 | 0.15 | 0.01 | 0.01 | 0.15 | 19 | 4.06 | 2.82 |
| | 1,600 | 13 | 28 | 0.19 | 0.01 | 0.02 | 0.19 | 21 | 4.06 | 2.82 |
| | 1,800 | 15 | 30 | 0.24 | 0.01 | 0.02 | 0.24 | 26 | 4.06 | 2.82 |
| | 2,000 | 17 | 32 | 0.30 | 0.02 | 0.03 | 0.30 | 30 | 4.06 | 2.82 |
| | 2,400 | 19 | 34 | 0.43 | 0.02 | 0.04 | 0.43 | 32 | 4.06 | 2.82 |
| 1818-300A | 2,600 | 22 | 39 | 0.34 | 0.05 | 0.04 | 0.04 | 32 | 5.69 | 3.10 |
| | 2,800 | 23 | 40 | 0.39 | 0.06 | 0.04 | 0.05 | 38 | 5.69 | 3.10 |
| | 3,000 | 25 | 42 | 0.45 | 0.07 | 0.06 | 0.06 | 40 | 5.69 | 3.10 |
| | 3,200 | 26 | 43 | 0.53 | 0.08 | 0.08 | 0.07 | 41 | 5.69 | 3.10 |
| | 3,400 | 27 | 45 | 0.61 | 0.09 | 0.10 | 0.08 | 42 | 5.69 | 3.10 |
| 1818-400A | 4,000 | 29 | 58 | 0.51 | 0.06 | 0.21 | 0.04 | 30 | 4.00 | 5.38 |
| 1818-500A | 5,000 | 33 | 62 | 0.60 | 0.03 | 0.18 | 0.06 | 30 | 6.15 | 6.25 |
| 1818-600A | 6,000 | 40 | 70 | 0.56 | 0.03 | 0.17 | 0.06 | 37 | 7.56 | 7.12 |
| | 7,200 | 46 | 79 | 0.64 | 0.04 | 0.27 | 0.08 | 47 | 7.56 | 7.12 |
| 1818-800A | 7,200 | 47 | 80 | 0.46 | Field Supplied | Field Supplied | Field Supplied | 39 | 8.82 | 8.08 |
| | 8,000 | 48 | 82 | 0.51 | Field Supplied | Field Supplied | Field Supplied | 39 | 8.82 | 8.08 |
| | 10,000 | 52 | 90 | 0.54 | Field Supplied | Field Supplied | Field Supplied | 41 | 13.97 | 8.91 |

**Performance Notes:**

- All engineering data is based upon interpolated data and should be used for reference only. Actual readings may vary.
- All pressure values are in inches of water.
- Throw values are given for the terminal velocities of 150 fpm (min throw) and 50 fpm (max throw)
- Each NC value represents the noise criterion curve which will not be exceeded by the sound pres sure in any of the octave bands, 2nd through 7th. Each NC value is based on a room absorption of 10 db, re 10 - 12 watts.
- The NC value is based upon an “A” weighting (Human Ear Listening Response).