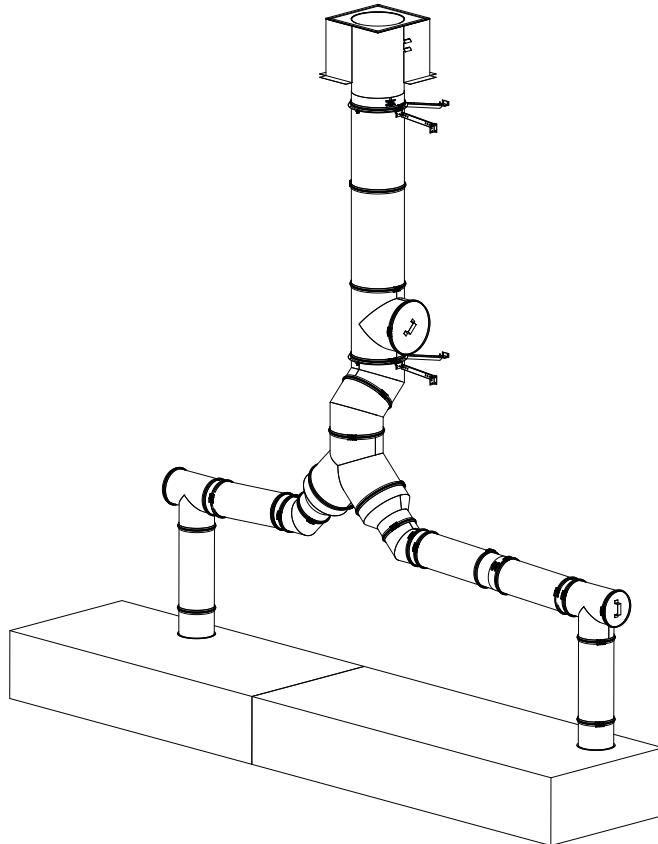


Non-Welded Grease Duct Systems

# Installation, Operation, and Maintenance Manual



#### FOR YOUR SAFETY

**TWO MAJOR CAUSES OF GREASE DUCT RELATED FIRES: (1) FAILURE TO MAINTAIN REQUIRED CLEARANCE (AIR SPACE) TO COMBUSTIBLE MATERIALS AND (2) FAILURE TO CLEAN GREASE LADEN DUCTS. IT IS OF UTMOST IMPORTANCE THAT THIS GREASE DUCT BE INSTALLED ONLY IN ACCORDANCE WITH THESE INSTRUCTIONS. DO NOT INSTALL GREASE DUCT WITHOUT FIRST READING THESE INSTRUCTIONS VERY CAREFULLY.**

#### RECEIVING AND INSPECTION

**EXAMINE ALL COMPONENTS FOR POSSIBLE SHIPPING DAMAGE PRIOR TO INSTALLATION. DIFFERENT MANUFACTURERS HAVE DIFFERENT JOINT SYSTEMS AND ADHESIVES. DO NOT MIX PIPE, FITTINGS, OR JOINING METHODS FROM DIFFERENT MANUFACTURERS.**

**Save these instructions. This document is the property of the owner of this equipment and is required for future maintenance. Leave this document with the owner when installation or service is complete.**

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## **WARRANTY**

This ductwork is warranted to be free from defects in material and workmanship, under normal use and service, for a period of 20 years from the date of shipment. This warranty shall not apply if:

1. The equipment is not installed by a qualified installer per this installation guide; this guide should be kept with the equipment once installation is complete.
2. The equipment is not installed in accordance with federal, state, and local codes and regulations.
3. The equipment design or sizing is not approved per MANUFACTURER'S specifications.
4. The equipment is misused, neglected, or not maintained per the MANUFACTURER'S maintenance instructions.
5. The equipment is exposed to elevated temperatures due to a fire originating in the building, hood, fan, duct or kitchen appliances.
6. The equipment is not operated within its published capacity.
7. The equipment is operated, tested or stored in the presence of chlorines, solvents, refrigerant vapors, caustic substances, halogenated compounds or other conditions which could cause condensation of corrosive materials within or on the system.
8. The equipment is substituted or connected with parts not manufactured per Original Equipment Manufacturer.
9. The invoice is not paid within the terms of the sales agreement.

The MANUFACTURER shall not be liable for incidental and consequential losses and damages potentially attributable to malfunctioning equipment. Should any part of the equipment prove to be defective in material or workmanship within the 20-year warranty period, upon examination by the MANUFACTURER, such parts will be repaired or replaced by the MANUFACTURER at no charge. The BUYER shall pay all labor costs incurred in connection with such repair or replacement. Equipment shall not be returned without MANUFACTURER'S prior authorization and all returned equipment shall be shipped by the BUYER, freight prepaid to a destination determined by the MANUFACTURER.

## **APPLICATION**

The listed grease duct is suitable for use in commercial cooking installations for the removal of smoke and grease laden vapors. The grease duct system includes all components for a complete exhaust system from the hood to the exhaust fan inlet.

Grease duct installations require provisions for cleaning the interior of the duct. NFPA 96 clean-out requirements are as follows:

1. A clean-out must be provided at each change of direction except where the entire length of duct can be inspected and cleaned from either the hood or the discharge end.
2. On horizontal duct runs, at least one 20" diameter opening must be provided. Where the opening is smaller than 20" diameter, openings large enough to permit cleaning must be provided at intervals of no more than 12'.
3. Openings must be at the side or the top, whichever is more accessible. When the opening is on the side of the duct, the lower edge of the opening must be at least 1-1/2" above the bottom of the duct. For the listed grease duct, this is accomplished by the use of the grease manifold tee and clean-out cap.
4. On vertical duct runs where personnel entry is possible, access must be from the top of the riser. Where entry is not possible, access must be provided at each floor.

**NOTE: ACCESS REQUIREMENTS ARE SUBJECT TO CHANGE IN ACCORDANCE WITH LOCAL CODE. LOCAL AUTHORITIES SHOULD BE CONSULTED FOR EXACT REQUIREMENTS. GREASE DUCT MAY BE CONNECTED ONLY TO HOODS IN A SINGLE FIRE ZONE ON ONE FLOOR. DO NOT CONNECT GREASE DUCTS TO ANY OTHER PART OF THE BUILDING VENTILATION OR EXHAUST SYSTEM.**

When grease duct is installed in accordance with these installation instructions and the joints are sealed properly with the recommended sealant, the system will contain a grease fire within the duct. A grease fire can burn at extremely high temperatures. This system should be dismantled and inspected after any exposure to a grease fire. Any section that is distorted or discolored should be replaced. All joints in the system should be examined. Because the sealant expands to assure a positive seal in the case of a fire, any sealant that has been exposed to high temperature must be replaced. This will ensure that the system maintains its integrity against fire conditions in the future. The manufacturer of this grease duct cannot be responsible for grease duct systems that are not properly maintained or have been subjected to one or more grease fires.

Grease duct systems size and capacity information may be obtained from the "ASHRAE Handbook – Fundamentals" or from the "Air Pollution Engineering Manual" of the "US Environmental Protection Agency". Refer to the grease duct systems catalog for descriptions and dimensional data of parts.

## **MECHANICAL**

### **Joint Sealant**

The joint sealant used to seal all joint assemblies is a 3M product. 3M Fire Barrier 2000 + Silicone Sealant is a ready-to-use, gun-grade, one-component silicone elastomer that cures upon exposure to atmospheric humidity to form a flexible seal. 3M Fire Barrier 2000 + Silicone Sealant, when installed properly, will control the spread of fire before, during and after exposure to open flames. It will stop the spread of noxious gas, smoke and water, and maintain the integrity of fire rated assemblies and construction.

#### **NO SEALANT SUBSTITUTES MAY BE USED.**

##### Sealant Features

1. Superior adhesion
2. Capable of withstanding 2000 °F + temperatures.
3. Class 25 sealant, per ASTM C920.
4. Re-enterable/repairable.
5. Provides up to 4-hours fire-rating.
6. Cures upon exposure to atmospheric humidity.
7. Working time 30 minutes.
8. Full cure time: 14 to 21 days.
9. Applied with a standard caulk gun.
10. Duct can be placed in operation 7 days after installation, prior to full cure.

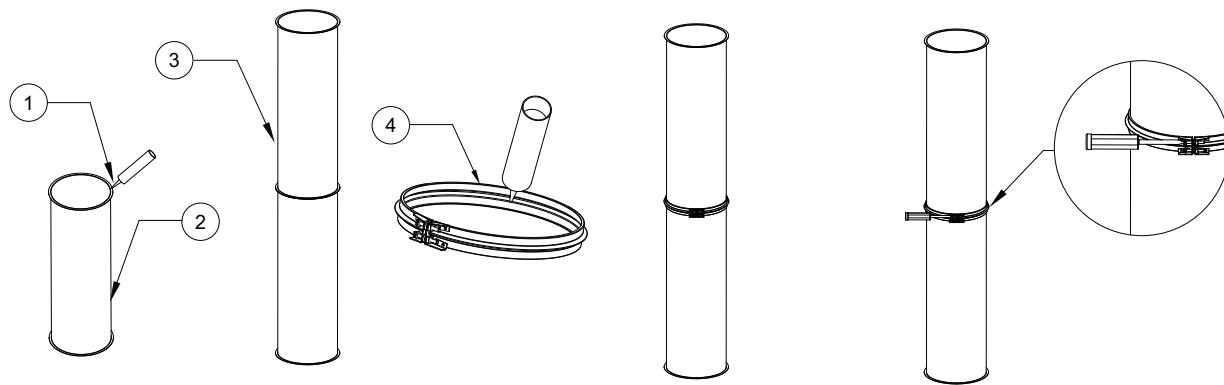
**Table 1 - Sealant Usage**

<b>3M Fire Barrier 2000 Plus</b>			
<b>Diameter</b>	<b>Duct Perimeter (Feet)</b>	<b>Average Feet Per Tube</b>	<b>Number of Joints</b>
8"	2.16	30	7
10"	2.68	30	6
12"	3.21	30	5
14"	3.73	30	4
16"	4.25	30	3.5
18"	4.78	30	3
20"	5.30	30	3
22"	5.83	30	2.5
24"	6.35	30	2.5
30"	7.98	30	1.5
36"	9.55	30	1

## Grease Duct Standard Connection

1. Apply a continuous bead of 3M Fire Barrier 2000 + Silicone Sealant around the flange to be joined. The bead should be 1/4" thick and continuous.
2. Join the two flanged ends of the duct section together.
3. Fill the V-clamp with 3M Fire Barrier 2000 + Silicone Sealant. The bead should be inside the "V".
4. Install the V-clamp around the duct sections. Both duct flanges should be inside the "V".
  - For horizontal duct runs, the V-clamp hardware should be located on the top side of the duct and be orientated between the 3 and 9 o'clock position on the duct.
  - NEVER install the V-clamp with the hardware orientated on the bottom side of the duct on horizontal runs.
5. Secure the V-clamp around the duct by tightening the 1/4"-20 hardware between **40 - 60 in-lbs**. See **Figure 1** for details. Remove any excess sealant from the inside of the duct surface.

