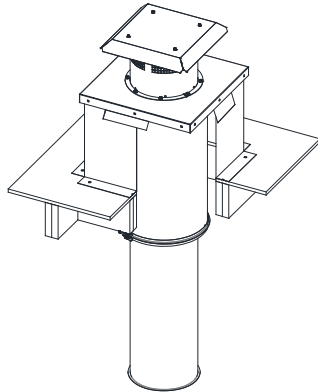
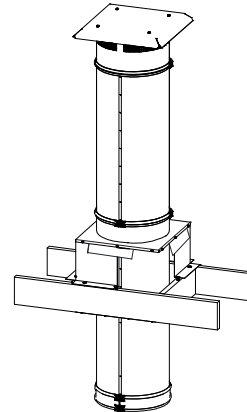


Non-Welded Single and Double Wall Insulated Vent Systems Installation, Operation, and Maintenance Manual

Single Wall



Double Wall



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.

FOR YOUR SAFETY

DO NOT INSTALL SPECIAL GAS VENT WITHOUT FIRST READING THESE INSTRUCTIONS VERY CAREFULLY.

A MAJOR CAUSE OF SPECIAL GAS VENT RELATED FIRES IS FAILURE TO MAINTAIN REQUIRED CLEARANCE (AIR SPACE) TO COMBUSTIBLE MATERIALS. IT IS OF UTMOST IMPORTANCE THAT THIS SPECIAL GAS VENT BE INSTALLED ONLY IN ACCORDANCE WITH THESE INSTRUCTIONS.

CAUTION: RISK OF FIRE: DO NOT ENCLOSE WITH COMBUSTIBLE MATERIALS.

INSTALLATION

PROPER JOINT ASSEMBLY IS ESSENTIAL FOR A SAFE INSTALLATION. FOLLOW THESE INSTRUCTIONS EXACTLY AS WRITTEN. CHECK SEVERENESS OF JOINTS UPON COMPLETION OF ASSEMBLY.

THIS VENTING SYSTEM MUST BE FREE TO EXPAND AND CONTRACT. THIS VENTING SYSTEM MUST BE SUPPORTED IN ACCORDANCE WITH THESE INSTRUCTIONS.

CHECK FOR UNRESTRICTED VENT MOVEMENT THROUGH WALLS, CEILINGS, AND ROOF PENETRATIONS.

WARNING / ADVERTISSEMENT

RISK OF FLUE GAS LEAK, REFER TO INSTRUCTIONS FOR PROPER INSTALLATION.

WARNING / ADVERTISSEMENT

RISK OF CARBON MONOXIDE (CO) POISONING AND RISK OF FIRE IF IMPROPERLY INSTALLED. FOLLOW ALL CAUTIONS, WARNINGS, AND INSTRUCTIONS REGARDING INSTALLATION OF THE VENT PIPE SYSTEM.

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 Special Gas Vent system 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, fan, or vent.
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 that 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.

LISTINGS

This Special Gas Vent system has been tested and is listed to UL1738, and ULC-S636. This vent system has been tested for unenclosed installation and is for commercial use only. Model -V/-2V Type BH is used for Special Gas Vent applications when installed in accordance with these instructions and comply with national safety standards and building codes.

Model -V/-2V Type BH is suitable for use at temperatures not exceeding **550°F (288°C)** continuously for US and flue gas temperatures not exceeding **245°C (473°F)** for Canada. Model -V/-2V Type BH is intended for installation within commercial/industrial applications. Model -V/-2V Type BH is not intended for use in family dwellings.

CLASSIFICATIONS

UL 1738: Standard for Venting Systems for Gas-Burning Appliances, Categories II, III, IV, and Canadian Standard for Type BH Gas Venting Systems, ULC-S636-08.

Model -V Type BH is a single wall venting system for building heating appliance(s). For use in commercial applications only, Factory Built Vents intended for commercial and industrial applications in sizes 5" through 36" ID.

Model -2V Type BH is an insulated double wall venting system for building heating appliance(s). For use in commercial applications only, Factory Built Vents intended for commercial and industrial applications in sizes 5" through 16" ID.

ULC-S636 Clause 4.9: The venting system will terminate in accordance with the requirements of CAN/CSA-B149.1, Natural Gas and Propane Installation Code, or CAN/CSA-B149.2, Propane Storage and Handling Code, as applicable.

