Introduction

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.

Flexible Duct uses two or more individual pieces of flexible duct to direct the supply air from the rooftop unit to a diffuser, and return air from the diffuser to the 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 Are Not Supported, Or Available As Kits
Please Note that Large tonnage MicroMelt diffusers are not supported, or available as system kits, and have no supporting accessories. MicroMelt 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 MicroMelt curbs, visit our www.micromelt.com, or blog.micromelt.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.
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.

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*IF INSTALLING FLEX DUCT SKIP TO STEP 5.

GENERAL

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

SAFE PRECAUTIONS

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 this 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 issues & 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 installation in a safe and proper manner, and in accordance to all engineering specifications, and local codes.

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

A MICROMETL AIR DIFFUSER IS OFFERED IN FOUR DIFFERENT CONFIGURATIONS...

Type I - Drop Type Diffuser with Hard Duct Connection (Illustration #4)
Type II - Drop Type Diffuser with Flexible Duct Connection  
(Illustration #5)

Type III – Flush Mount Diffuser with Hard Duct Connection  
(Illustration #6)

Type IV - Flush Mount Diffuser with Flexible Duct Connection  
(Illustration #7)

UNPACK & INSPECT

Reference the Product Submittal for your specific part number, and an illustration of all necessary parts. Unpack, and inspect your new Concentric Kit or pieces for missing parts or damages. Contact 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.

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

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.

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 inches wider than the supply hard duct size.

Please refer to the appropriate submittal for dimensional information.
Referring to a submittal to obtain dimensions “X” & “Y,” cut roof open two inches larger. Cut one inch wider in each direction as seen in Illustration #9.

**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 #9

---

**Illustration #9**

**Type II Hard Duct Transition Plenum**
When installing a Type II Hard Duct Transition shown in Illustration 10, 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.

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**Illustration #10**

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 11.
Referring to the submittal for dimensions “SX” & “SY” (Supply Opening) and “RX” & “RY” (Return Openings), cut each roof opening two inches larger. Cut one inch wider in each direction.

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

If the dimension of “RX” is 20 inches, and “SY” is 25 inches, your supply cut should be 22 X 27 as seen below.

![Illustration #13](image)

**Flex Duct Opening – Method Two – Single Openings**

We suggest when cutting only one opening, make the cut one inch wider than the area of the supply and return curb openings combined. Please refer to the appropriate submittal for dimensional information.

![Illustration #14](image)

When referring to the submittal for dimensions “X” & “Y”, the dimensions will be present on the submittal, but must be added together to determine the size of the rooftop cut needed. Measure from the furthest edge of the return & supply roof curb openings. As shown in Illustration #15.

**NOTE:** Do not exceed curb “ID” if making cut prior to curb installation.

Adapter Pan #1 in this example is 10” longer than adapter pan #2. Therefore using the longest dimension of 25” and the summation of 35”.

Cut the opening two inches larger than dimension “X” & “Y,” as shown in Illustration #14 (one inch wider in each direction).

**Example:** If the combined dimensions noted as “X” is 35 inches, and “Y” is 25 inches, your supply cut should be 37 X 17 as seen below.

![Illustration #15](image)

**Hard Duct Curb Insert Assembly Instruction**

A standard forty-eight inch Hard Duct connection is offered from MicroMetal 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. MicroMetal 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.

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

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.

Illustration #17

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 of 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.

Illustration #20
Lower the plenum platform into the curb. Using the MicroMetl factory provided self-drilling screws. Secure the section into the curb perimeter.

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 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.

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 located on page 11.

To install the Supply Air Section: Remove all obstructing curb support pieces. CAUTION: Depending upon the size of 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.

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 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.

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 on Page 11.

INSTALLING ADAPTER PANS FOR FLEX DUCT INSTALLATION

A standard forty-eight inch Flex Duct connection is offered by MicroMetl to fit between the curb, and diffuser. This connection must be tight fitting, and secure. Check the MicroMetl website, or contact Customer Service for pricing and availability.
MicroMetl round flex duct is insulated, Underwriters Laboratories (UL) Approved, and constructed of two ply, polyester film using a zinc coated spring steel helix wire without collars.

**FLEX DUCT ADAPTER PANS TYPES DEFINED**

**Flexible Duct Adapter Pans Defined** – To transform the supply and return air section from a square or rectangular opening to round duct, adapter inserts are required. MicroMetl can provide adapter inserts which are factory constructed and simple to field install.

**INSTALLING ADAPTER PANS FOR FLEX DUCT**

MicroMetl Flex Duct requires no assembly. Most adapter pan installations do not require the removal of curb supports. The adapter pans will most often fit directly upon the supports of the existing supply and return curb openings.

If two individual pans are provided, each is designed to fit its respective opening – check submittal to match each adapter pan dimensionally. Should you receive a single pan, as displayed in Illustration #34, remove all obstructing curb support pieces, they are no longer needed, and may be discarded at the completion of the installation. Refer to your submittal as a visual aide.
INSTALLING FLEX DUCT

NOTE: Some flex duct connections are obround and require the installer to secure the flex duct slightly out of its round form.

Although MicroMetl provides screws to secure the Flex Duct to the collars, it is recommended you use Panduit type cable ties (not provided).