**Figure 1 - Joint Assembly**



1. 3M Fire Barrier 2000 + Silicone Sealant  
2. Duct Section

3. Connecting Duct Section  
4. V-band

**IMPORTANT: THE HARDWARE USED TO ASSEMBLE THIS DUCTWORK IS SPECIFICALLY DESIGNED FOR THIS APPLICATION. NO SUBSTITUTE HARDWARE IS ALLOWED. ALL REPLACEMENT HARDWARE MUST BE PURCHASED FROM THE DUCTWORK FACTORY.**

## Collar and Adjustable Duct Connections

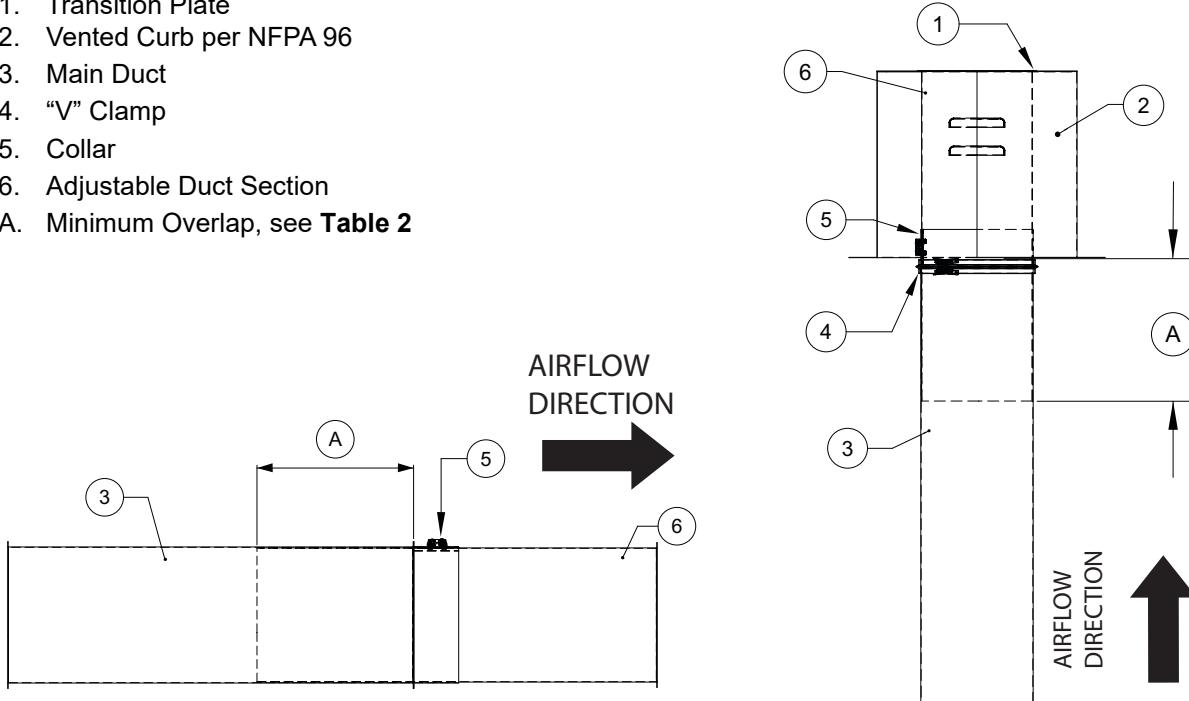
The collar and the adjustable duct length have two major functions: One function is to make up odd lengths of duct as needed in short runs, as in termination of the duct at the exhaust fan. Another function is to serve as an expansion joint for thermal expansion in larger duct runs.

When used in systems of any orientation, it can perform both functions simultaneously. The adjustable duct section is overlapped to allow grease to drain back to the hood in both vertical and horizontal installations, see **Figure 18**. The adjustable duct is flanged at one end only. The collar is constructed of the same material as the duct, and is also designed with a 1/2" flange that is connected to the standard duct section using the “**Grease Duct Standard Connection**” on page 6 method. Collars are also sealed using high temperature silicone that compresses around the adjustable duct when the collar hardware is tightened. The collar is designed to securely hold the adjustable duct, while allowing for thermal expansion. If the protruding section interferes with mating parts in the duct run, you will need to field cut the adjustable section. Verify the minimum overlap is set correctly, refer to **Table 2**.

**Note:** When installing ductwork, verify directional label is in the correct direction of airflow.

**Figure 2 - Adjustable Duct Overlap**

1. Transition Plate
  2. Vented Curb per NFPA 96
  3. Main Duct
  4. “V” Clamp
  5. Collar
  6. Adjustable Duct Section
- A. Minimum Overlap, see **Table 2**



**Table 2 - Minimum Overlap**

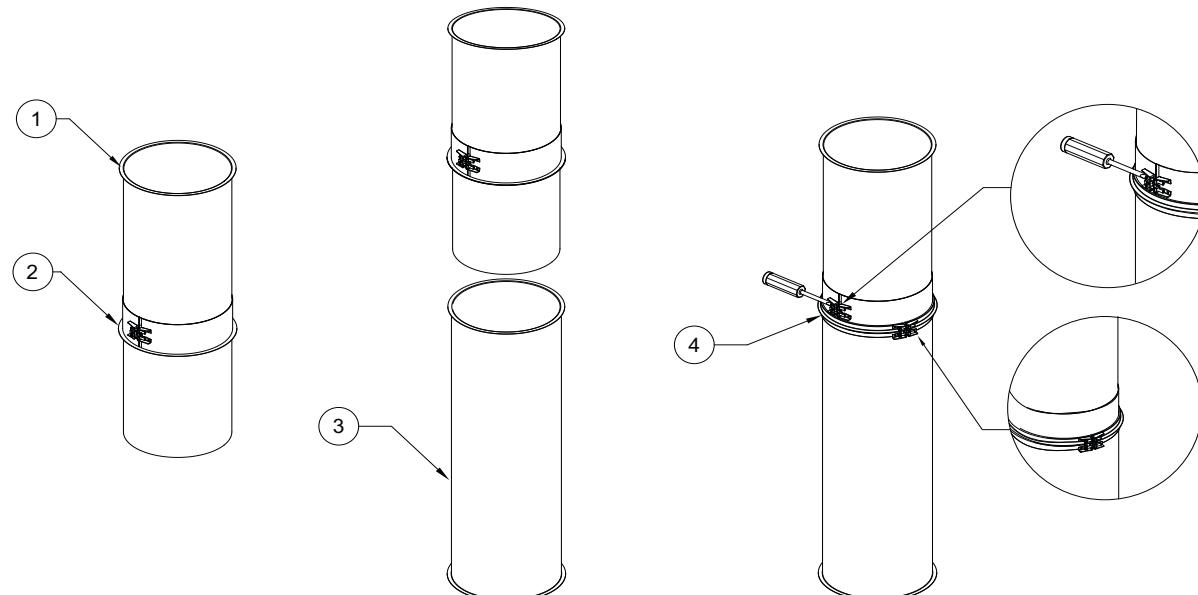
Diameter	Minimum Overlap for Adjustable Duct
8"	4"
10"	5"
12", 14", 16", 18", 20", 22", 24", 30", 36"	6"

## **Collar and Adjustable Duct Vertical Installation**

When the adjustable length duct and collar are installed in the vertical position between two fixed points, such as the beginning support and the ending support, it should be installed just below the higher support. To ensure proper axial alignment, wall guide support assemblies must be installed below the duct joint immediately below the adjustable duct. This combination of parts will force the sliding inner and outer parts of the adjustable duct to overcome collar friction allowing movement along the axis of the duct and thus relieving expansion stresses which would otherwise develop between the fixed points of the heated vertical duct.

1. Slide the adjustable collar over the adjustable duct. Flanges should be opposite.
2. Slide the adjustable duct into the standard duct to the point that the collar flange and the standard duct flange meet.
3. The adjustable collar and standard duct are joined and sealed using the “**Grease Duct Standard Connection**” on page 6 method.
4. Slide the adjustable duct into the standard duct to the desired length. If the protruding section interferes with mating parts in the duct run, you will need to cut the adjustable duct section that is interfering with mating parts. Minimum overlap dimensions are specific to the duct diameter. See **Table 2** for proper overlap specifications.
5. Once the desired overlap has been set, use high temperature silicone.
6. Install V-clamp. Tighten the 1/4"-20 hardware on the V-clamp and the outside of the adjustable collar between **40 - 60 in-lbs**.
7. Inspect the connection for gaps in silicone.

**Figure 3 - Collar and Adjustable Duct Installation**



1. Adjustable Duct
2. Adjustable Collar

3. Standard Duct
4. "V" Clamp

## Offset Distance

Table 3 - Offset Distance Tables

Offset Center Line Distance 15 Degree Elbows				
Duct Diameter	Duct Flange Diameter	Part Number	HT 1	CL 1
8"	9"	DW0815ASY	19-3/4"	2-1/2"
10"	11"	DW1015ASY	20-3/8"	2-5/8"
12"	13"	DW1215ASY	20-7/8"	2-3/4"
14"	15"	DW1415ASY	21-3/8"	2-7/8"
16"	17"	DW1615ASY	21-7/8"	2-7/8"
18"	19"	DW1815ASY	22-3/8"	3"
20"	21"	DW2015ASY	22-7/8"	3"
22"	23"	DW2215ASY	23-3/8"	3-1/8"
24"	25"	DW2415ASY	23-7/8"	3-1/8"
30"	31"	DW3015ASY	25-1/2"	3-3/8"
36"	37"	DW3615ASY	27-1/8"	3-1/2"

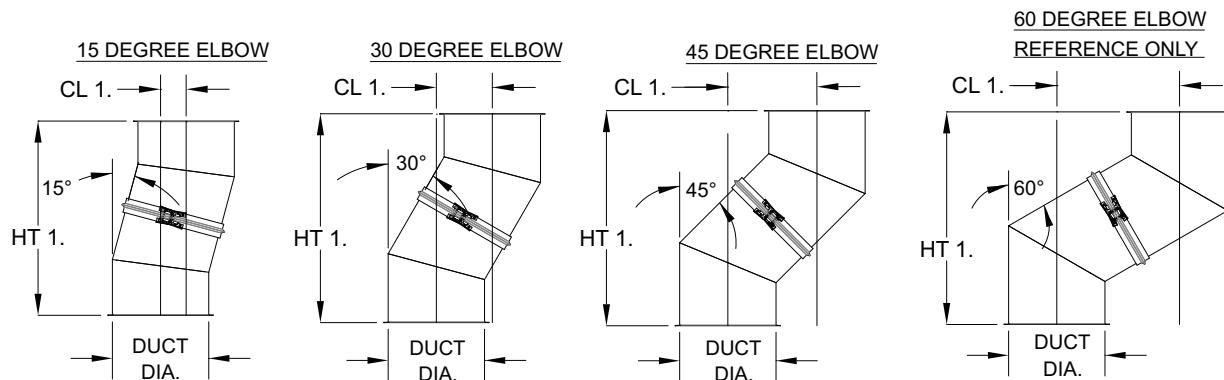
Offset Center Line Distance 30 Degree Elbows				
Duct Diameter	Duct Flange Diameter	Part Number	HT 1	CL 1
8"	9"	DW0830ASY	20-7/8"	5-1/2"
10"	11"	DW1030ASY	21-7/8"	5-7/8"
12"	13"	DW1230ASY	22-7/8"	6-1/8"
14"	15"	DW1430ASY	23-7/8"	6-3/8"
16"	17"	DW1630ASY	24-7/8"	6-5/8"
18"	19"	DW1830ASY	25-7/8"	7"
20"	21"	DW2030ASY	26-7/8"	7-1/8"
22"	23"	DW2230ASY	27-3/8"	7-3/8"
24"	25"	DW2430ASY	28-7/8"	7-3/4"
30"	31"	DW3030ASY	31-7/8"	8-1/2"
36"	37"	DW3630ASY	34-7/8"	9-3/8"