ULC-S636 Clause 4.13: Authority Having Jurisdiction (AHJ) representatives (such as gas inspection authority, municipal building department, fire department, fire prevention bureau, etc.) should be consulted before installation to determine the need to obtain a permit.

APPLICATION

SUITABLE FOR INTERIOR OR EXTERIOR INSTALLATION

SUITABLE FOR USE WITH GASEOUS FUELS

For Special Gas/Type BH Vent – This venting system is intended to vent Category I, II, III, and IV gas-fired appliances. Listed in accordance with certain ANSI/CSA gas appliance Standards.

The system is suitable for gas-fired appliance use at gas vent temperatures not exceeding **550°F (288°C)** continuously for US, and gas vent temperatures not exceeding **245°C (473°F)** for Canada.

Check the joints and seams for gas tightness when using the venting system with a Category III or IV appliance.

Vent sections with joints, assembled in accordance with the manufacturer's instructions, shall withstand without rupture an internal air pressure. This venting system is suitable for a positive internal pressure of 50 in. w.c.

Appliance – A gas burning device constructed and installed in accordance with nationally recognized standards, as appropriate.

Category I: An appliance that operates with negative static pressure in the vent and a temperature that is high enough to avoid condensation in vent.

Category II: An appliance that operates with negative static pressure in the vent and a temperature that is low enough to cause excessive condensation in the vent.

Category III: An appliance that operates with positive static pressure in the vent and a temperature that is high enough to avoid condensation in vent. Condensation of vent gases is not likely.

Category IV: An appliance that operates with positive static pressure in the vent and a temperature that is low enough to cause excessive condensation in the vent. Forced draft, condensing furnace - condensation of vent gases is likely.

Special Gas Vent

When the Special Gas Vent is installed in accordance with these installation instructions, appliance manufacturer instructions, and the assembly joints are sealed properly with recommended sealant, the system will contain a fire within the vent. A fire can burn at extremely high temperatures. The system should be dismantled and inspected after any exposure to a fire. Any section that is distorted or discolored should be replaced. All joints in the system should be examined. The sealant expands to ensure a positive seal in the case of a fire, and 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 Special Gas Vent cannot be responsible for systems that are not properly maintained or have been subjected to one or more fires.

The fact that proper operation of the venting system and appliance is dependent on the use of all parts specified by the manufacturer for use in the particular installation, and that proper performance of the system may be affected if the proper assembly of all required parts is not accomplished.

Factory Built Special Gas Vent Model -V/-2V Type BH is listed for continuous internal temperatures of **550°F US & 245°C (473°F) Canada**. Factory Built Special Gas Vent Model -V/-2V Type BH is ideally suited for commercial and industrial application for the removal of smoke and heat.

NOTE: MODEL -V/-2V TYPE BH VENT DOES NOT REQUIRE JOINTS TO BE SEALED WITH THE RECOMMENDED SEALANT PER THE LISTING REPORT.

NOTE: MODEL -V/-2V TYPE BH FACTORY BUILT SPECIAL GAS VENT IS INTENDED FOR COMMERCIAL AND INDUSTRIAL APPLICATIONS. FACTORY BUILT MODEL -V/-2V TYPE BH SPECIAL GAS VENT IS NOT INTENDED FOR FAMILY DWELLINGS. SPECIAL GAS VENT SHOULD BE SIZED IN ACCORDANCE WITH THE “APPLIANCE MANUFACTURER’S INSTRUCTIONS”.