Slightly pull back the insulation, exposing the membrane. Carefully slide the membrane over the collar until it contacts the sheet metal surface. Using a Panduit type cable tie, tightly secure the membrane to the collar. Using duct tape, apply the tape around the perimeter of the duct several times covering the cable tie. Push the insulation down until it meets with the sheet metal covering the membrane. Again, using a cable tie, tightly secure the membrane to the collar. Using duct tape, apply the tape around the perimeter of the duct several times covering the cable tie.

NOTE: Other methods of attaching flexible ductwork exist. Use the one recommended by the Engineering Specification for your job site if requested.

INSTALLING THE DIFFUSER

MicroMetl offers two types of Concentric Diffusers, the Drop Type, and Flush Mount. Each type allows Flex Duct, or Hard Duct connections.

Stand Alone Concentric Diffusers

Several large Micrometl Diffusers are not offered as kits and have no supporting factory accessories. MicroMetl does not provide ductwork, air transitions, or air adapters for any of the larger ton diffusers listed below. Duct work from an air source must be field provided, fabricated, and assembled.

Flush Mount Types Diffusers...
0902-0013, 0902-0014, 1017-800A and 1017-990A

Drop Type Diffusers...
1018-800A, 1018-990A, 1818-800A and 1818-990A

CONCENTRIC DIFFUSER TYPES DEFINED

MicroMetl Diffusers are specifically designed to disperse air from the outside perimeter in a 360 degree radius with equal velocity. They are further designed to throw and disperse the supply air with sufficient velocity, and then return the recirculated air to your rooftop unit through the center of the diffuser. Chose a diffuser according to your desired airflow in Cubic Feet of Air per Minute (CFM). See Tables on page 12 and 13 for Diffuser Performance Specifications.

Drop Type Diffuser Defined – If used in conjunction with a drop ceiling, it will extend several inches below the ceiling surface. This style diffuser is designed to disperse the supply air from the perimeter allowing a further dispersion of air than obtainable from a flush mount diffuser. Most often used as a stand-alone application.

Additionally, the blades circling the perimeter are adjustable both vertically and horizontally to allow optimal control of supply air direction and velocity. Due the design of the Drop Type Diffuser, your return air is less likely to generate air noise due to the lower face velocity, and larger return air section used to draw air into the diffuser.

Flush Mount Diffuser Defined – Most often used in conjunction with a drop ceiling, built to lay flush to the ceiling surface. The outside perimeter of the flush mount section is used for air distribution. All blades are fixed, and when comparing equal velocities, the flush mount does not throw air as far as drop type diffusers, and produces a slightly higher rate of static pressure due to a smaller supply and return area.
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.

Illustration #38

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 Step 5C - INSTALLING FLEX DUCT," 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.
INSTALLING FLEX DUCT DIFFUSERS AND DUCT

Flush Mount

Support from the flex duct connections, a diffuser with flexible duct configuration (Illustration #7), or ceiling grid is not sufficient to support the assembly, and should never be the sole method for securing diffusers or concentric assemblies.

Push the flush mount diffuser box up through grid and lay in place. Be certain to label and connect the proper ducts to the diffusers. The 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. 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.

Slip ends of flexible duct over the collars on the diffuser box. Refer to - THE INSTALLING FLEX DUCT section on page 10, for suggested flex duct installation methods.

Drop Type Diffuser with Flexible Duct Connections (Illustration #5) - The Flex duct connections alone, are not sufficient to support the weight of diffusers, and should never be a method of securing and 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.

Always label and connect the proper ducts to the diffuser opening. 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 - INSTALLING FLEX DUCT section on page 10, for suggested flex duct installation methods.

Concentric Adapter

MicroMetl curb or factory curb

Illustration #40

APPLY THE GASKET MATERIAL

To avoid property damage or personal injury, it is the installer’s responsibility that the roof curb and unit are to be completely sealed, preventing any water or air leakage/damage.

Sealing Gasket should be provided from the curb manufacturer, and is NOT provided with any Concentric Equipment or Kits!

Install sealing gasket on top of the curb perimeter, supports and flanges of all concentric parts flush with the surface of your curb. Gasket should be cut and butted together at the corners. Gasket strips must fit tightly together to leave no gaps for leakage. The weight of the unit will compress the gasket to seal the joint between the unit and the roof curb. Do not slide unit into position when it is sitting on the curb. The curb gasket material may be damaged and leaks may result.

If sealing gasket is needed, MicroMetl offers gasket tape in a variety of lengths.

Contact MicroMetl’s Customer Service or visit our website and search for part number...9430-0100- Twenty-five feet of 1.5” X 0.25 closed cell polyvinyl chloride foam with an adhesive backing.

Improperly installed gasket can result in air leaks, water penetration, and poor unit performance.

SEAL ALL SEAMS

To best seal all seams and prevent air and energy leakage, a mastic adhesive is recommended. Tapes can, and often separate over time due to temperature, condensation, and age. Mastic adhesives when applied to a clean metal surface are a permanent solution.

Additionally, consider taping or sealing the insulation at the top of the hard duct connection upon construction and completion of the project. If the leading edges of the insulation become exposed to high velocity of the supply air stream, it will separate and tear apart over time.
Flush Mount Diffuser - Hard Duct Connection - Complete Kit Information!

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Flush Mount Diffuser - Flexible Duct Connection - Complete Kit Information!

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