Offset Center Line Distance 45 Degree Elbows				
Duct Diameter	Duct Flange Diameter	Part Number	HT 1	CL 1
8"	9"	DW0845ASY	21"	8 3/4"
10"	11"	DW1045ASY	22-1/2"	9-3/8"
12"	13"	DW1245ASY	23-7/8"	9-7/8"
14"	15"	DW1445ASY	25-3/8"	10-1/2"
16"	17"	DW1645ASY	26-3/4"	11"
18"	19"	DW1845ASY	28-1/8"	11-5/8"
20"	21"	DW2045ASY	29-1/2"	12-1/4"
22"	23"	DW2245ASY	30"	12-7/8"
24"	25"	DW2445ASY	32-3/8"	13-3/8"
30"	31"	DW3045ASY	36-5/8"	15-1/4"
36"	37"	DW3645ASY	40-7/8"	17"

Offset Center Line Distance 60 Degree Elbows				
Duct Diameter	Duct Flange Diameter	Part Number	HT 1	CL 1
8"	9"	DW0860ASY	20-1/2"	11-7/8"
10"	11"	DW1060ASY	22-1/4"	12-7/8"
12"	13"	DW1260ASY	24"	13-7/8"
14"	15"	DW1460ASY	25-5/8"	14-7/8"
16"	17"	DW1660ASY	27-1/2"	15-7/8"
18"	19"	DW1860ASY	29-1/8"	16-7/8"
20"	21"	DW2060ASY	30-7/8"	17-7/8"
22"	23"	DW2260ASY	32-5/8"	18-7/8"
24"	25"	DW2460ASY	34-3/8"	19-7/8"
30"	31"	DW3060ASY	39-1/2"	22-7/8"
36"	37"	DW3660ASY	44-3/4"	25-7/8"

Note: 60 Degree Elbow Details are for Reference Only.

Figure 4 - Offset Details



## Factory and Field (Bolted and Welded) Risers

There are two options for the riser, this is the connection to hood plenum. There may be welded (factory or field) or bolted.

Dimensional data identifying the size and location of the riser must be provided for factory installation. The riser is fully welded to the hood plenum.

When field installed, the riser is shipped loose allowing the installer at the jobsite to decide on the final location of the riser. Field installed risers help when the final location is not known or adjustments may have to be made due to duct misalignments. Field installed risers may be welded or bolted in place.

1. Locate the specific position at which the riser needs to be installed.
2. Use the riser as a guide when marking the hood.

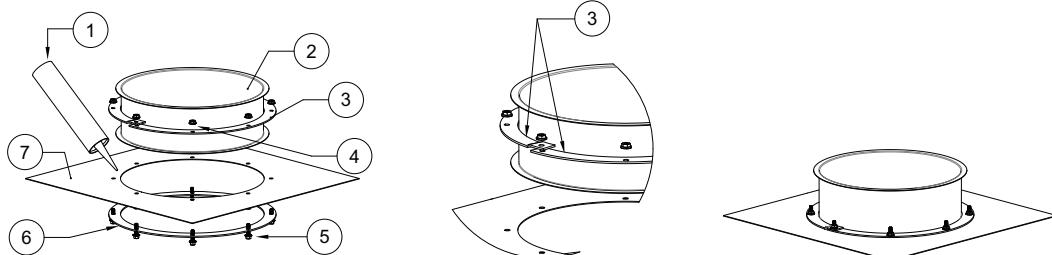
**Note: Verify the hole location is inside the plenum area before cutting any holes.**

3. Use the single piece riser ring as a template to mark the bolt hole locations. Align the inner circles of the hole in the plenum with the single piece riser ring. Mark the bolt hole circle. Make sure the bolt hole circle is inside the plenum area before cutting.
4. Use 3M Fire Barrier 2000+ Silicone to seal around the riser hole. Apply sealant to the top and bottom of the hole. Make sure the silicone bead is a minimum of 1/4" thick and is continuous inside and outside of the bolt hole circle.
5. Center the riser over the hole in the plenum and push down. Make sure the riser flange is positively sealed. Make sure the two piece riser ring on the riser is pushed down into the sealant. Sealant should come through the holes on the ring.
6. Align the single piece riser ring to the hole on the inside of the plenum and push into the silicone.
7. Align the two piece riser ring above the hood and bolt the rings together using 1/4"-20 bolts and nuts.  
**Make sure the tabs are on top.**

**Note: The bolt head must be installed on the plenum side. This is the bottom side of the hood plenum.**

8. Excess silicone should be removed, and the connection should be inspected for gaps and loose hardware.
9. When joining duct to the riser, refer to “**Grease Duct Standard Connection**” on page 6.

**Figure 5 - Field Installed Riser (Bolted)**



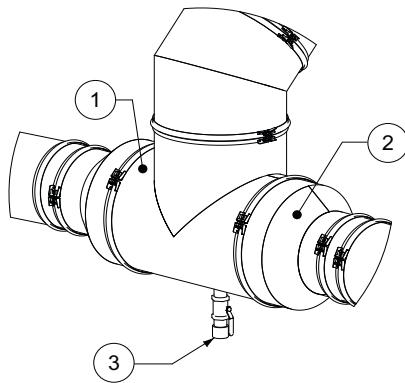
1. 3M Fire Barrier 2000+ Silicone
2. Riser
3. Two Piece Riser Ring
4. 1/4"-20 Nuts
5. 1/4"-20 Bolts
6. Single Piece Riser Ring
7. Top of Hood

## Duct Drains

Drains are used to provide a point at which low points in the duct system can be drained. Condensation and low lying water left over from duct cleaning can be drained easily with the installation of the ball valve drain. Drains are designed to aid in duct cleaning and can be used to drain grease into an approved grease collection reservoir. Drains can be hard piped to an approved grease collection reservoir. Remove the cap and connect to the 1-1/2" NPT threads.

**Figure 6 - Duct Drain**

1. Tee
2. Adapter
3. Drain

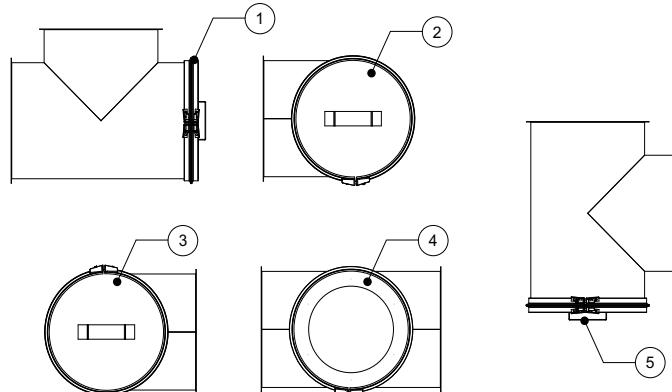


## Grease Manifold Tee

The grease manifold tee is used to provide access for clean-out to comply with NFPA 96 requirements. It is equipped with an internal blank that acts as a grease dam and gasket. The access port is then closed with a clean-out cap or tee cap. The location of the access port in the tee is dependent on the orientation of the tee in the final installation. Access port locations are shown in **Figure 7**. Access ports are never located where grease can build up and fall out once the clean-out cap is removed.

**Figure 7 - Tee Position**

1. Position 1
2. Position 2
3. Position 3
4. Position 4 - Access door removed for clarity.
5. Incorrect Position

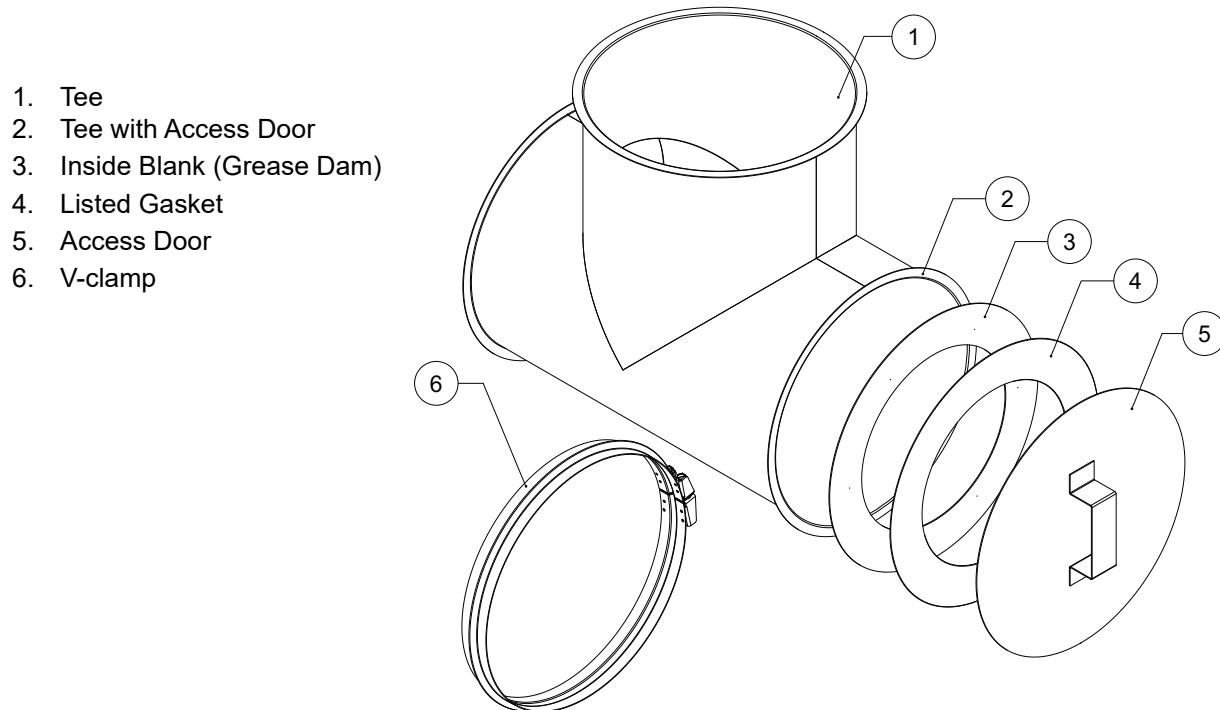


## Access Door (Tee Cap) Assembly

Access doors (tee caps) are available 8" to 36". They work in conjunction with the manifold tee as shown on "**Grease Manifold Tee**" on page 11. The tee joint connection is the same as the joint assembly method shown in "**Grease Duct Standard Connection**" on page 6; however, the installation of the access door is slightly different. Read the following instructions very carefully. Consult NFPA 96, Chapter 7, Section 7.3.1 "*Openings shall be provided at the sides or at the top of the duct, whichever is more accessible, and at change of directions*".