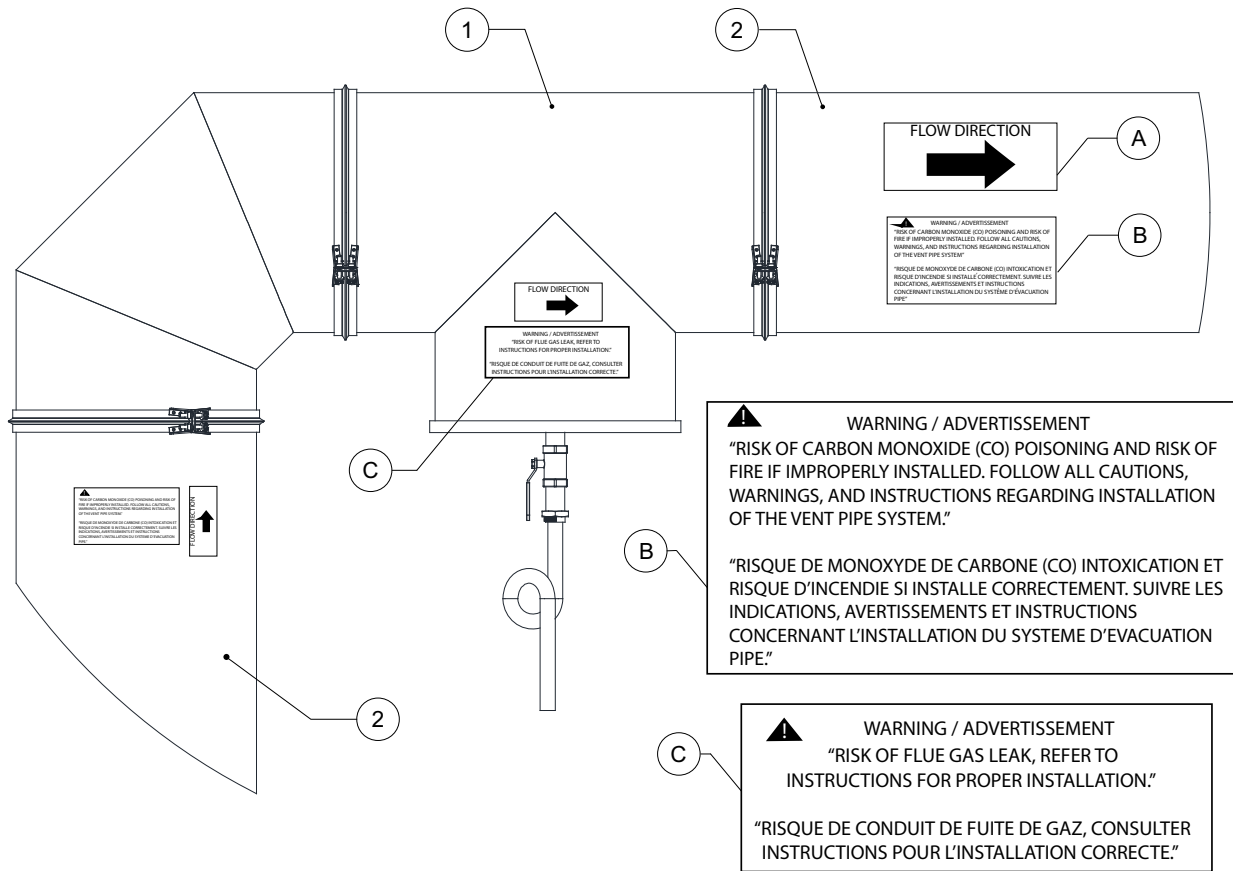
Refer to the appliance’s instructions to determine:

- Proper sizing and connection of the venting system to the appliance
- Maximum horizontal length from the appliance, maximum height
- Maximum number of joints or sections of pipe for use in the assembly
- Required installation clearances (air spaces)

NOTE: THE VENT SHOULD BE INSPECTED ONCE EVERY TWO MONTHS FOR DAMAGE. CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSPECTIONS IN YOUR AREA.