1. Select the location and the position of the access door.
2. All tee joints will be connected as shown in "**Grease Duct Standard Connection**" on page 6, except for the access door.
3. Apply the proper sealant to the flange of the tee that will be used for access door to the duct system.
4. Apply a 1/4" continuous bead around the tee flange.
5. Center the inside blank over the opening of the tee and apply pressure. Push the inside blank down onto the tee flange sealant to secure the inside blank to the tee flange.
6. Apply enough pressure to create a positive bond between the tee flange and the inside blank. Remove excess sealant after making parts concentric (centered).
7. Apply a 1/4" continuous bead around the inside blank 1" from the outside edge.
8. Center the listed gasket over the inside blank. Push the gasket down into the sealant to secure the gasket to the inside blank.
9. Sealant will begin to cure upon exposure to atmospheric humidity. It will form a flexible seal.
10. Once the sealant is dry attach the access door using a V-clamp. Verify flanges are in the "V" before tightening 1/4"-20 hardware. Tighten between **40 - 60 in-lbs**.

**Figure 8 - Access Door Assembly**

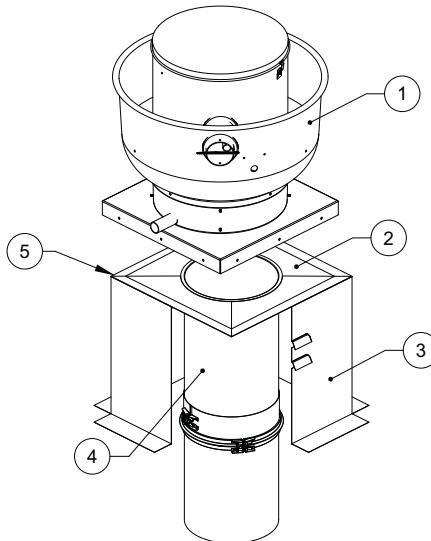


## Transition Plate

The transition plate is designed to connect to a roof curb. The duct section is welded to the underside of the plate. The plate is formed to provide a slope to allow grease deposits to flow back towards the duct. When connected the plate mounts on top of the fan curb, which supports the fan housing. The plate may be positioned off center within the curb provided that the minimum distance to combustibles is maintained. In the event that the plate is positioned off center, trim off excess plate material to allow for fan placement. Secure the plate to the curb using a minimum of three fasteners per side. A suitably sized fastener provided by others is used. The transition plate can be used to maintain distance to combustibles and also for vertical support.

**Figure 9 - Transition Plate**

1. Exhaust Fan
2. Transition Plate, secured to curb by others
3. Vented Curb
4. Adjustable Duct
5. Sealant - Apply sealant between the transition plate and curb.



## Prevention of Grease Accumulation in Horizontal Grease Duct

Duct systems serving Type 1 hoods shall be constructed and installed so that grease cannot collect in any portion of the duct system. The duct system shall slope not less than 1/16" per linear foot towards the hood or toward an approved grease collection reservoir. Where horizontal ducts exceed 75 feet in length, the slope shall not be less than 3/16" per linear foot. Offset collars have been designed to meet the above specification. The collar is used in conjunction with other accessories such as tees and elbows to maintain the above listed slope in horizontal duct runs. The V-clamp hardware should be located on the top side of the duct and be orientated between the 3 and 9 o'clock position on the duct. Never install the V-clamp with the hardware orientated on the bottom side of the duct on horizontal runs.

## Alignment and Bracing of Grease Duct

Grease duct has the characteristics of a continuous stainless steel pipe and it will expand and contract along its entire length with changes in its temperature. For this reason, conventional methods of attaching guides and braces to the outer wall of the grease duct cannot be used. Correctly installed support rings, saddles and wall guide assemblies will serve to keep the duct aligned, provide for adequate resistance to lateral loads and allow the free axial expansion and contraction movement. A simplified rule for duct expansion is that the axial growth will be approximately 1 inch per 100 feet of pipe length for each 100 degrees Fahrenheit the exhaust vapor temperature is above the surrounding air temperature.

## Horizontal Support and Support Spacing

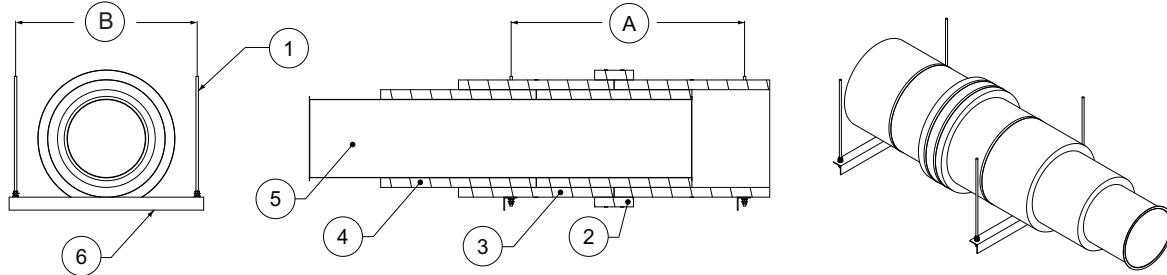
**IMPORTANT: HORIZONTAL SUPPORTS SHOWN IN THIS MANUAL ARE RECOMMENDED.**  
**SUPPORTS BY OTHERS MUST BE APPROVED BY THE MANUFACTURER AND AHJ. SUPPORT SPACING MUST BE AS STATED IN THIS MANUAL.**

Horizontal duct runs are supported using either 2" x 2" x 1/8" angle or Unistrut. Horizontal support spacing is shown in **Table 4**. When cutting the angle or Unistrut to length there must be a minimum of 2" on either side of the duct or duct wrap. It is important that the 1/2" threaded rod suspending the angle or Unistrut does not rub against the duct or duct wrap. Once the angle has been cut to length it is suspended using 1/2" threaded rod (minimum). Appropriate sized holes are drilled/punched in either end of the angle. The 1/2" threaded rod is secured to the angle or Unistrut using appropriate sized grade 5 hardware. Washers are used on the top and bottom before installing nuts. Double nuts are used to make sure bottom nuts do not come loose.

**Table 4 - Horizontal Support Spacing**

Diameter (Inches)	Horizontal Support Spacing (Feet)
8", 10", 12", 14", 16", 18", 20", 22", 24", 30", 36"	10'

**Figure 10 - Horizontal Support Details**



1. 1/2" Threaded Rod, by others
  2. 6" Collar
  3. Duct Wrap Outer Layer
  4. Duct Wrap Inner Layer
  5. Duct
  6. Angle / Unistrut
- A. Horizontal Support Spacing, refer to **Table 4**  
B. Outside Diameter (OD) + 4"

## **Vertical Support Spacing and Wall Guide Support**

**IMPORTANT: VERTICAL SUPPORTS SHOWN IN THIS MANUAL ARE RECOMMENDED. SUPPORTS BY OTHERS MUST BE APPROVED BY THE MANUFACTURER AND AHJ. SUPPORT SPACING MUST BE AS STATED IN THIS MANUAL.**

**The wall guide is to be attached to Non-Combustible and Combustible surfaces.** The wall guide is constructed of 12 gauge steel and is comprised of a full ring, brackets, angle struts, wall support plates and hardware for assembly (includes mounting hardware to secure supports to gypsum walls constructed using 25 gauge steel studs), see **Figure 12**. The ring, which is split in two halves for ease of assembly, is constructed of 12 gauge steel. With the addition of a spacer between the two halves, the diameter is 1/8" larger than the outside diameter of the duct. This is to allow for thermal expansion.

The wall support should be installed at the joint of the duct and below the V-clamp so that the V-clamp moves away from the support ring. The wall guide assembly is designed for 2 to 18 inches of clearance from duct to non-combustible/combustible walls. The side struts may be placed either up or down as is convenient. This assembly is intended to resist lateral or side loads only and is not for carrying the weight of the vertical grease duct. The horizontal struts allow for attachment to the wall after the grease duct has been positioned. The angle of attachment may vary as needed for the duct to wall clearance. Wall supports shall be used at the proper spacing shown in **Table 5** for vertical duct support, with appropriate expansion joints to allow for thermal expansion and wall guides for lateral stability.

**The curb / transition plate combination is to be attached to Non-Combustible and Combustible surfaces.** The curb is constructed of 20 gauge aluminized steel. The curb has 3" flanges on the bottom, and 1" flanges on top. The bottom flanges are used to secure the curb to the roof substrate while the top 1" flange is used to strengthen the top of the curb where the fan is mounted, see **Figure 16** and **Figure 17** for details.

The transition plate is constructed of 16 gauge aluminized steel. There are three types of transition plates available TP, TPDB, and TPDBEX. TP is an oversized transition plate that can be cut to size in the field, TP is installed under the exhaust fan. TPDB is used when the duct is running through the curb and continuing above the plate. This plate has a 2" down bend to help seal the curb. TPDB is not used with exhaust fans. TPDBEX is designed to be used under the exhaust fan and not interfere with the fan base or hinge kits. TPDBEX is installed under the exhaust fan and does require an exact fit. The curb / transition plate combination is considered part of the vertical support system. The curb / transition plate combination support spacing is shown in **Table 5**. See "**Transition Plate**" on page 13 for more information on transition plates.

**Table 5 - Vertical Support Spacing**

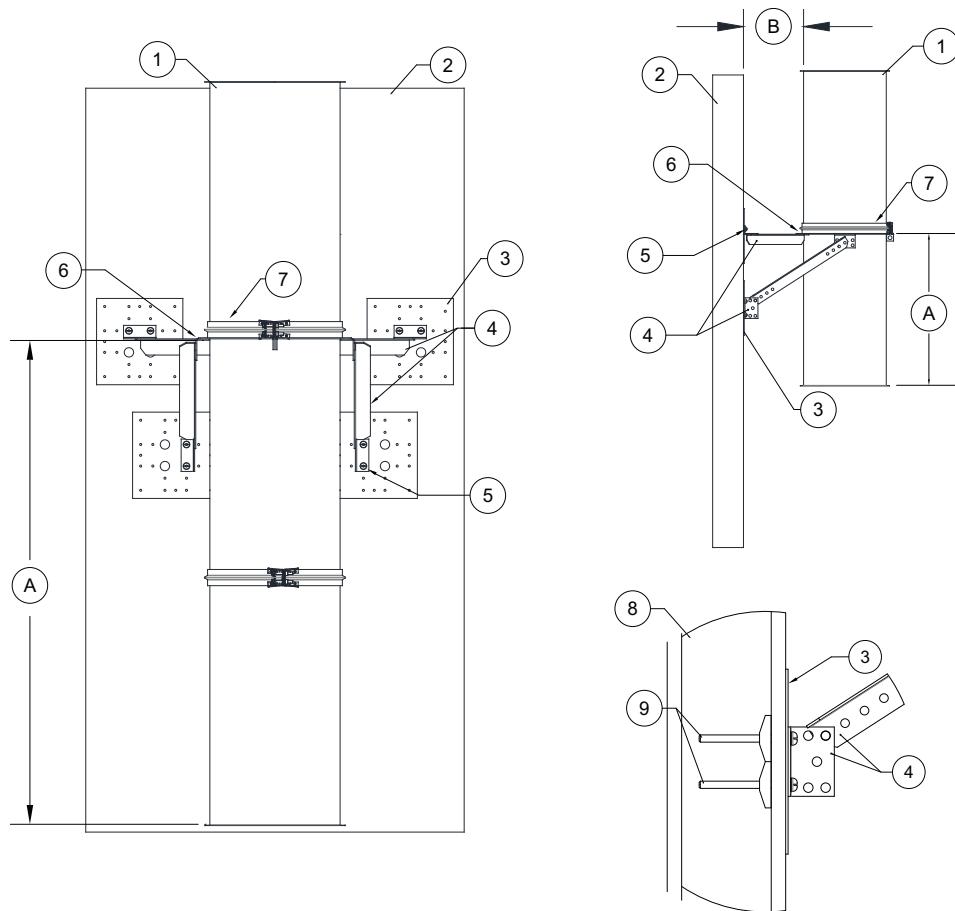
Diameter (Inches)	Vertical Wall Support Spacing (Feet)	Vertical Curb/Floor Support Spacing (Feet)
8"	10'	24'
10"	10'	24'
12"	10'	24'
14"	10'	24'
16"	10'	24'
18"	10'	24'
20"	10'	24'
22"	10'	24'
24"	10'	24'
30"	10'	24'
36"	10'	24'