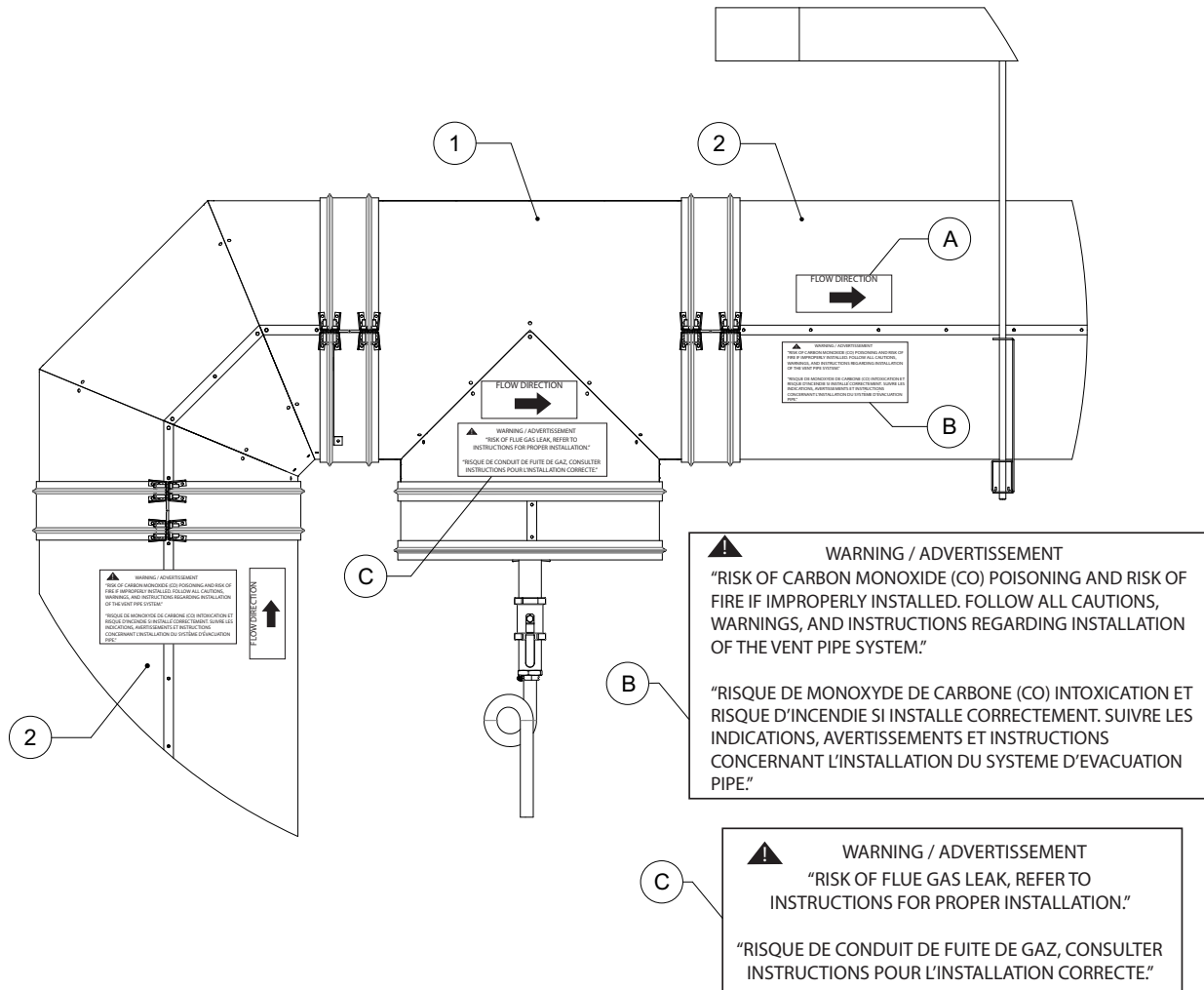
Warnings and Label Placement

Figure 1 - Single Wall Warning Label Placement



1. -V Vent Pipe Tee and Drain. See **“Single Wall and Double Wall Drains”** on page 37.
2. -V Vent Pipe Straight Section Over 11-7/8” (300 mm).
- A. Flow Direction Label. Each vent pipe shall be permanently marked with an arrow pointing in the intended flow direction.
- B. Warning Label - The exterior surface of each straight vent pipe section shall be marked with one label per vent pipe over 11-7/8” (300 mm) with this label.
- C. Warning Label - The exterior of drain vent pipe tee shall be marked with one label per drain with this label.

Figure 2 - Double Wall Warning Label Placement



1. 2V Vent Pipe Tee and Drain. See **“Single Wall and Double Wall Drains”** on page 37.
2. 2V Vent Pipe Straight Section Over 11-7/8” (300 mm).
- A. Flow Direction Label. Each vent pipe shall be permanently marked with an arrow pointing in the intended flow direction.
- B. Warning Label - The exterior surface of each straight vent pipe section shall be marked with one label per vent pipe over 11-7/8” (300 mm) with this label.
- C. Warning Label - The exterior of drain vent pipe tee shall be marked with one label per drain with this label.

MECHANICAL

Joint Sealant

Proper joint assembly is essential for safe installation. Follow these instructions exactly as written. Check severeness of joints upon completion of assembly.

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. A properly sealed system will stop the spread of noxious gas, smoke, water, and maintain the integrity of fire-rated assemblies and construction. All vents must be liquid tight. The following steps are to be used to ensure that this requirement is met. Model -V/-2V Type BH vent does not require joints to be sealed with the 3M Fire Barrier 2000+ Silicone Sealant per the listing report. Although -V/-2V Type BH vent does not require the joints to be sealed, it is recommended for commercial appliances. **Table 1** provides tube usage per duct diameter.

NO SEALANT SUBSTITUTES MAY BE USED.

Sealant Features

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

Table 1 - 3M Fire Barrier 2000 Plus Usage Chart

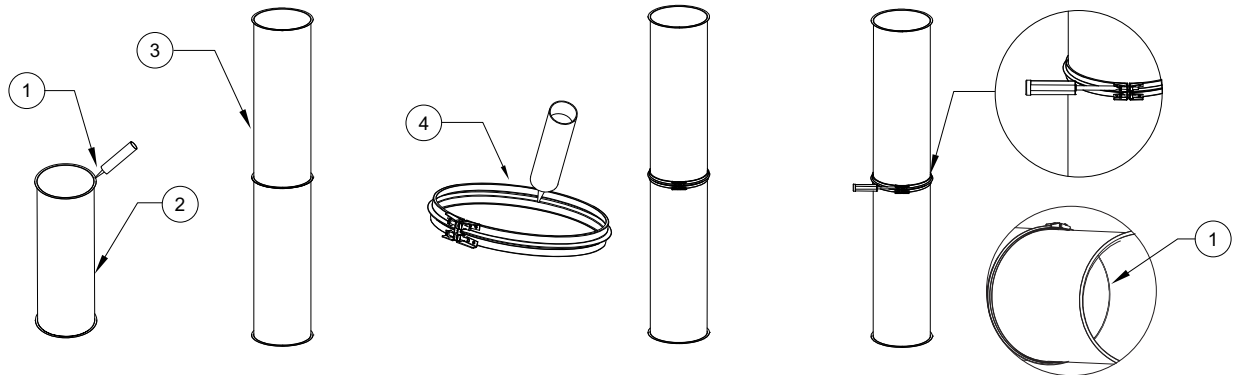
-V Diameter	-2V Diameter	Duct Vent Perimeter Feet	Average Feet Per Tube	Number of Joints Per Tube
5"	5"	1.43	30	10.5
6"	6"	1.70	30	9
7"	7"	1.96	30	7.5
8"	8"	2.16	30	7
10"	10"	2.68	30	6
12"	12"	3.21	30	5
14"	14"	3.73	30	4
16"	16"	4.25	30	3.5
18"	-	4.78	30	3
20"	-	5.30	30	3
22"	-	5.83	30	2.5
24"	-	6.35	30	2.5
26"	-	6.93	30	2
28"	-	7.46	30	1.5
30"	-	7.98	30	1.5
32"	-	8.39	30	1.5
34"	-	8.91	30	1
36"	-	9.55	30	1

Single Wall Vent & Chimney Joint Assembly

All grease ducts are to be liquid tight per NFPA 96. Chimney used in positive pressure applications must be liquid tight per UL103 listing. When a chimney system is used in a positive pressure application, it must be fitted with an internal joint collar and sealed as shown in **Figure 3** (positive pressure only). Positive pressure applications must be liquid tight per UL103 Positive Pressure Testing. When a chimney system is used in a negative or neutral pressure application, it does not need to be sealed per the listing report; although, sealing the system is recommended for commercial cooking appliances where grease is present.

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. Refer to "**Joint Sealant**" on page 9 for sealant details. For neutral and negative chimney or grease duct applications, proceed to step 4.
2. For positive pressure chimney applications, apply 1/4" wide continuous bead of 3M Fire Barrier 2000 + Silicone around the formed bead of the internal joint collar. Push the internal collar down into the chimney section assembly.
3. For positive pressure chimney applications: The internal joint collar should be pushed down into the chimney section until the collar bead sits on the chimney flange.
4. Join the two flanged ends of the vent section together.
5. Fill the V-clamp with 3M Fire Barrier 2000 + Silicone Sealant. The bead should be inside the "V".
6. Install the V-clamp around the vent sections. Both vent flanges should be inside the "V".
7. For horizontal runs, the V-clamp hardware should be located on the top side of the vent and orientated between the 3 and 9 o'clock position.
8. NEVER install the V-clamp with the hardware orientated on the bottom side of the vent on horizontal runs.
9. Secure the V-clamp around the vent by tightening the 1/4"-20 hardware between **40 - 60 in-lbs**. See **Figure 3** for details. Smooth out any excess sealant from the inside of the vent surface.