**Vertical support systems must be attached only to the building structure or supported with rigid structural members. See TABLE 6 for maximum support spacing. It's recommended that vertical support systems are attached to block, concrete, or steel with clearance that is adequate for installation and access.**

**IMPORTANT: VERTICAL SUPPORTS SHOWN IN THIS MANUAL ARE RECOMMENDED. SUPPORTS BY OTHERS MUST BE APPROVED BY THE MANUFACTURER AND AHJ. SUPPORT SPACING MUST BE AS STATED IN THIS MANUAL.**

1. Determine the wall material that the duct will be attached to. This may be gypsum, wood, or concrete.
2. Wall support plates are used to distribute weight when installed on gypsum. Support struts are used to support the duct assembly and to connect the wall support plates and brackets.
3. Locate the support bracket assembly. Verify there is no interference and that the clearance to combustibles is 18", or the duct system is wrapped using a UL Listed wrap.
4. Mark the location and drill clearance holes. Use supplied hardware to assemble supports.
5. To install supports to wall, use the appropriate hardware kit:
  - Use kit DWVESU-HARDWARE-CM for concrete or masonry wall construction
  - Use kit DWVESU-HARDWARE-S for steel gauge wall construction
  - Use kit DWVESU-HARDWARE-W for wooden wall construction
6. Make sure the duct V-clamp is installed above the support ring.

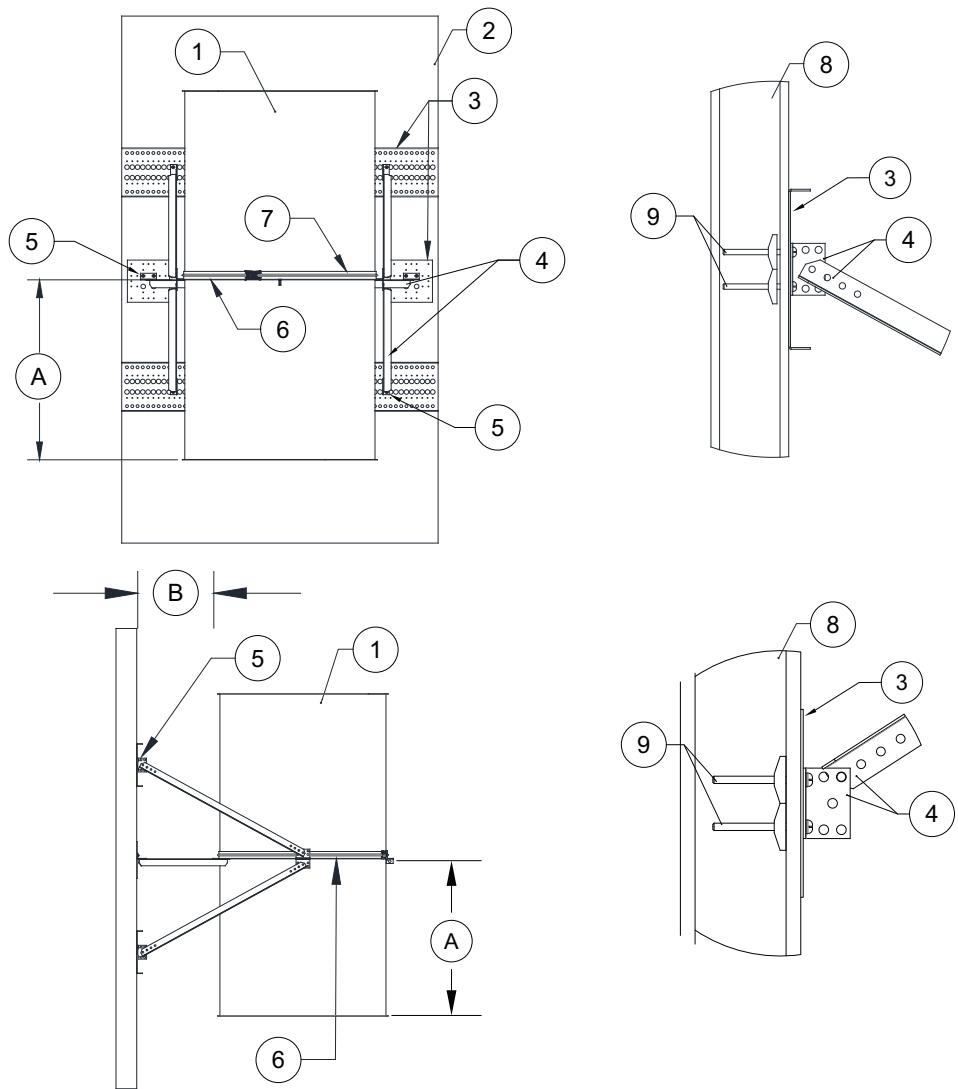
**Figure 11 - Vertical Wall Support (8"-24")**



- |   |  |
|---|--|
| 1. Duct                                   | 8. Open Wall   |
| 2. Wall Material (Gypsum, Wood, Concrete) | 9. 5/16" x 4" Long Toggle Bolts - used for open wall cavities. |
| 3. Wall Support Mounts                    | A. Vertical Support Spacing, refer to <b>Table 5</b> .         |
| 4. Support Struts                         | B. Uninsulated Duct Must be 18" from Combustible Surface.      |
| 5. 5/16"-18 Hardware by Others            |  |
| 6. Support Ring                           |  |
| 7. "V" Clamp                              |  |

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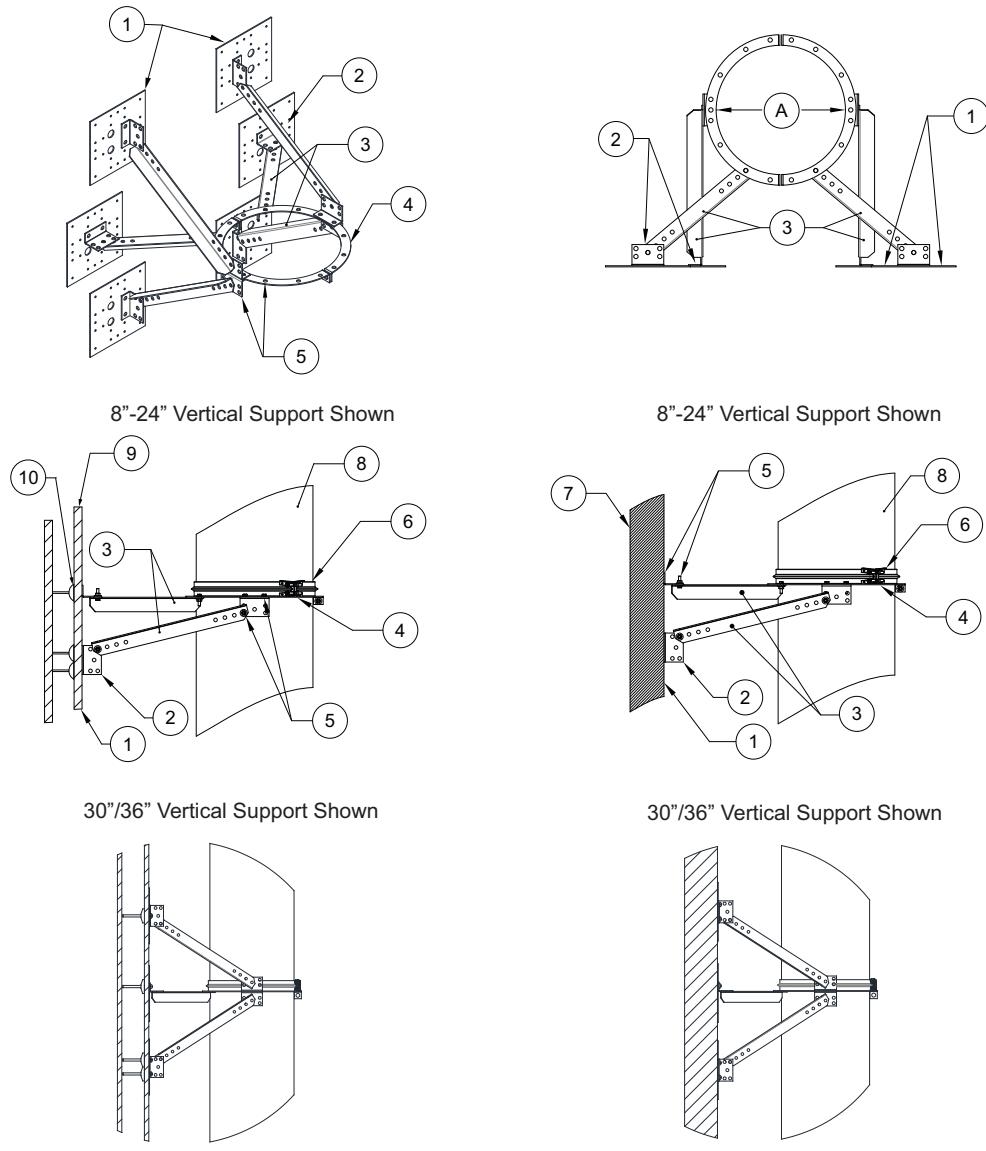
**Figure 12 - Additional Wall Support Details (30"/36")**



- 1. Duct
- 2. Wall Material (Gypsum, Wood, Concrete)
- 3. Wall Support Mounts
- 4. Support Struts
- 5. 5/16"-18 Hardware by Others
- 6. Support Ring
- 7. "V" Clamp
- 8. Open Wall
- 9. 5/16" x 4" Long Toggle Bolts - used for open wall cavities.
- A. Vertical Support Spacing, refer to **Table 5**.
- B. Uninsulated Duct Must be 18" from Combustible Surface.

**IMPORTANT: VERTICAL SUPPORTS SHOWN IN THIS MANUAL ARE RECOMMENDED. SUPPORTS BY OTHERS MUST BE APPROVED BY THE MANUFACTURER AND AHJ. SUPPORT SPACING MUST BE AS STATED IN THIS MANUAL.**

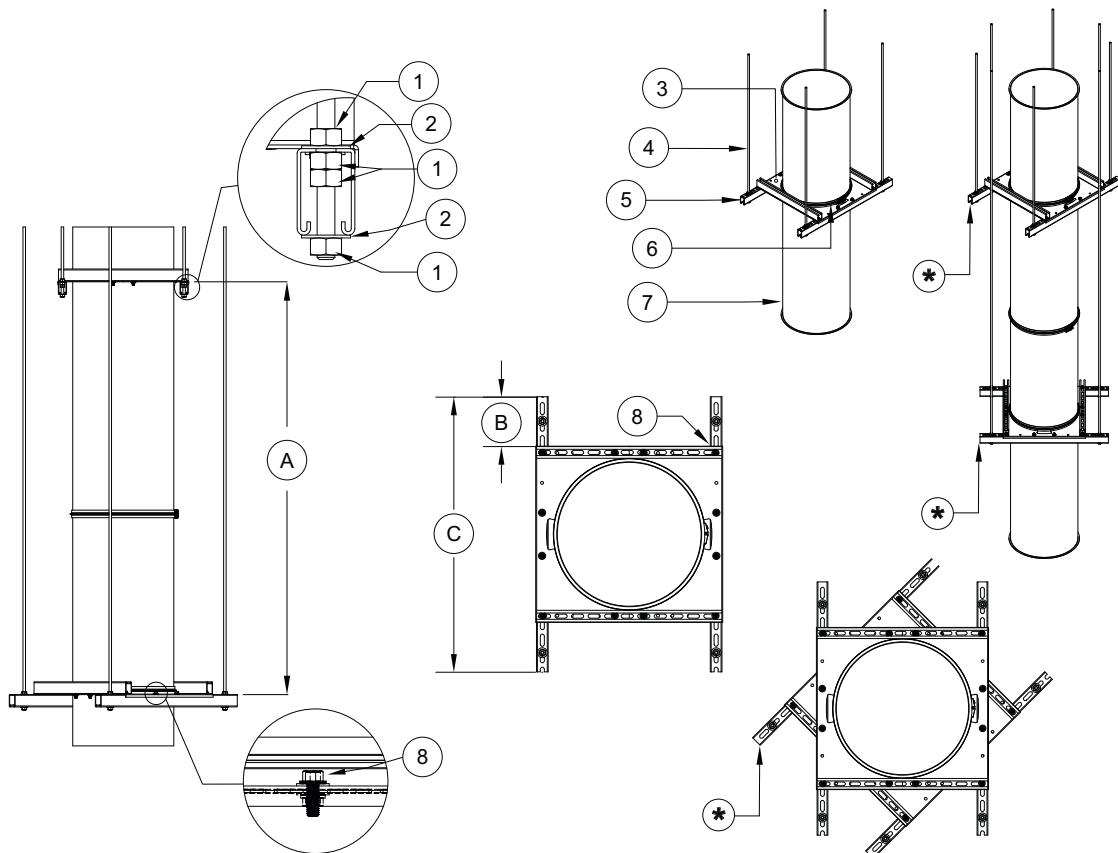
Figure 13 - Vertical Support Details



1. Additional Wall Support for 30"/36"
2. Standard Wall Support for 8"-36"
3. Strut
4. Full Support Ring
5. 5/16"-18 Hardware by Others
6. V-clamp
7. Solid Wall
8. Duct
9. Open Wall Gypsum
10. 5/16" x 4" Toggle Bolt - used for open wall cavities.
- A. Duct Outer Diameter (OD) + 1/8"

**IMPORTANT:** VERTICAL SUPPORTS SHOWN IN THIS MANUAL ARE RECOMMENDED. SUPPORTS BY OTHERS MUST BE APPROVED BY THE MANUFACTURER AND AHJ. SUPPORT SPACING MUST BE AS STATED IN THIS MANUAL.

**Figure 14 - Duct Ceiling Support**

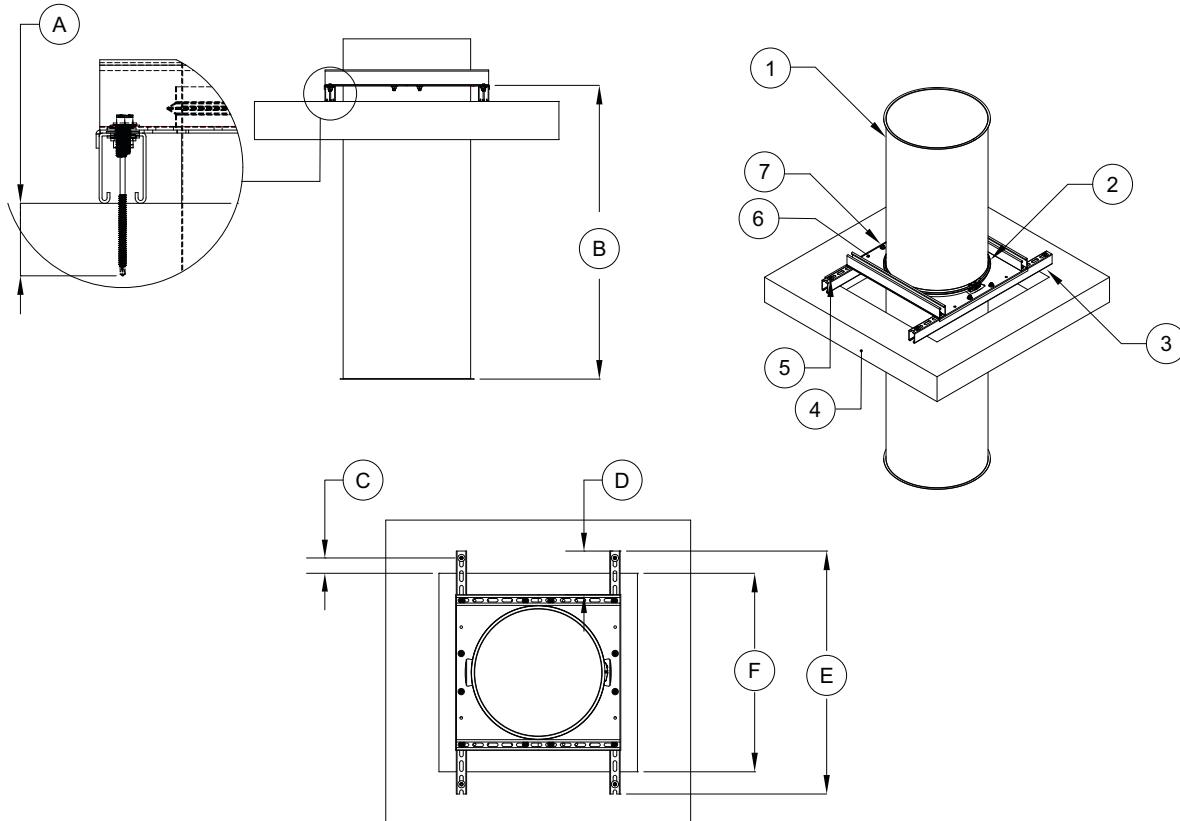


- |  |  |
|--|--|
| 1. 1/2" Nut<br>2. 1/2" Washer<br>3. Vertical Support Plate<br>4. 1/2" All Thread (Supplied by Others)<br>5. B12 Unistrut<br>6. Single Wall V-clamp | 7. Single Wall Duct<br>8. 3/8" Hardware<br>A. Vertical Support Spacing, refer to <b>Table 5</b><br>B. 5" Maximum Distance<br>C. 48" Maximum Distance |
|--|--|

\* Supports must be rotated so that all thread is attached directly to the ceiling. **DO NOT ATTACH ALL THREAD FROM ONE UNISTRUT TO ANOTHER.**

**IMPORTANT: VERTICAL SUPPORTS SHOWN IN THIS MANUAL ARE RECOMMENDED. SUPPORTS BY OTHERS MUST BE APPROVED BY THE MANUFACTURER AND AHJ. SUPPORT SPACING MUST BE AS STATED IN THIS MANUAL.**

Figure 15 - Chase Floor Support



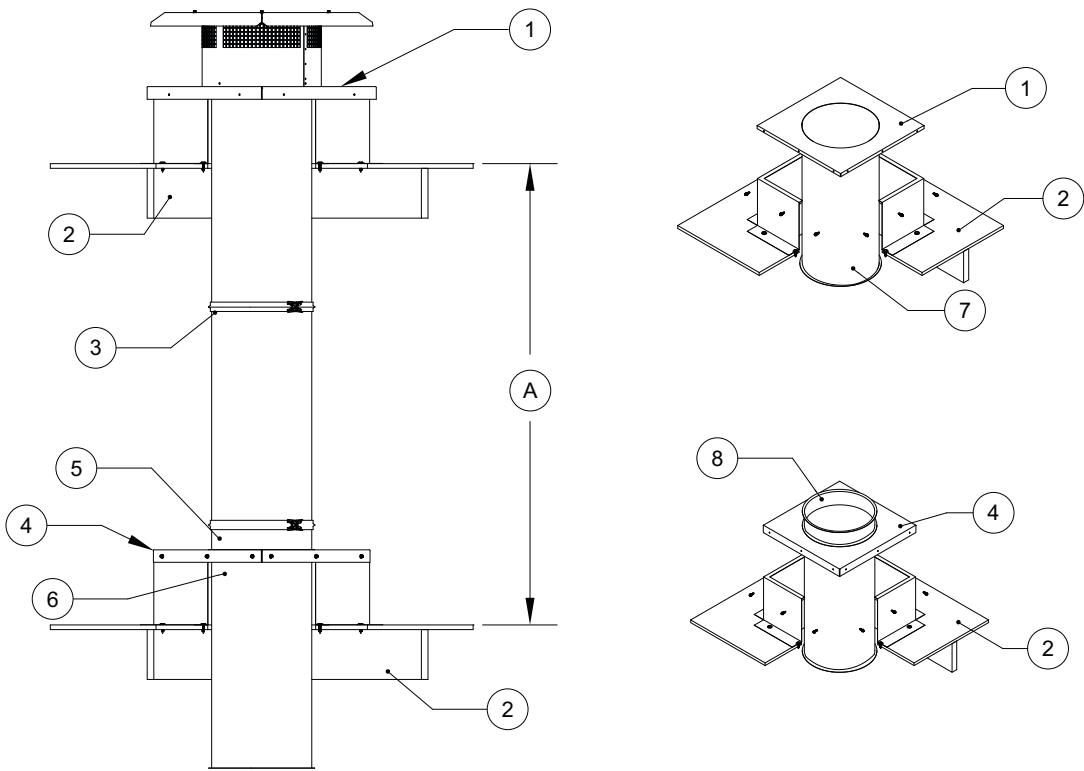
- |  |  |
|--|--|
| 1. Single Wall Duct                            | 7. 3/8" Hardware                                       |
| 2. Single Wall V-clamp                         | A. Minimum Thread Penetration, refer to <b>Table 6</b> |
| 3. B12 Strut                                   | B. Vertical Support Spacing, refer to <b>Table 5</b>   |
| 4. Substrate                                   | C. Minimum Edge Distance, refer to <b>Table 6</b>      |
| 5. Substrate Fastener, refer to <b>Table 6</b> | D. 5" Maximum Distance                                 |
| 6. Vertical Support Plate                      | E. 48" Maximum Distance                                |
|  | F. Open Area Chase                                     |

Table 6 - Substrate Hardware

Decking Material	Hardware	Minimum Thread Penetration	Minimum Edge Distance
Wood - Minimum G.42	Hex Head Lag Screw – Zinc Plated Steel – 3/8" x 2-1/2"	2"	1-1/2"
Concrete - 2500 Minimum PSI	Hilti Kwik Bolt - 3/8" Diameter TZ Expansion Anchor	2-5/16"	3"

**IMPORTANT: VERTICAL SUPPORTS SHOWN IN THIS MANUAL ARE RECOMMENDED. SUPPORTS BY OTHERS MUST BE APPROVED BY THE MANUFACTURER AND AHJ. SUPPORT SPACING MUST BE AS STATED IN THIS MANUAL.**

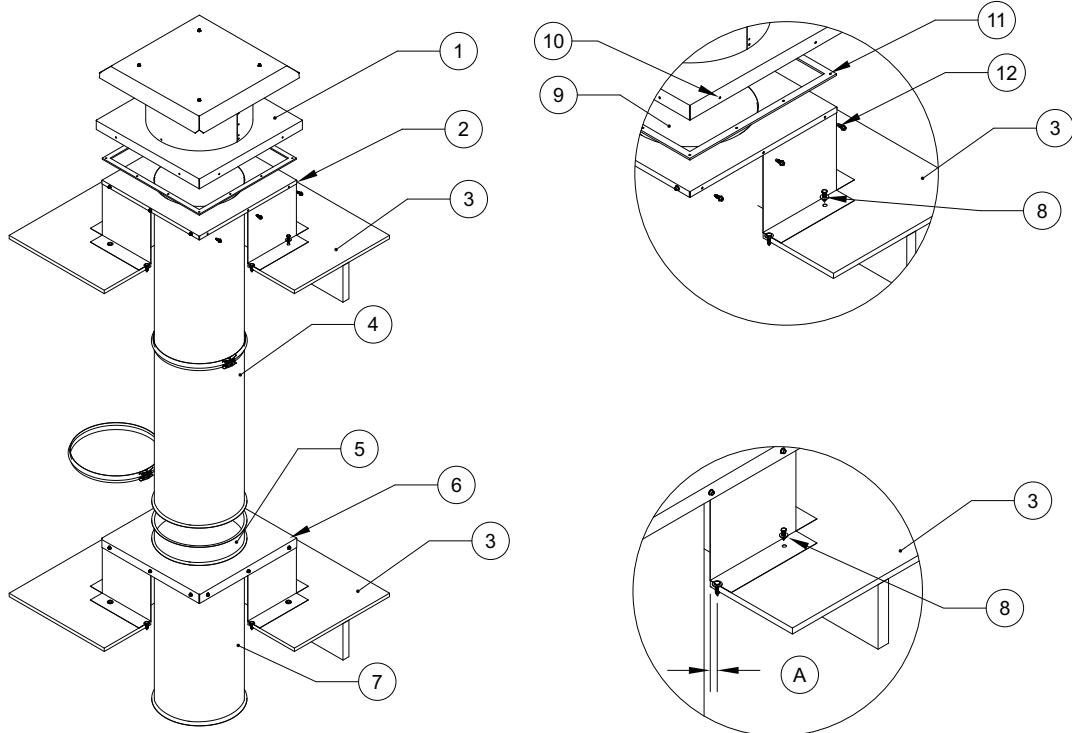
**Figure 16 - Vertical Curb Support Details View 1**



1. Transition plate (TPDBEX) is designed to mount under the unit.
  2. Decking Floor/Roof - Wood, Concrete, or Steel
  3. Straight duct section with V-clamp.
  4. Transition plate (TPDB) is designed to be secured to duct when going through curb.
  5. When duct is installed through the curb, the riser or fitting is welded above the TPDB.
  6. When duct is installed through the curb, the duct is welded below the TPDB.
  7. Straight duct welded to transition plate.
  8. Riser or fitting welded to TPDB.
- A. Vertical Support Spacing, refer to **Table 5**

**IMPORTANT: VERTICAL SUPPORTS SHOWN IN THIS MANUAL ARE RECOMMENDED. SUPPORTS BY OTHERS MUST BE APPROVED BY THE MANUFACTURER AND AHJ. SUPPORT SPACING MUST BE AS STATED IN THIS MANUAL.**

**Figure 17 - Vertical Curb Support Details View 2**



1. Gravity Vent
  2. Transition plate (TPDBEX) is designed to mount under the unit.
  3. Decking Floor/Roof - Wood, Concrete, or Steel
  4. Straight duct section with V-clamp.
  5. When duct is installed through the curb, the riser or fitting is welded above the TPDB.
  6. Transition plate (TPDB) is designed to be secured to duct when installed through curb.
  7. When duct is installed through the curb, the duct is welded below the TPDB.
  8. Substrate Hardware, refer to **Table 7**.
  9. Inner duct fully welded to the transition plate. All welds are factory dye tested.
  10. Unit is secured to the vented curb. Use 1/4"-20 x 2" zinc plated self-drilling screws.
  11. High temperature gasket used to seal unit to the transition plate.
  12. The transition plate is secured to the curb using 1/4"-20 x 1-1/2" zinc plated self-drilling screws.
- A. Minimum Edge Distance, refer to **Table 7**.

**Table 7 - Substrate Hardware**

Decking Material	Hardware		Minimum Edge Distance
Wood - Min G.42	Hex Head Lag Screw - Zinc Plated Steel - 3/8" x 2 1/2"	Washer - Zinc Plated Steel - 3/8" Lag Bolts	1-1/2"
Concrete - 2500 Min PSI	Hilti Kwik Bolt - 3/8" Diameter TZ Expansion Anchor	N/A	3"
Steel - Roof Truss 12 Gauge or 1/8" Thick	Dril-Flex Self Drilling Screws 1/4"-14 Min. 1/2" Through	N/A	3/8"

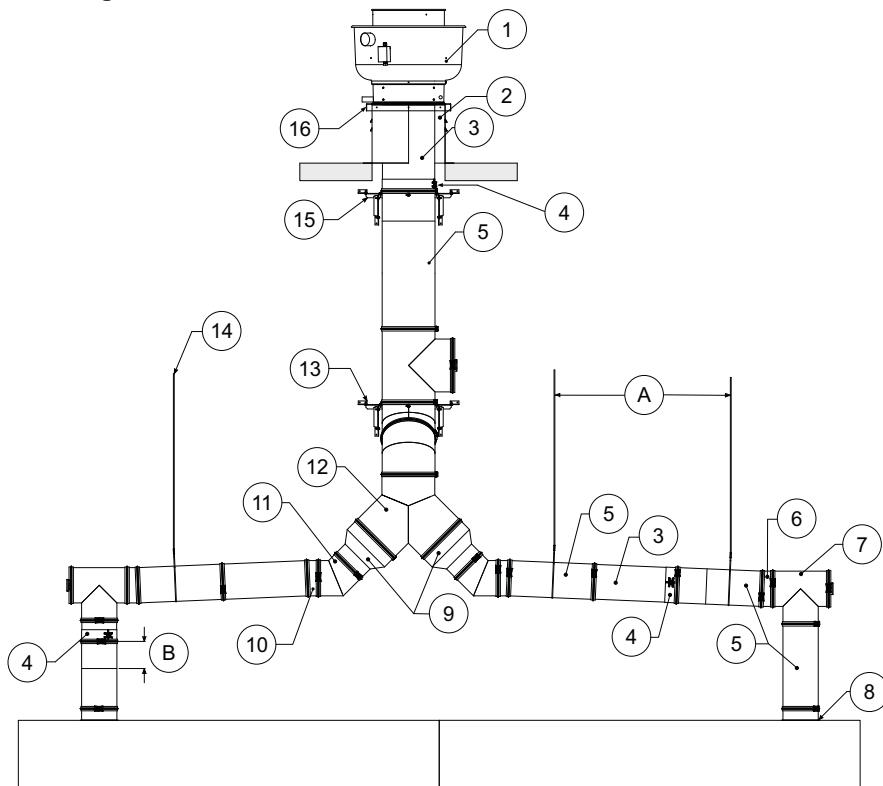
## Grease Duct Assembly Examples

The illustrations shown provide useful information on the installation of grease duct systems. Each installation is specific to the application and the jobsite. When duct systems are installed outside, welded seams must be painted with corrosion resistant high temperature paint. If you encounter a situation not covered by this illustration, refer to the guide or consult the factory. Remember, if the distance to a combustible surface is less than 18 INCHES you will need to wrap the duct in a UL Listed duct wrap to get "ZERO CLEARANCE TO COMBUSTIBLES".

Adjustable ducts and standard ducts can be used to terminate at the transition plate. The duct is fully welded to the transition plate at the factory.

Adjustable ducts are used on runs over 100 feet to compensate for thermal expansion. The duct will grow approximately 1" per 100 feet of duct length for each 100°F exhaust vapor temperature above the surrounding air temperature.

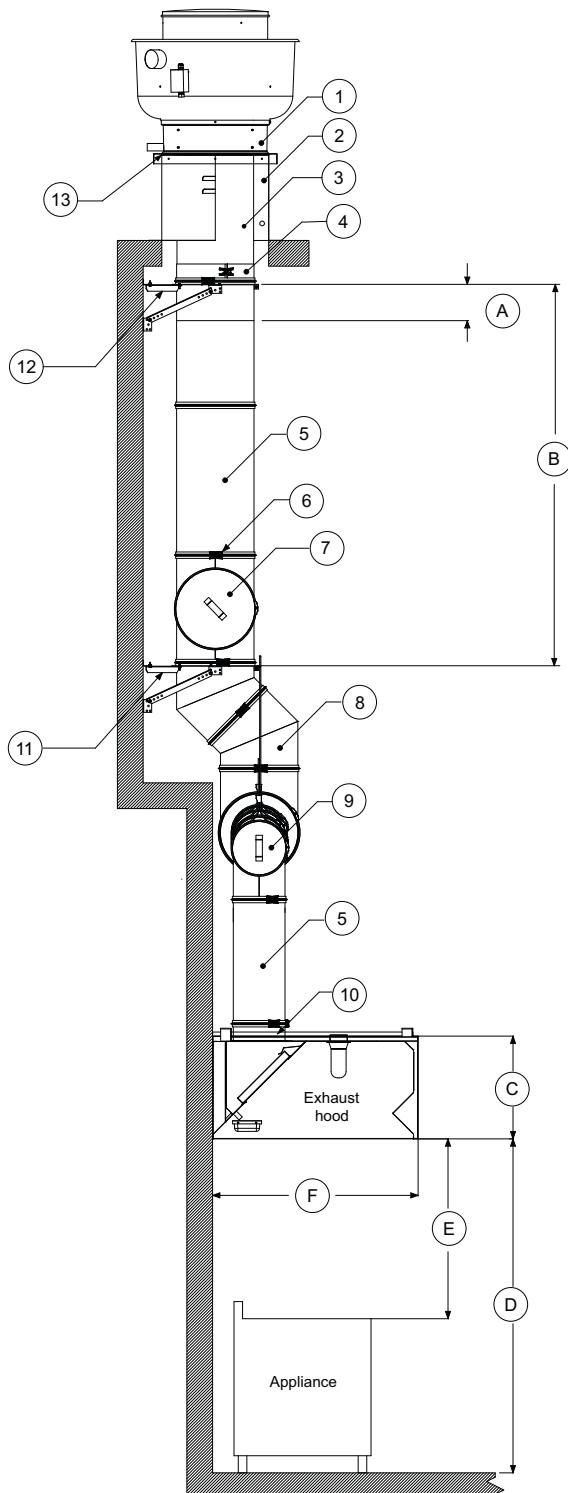
**Figure 18 - Grease Duct Installation Guide Details View 1**



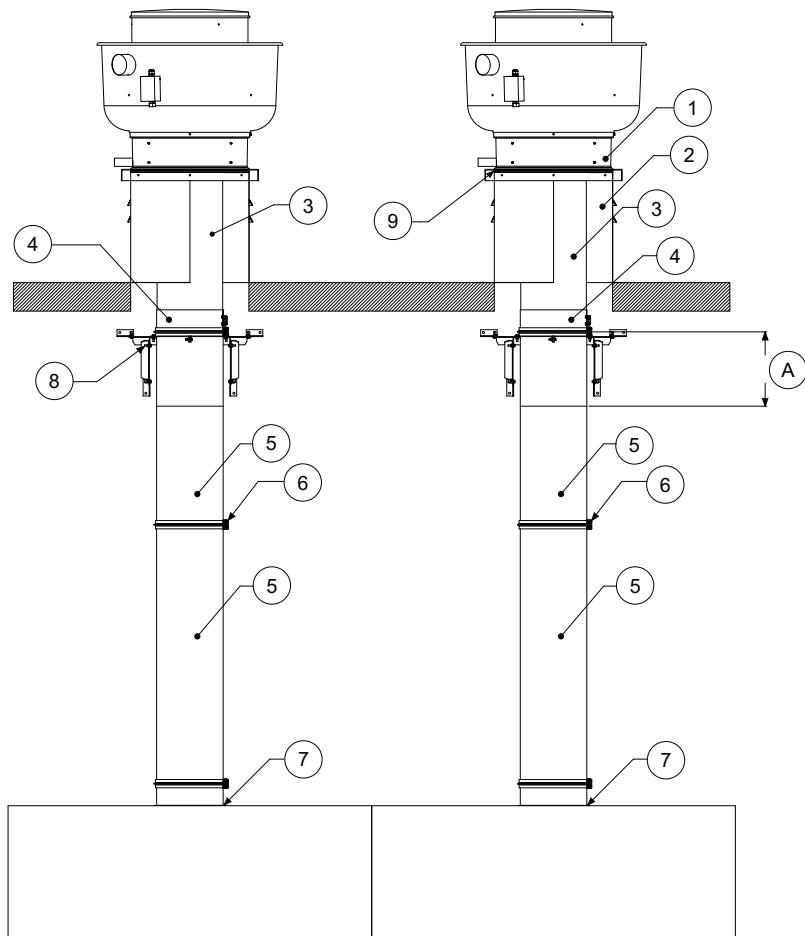
1. Exhaust Fan
  2. Vented Curb per NFPA 96
  3. Adjustable Duct
  4. Adjustable Collar
  5. Standard Duct
  6. Offset Collar
  7. Tee with Access Door - Access doors are used when there is a change in direction, or when areas of the duct are not accessible.
  8. Riser
  9. Adapter
  10. Offset collar used to pitch horizontal duct runs.
  11. 45° Elbow
  12. Y Tee
  13. First vertical support at joint #1 after change in direction. Support is mounted under V-clamp.
  14. 1/2" All Thread Rod
  15. The vertical support assembly is designed for 2" to 18" clearance from duct to non-combustible surface. Support is mounted under V-clamp.
  16. Transition plate with ceramic gasket.
- A. Horizontal Support Spacing, refer to **Table 4**.
- B. Minimum Overlap, refer to **Table 2**.

**Figure 19 - Grease Duct Installation Guide Details View 2**

1. Exhaust Fan
  2. Vented Curb per NFPA 96
  3. Adjustable Duct
  4. Adjustable Collar
  5. Standard Duct
  6. V-clamp
  7. Tee Assembly with Access Door - Access doors are used when there is a change in direction, or when areas of the duct are not accessible.
  8. 45° Elbow
  9. Access Door
  10. Riser
  11. The vertical support assembly is used at the first connection after the change of direction
  12. The vertical support assembly is designed for 2" to 18" clearance from duct to non-combustible surface.
  13. Transition plate with ceramic gasket.
- A. Minimum Overlap, refer to **Table 2**.
- B. Vertical Support Spacing, refer to **Table 5**.
- C. Hood Height
- D. Floor to bottom of hood height
- E. Appliance to bottom of hood height 33" minimum/ 48" maximum
- F. Hood Width



**Figure 20 - Grease Duct Installation Guide Details View 3**



- 1. Exhaust Fan
- 2. Vented Curb per NFPA 96
- 3. Adjustable Duct
- 4. Adjustable Collar
- 5. Standard Duct
- 6. V-clamp
- 7. Riser
- 8. The vertical support assembly is designed for 2" to 18" clearance from duct to non-combustible surface. The vertical support is mounted under the V-clamp and adjustable collar.
- 9. Transition plate with ceramic gasket.
- A. Minimum Overlap, refer to **Table 2**.

## Clearances

This grease duct is primarily intended for use in non-combustible surroundings, when installed in a room where enclosure is not required. Grease duct may be located at clearance to combustibles as shown in **Table 8**. Grease duct may be located in a corner formed by two combustible walls provided the minimum clearance is maintained.

In all buildings more than one story in height and in buildings where the roof-ceiling assembly is required to have a fire resistance rating, the duct must be enclosed in a continuous enclosure from the lowest fire-rated ceiling or floor above the hood, through any concealed spaces, to or through the roof to maintain the integrity of the fire separations required by the applicable building code provisions. If the building is less than 4 stories in height, the enclosure shall have a fire resistance rating of not less than 1 hour. If the building is 4 stories or more in height, the enclosure shall have a fire resistance rating of not less than 2 hours. The clearance between the outside of the duct and the inside of the rated enclosure must be a minimum of 6 inches or required by code.

Combustible roofs or roof-ceiling assemblies may be penetrated using the vertical support assembly when distance to combustible surfaces is maintained.

**Table 8 - Clearance to Combustibles**

Diameter	Clearance to Combustibles	Clearance to Limited Combustibles	Clearance to Non-Combustibles
8"	18"	3"	0"
10"	18"	3"	0"
12"	18"	3"	0"
14"	18"	3"	0"
16"	18"	3"	0"
18"	18"	3"	0"
20"	18"	3"	0"
22"	18"	3"	0"
24"	18"	3"	0"
30"	18"	3"	0"
36"	18"	3"	0"

The information in **Table 8** represents air space, in inches, to surroundings.

**Note:** Refer to the latest edition of NFPA 96, Chapter 3 Definitions. This explains the definitions of on combustible, non-combustible and limited combustible material.

## Zero Clearances to Combustibles

This duct is to be used in non-combustible surroundings. Where the duct does not require an enclosure, it must have a minimum clearance to adjacent combustible walls as shown in **Table 8**. In cases where the ducting extends through any story of a building above the location at the connected appliances, it must be enclosed in the upper stories with walls having a fire resistance rating of not less than one hour for buildings of two or three stories in height. If the building is four stories or more in height, the enclosure wall shall have a fire resistance rating of not less than two hours.

## **Methods Used to Test Duct After Assembly**

**Note:** The mentioned leakage tests are not specific to the listing(s) requirements of the system being tested. Local codes and regulations should be consulted before final inspection. In absence of local codes and regulations, refer to the latest edition of the International Mechanical Code (IMC) Chapter 5, Exhaust Systems for inspection and testing requirements.

### **Method 1 – Light Test per IMC 506.3.2.5**

Prior to the concealment of any portion of a duct system, a leakage test shall be performed. Ducts shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the ductwork from being visually inspected on all sides. The permit holder shall be responsible to provide the necessary equipment and perform the duct leakage test. A light test shall be performed to determine that all welded and brazed joints are liquid tight.

A light test shall be performed by passing a lamp having a power rating of not less than 100 watts through the entire section of ductwork to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls. A test shall be performed for entire duct system, including the hood-to-duct connection. The ductwork shall be permitted to be tested in sections, provided that every joint is tested. For listed factory-built grease ducts, this test shall be limited to duct joints assembled in the field and shall exclude factory welds.

### **Method 2 – Smoke Test**

**Note:** Materials or chemicals used for smoke testing should not be corrosive to stainless steel. Smoke bombs containing chlorine or chlorinated chemicals shall not be used. Consult the factory if there are any questions regarding compatibility of smoke bombs and duct.

After the ductwork has been installed allow the listed sealant to cure for a minimum of 24 hours. Smoke bombs are lit and placed at the bottom of the duct system, natural upwards drafts will pull the smoke to the top of the duct system. Various length duct runs may require multiple smoke bombs. Once the smoke has reached the top of the duct run, cap the duct securely. Inspect all joints for leakage.

### **Method 3 – Pressure Testing per SMACNA's HVAC Air Duct Leakage**

Testing and balancing shall be performed prior to the pressure duct leakage test.

A duct pressure test shall be performed during initial installation by the permit holder or its testing agency using the appropriate local code testing procedure. This test must be performed as a rough inspection prior to being covered, concealed, insulated or wrapped before final installation to the exhaust fan, kitchen exhaust hood, or other equipment. In the absence of any local code testing procedures, use SMACNA's HVAC Air Duct Leakage Test Manual for inspection and testing guidelines.

If the duct system is modified or renovated, the entire system will require re-testing.

## **GENERAL DUCT WEIGHT**

Two different material gauges are available, 20 gauge is the minimum / 18 gauge is the maximum allowable material per this listed duct. Both gauges have been tested by ETL and comply with standard UL-1978. 20 gauge is the standard material used in application with 18 inches or more to combustible surfaces. 20 gauge duct may also be wrapped using a listed duct wrap for zero clearance to combustibles, 18 gauge is required in some JHA when duct needs to be wrapped using a listed duct wrap for zero clearance to combustibles.

### **Weight – 20 Gauge Duct**

The following formula can be used to approximate the weight of total lengths of duct for 20 GA duct (.0327 x "L" x "D"). "L" and "D" should be calculated in inches, where L is the length and D is the diameter. Example: A total length of duct is 25 ft long, 14" diameter (.0327 x (25' x 12") x 14" = 137 LBS).

### **Weight – 18 Gauge Duct**

The following formula can be used to approximate the weight of total lengths of duct for 18 GA duct (.0417 x "L" x "D"). "L" and "D" should be calculated in inches, where L is the length and D is the diameter. Example: A total length of duct is 25 ft long, 14" diameter (.0417 x (25' x 12") x 14" = 175 LBS).

## **CLEANING & MAINTENANCE RECORD**

Date	Service Performed

Factory Service Department

Phone: 1-866-784-6900

Fax: 1-919-554-2415