Figure 3 - Joint Assembly



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

3. Connecting Vent Section
4. V-band

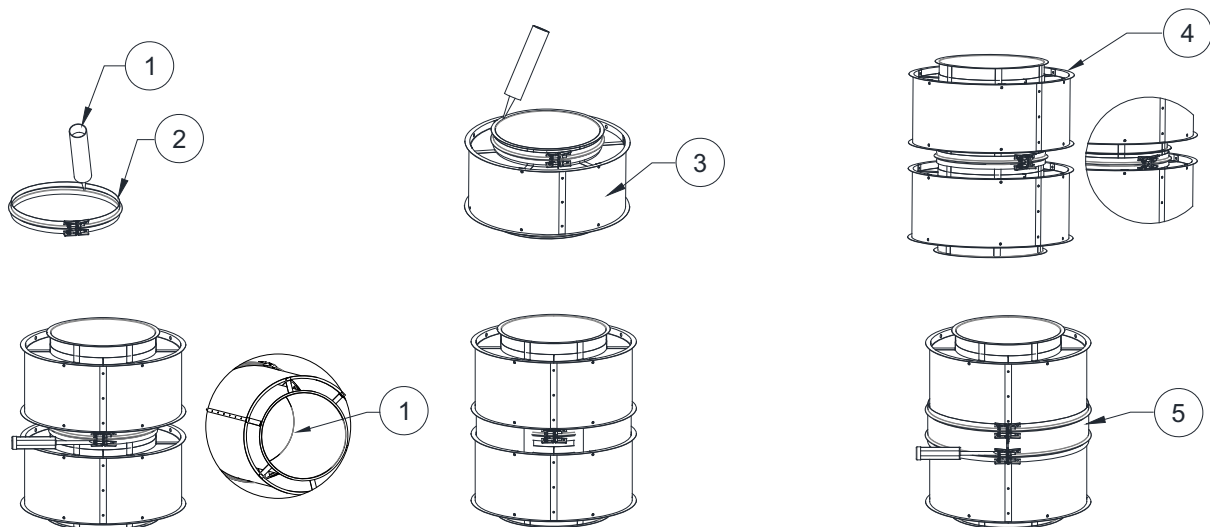
IMPORTANT: THE HARDWARE USED TO ASSEMBLE THIS VENT SECTION IS SPECIFICALLY DESIGNED FOR THIS APPLICATION. NO SUBSTITUTE HARDWARE IS ALLOWED. ALL REPLACEMENT HARDWARE MUST BE PURCHASED FROM THE FACTORY.

Double Wall Vent Joint Assembly

All vents are to be liquid tight. The following steps are to be used to ensure that this requirement is met. Model -2V Type BH vent does not require joints to be sealed with the 3M Fire Barrier 2000+ Silicone per the listing report. Although -2V Type BH vent does not require the joints to be sealed, it is recommended for commercial appliances.

1. Fill the V-band with 3M Fire Barrier 2000+ Silicone. The bead should be continuous. Refer to “**Joint Sealant**” on page 9 for sealant details.
2. Place the loose V-band over the vent flange. Apply a continuous bead of 2000+ Silicone 1/4” wide to the flange that will be joined.
3. Join the two flanged ends of the inner vent sections together and rotate slightly to ensure complete coverage of sealant on flanges.
4. For horizontal vent runs, the V-band hardware should be located on the top side of the vent and orientated between the 3 and 9 o’clock position on the vent.
5. NEVER install the V-band with hardware orientated on the bottom side of the vent on horizontal runs.
6. Install the V-band around the vent flanges making sure the flanges are located within the V-band. Tap the outside of the V-band while tightening V-band hardware to make sure the flanges are aligned and have been pulled together. Secure the 1/4”-20 hardware between **40-60 in-lbs**. Smooth out any excess sealant from inside of the vent surface.
7. Insulation must be minimum of 4-1/2” wide, and the same type and number of layers as the base vent. Tightly pack and completely fill all voids between the inner vent and the outer shell.
8. Install the double V-band ensuring the outer shell flanges are positively engaged in the V-bands before tightening the 1/4”-20 hardware between **40-60 in-lbs**. The double V-band can be sealed using 3M Fire Barrier 2000+ Silicone when being installed outside.

Figure 4 - Vent Joint Assembly



1. 3M Fire Barrier Silicone
2. V-band
3. First Vent Section

4. Second Vent Section
5. Double V-band

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

Single Wall Collar and Adjustable Vent Connections

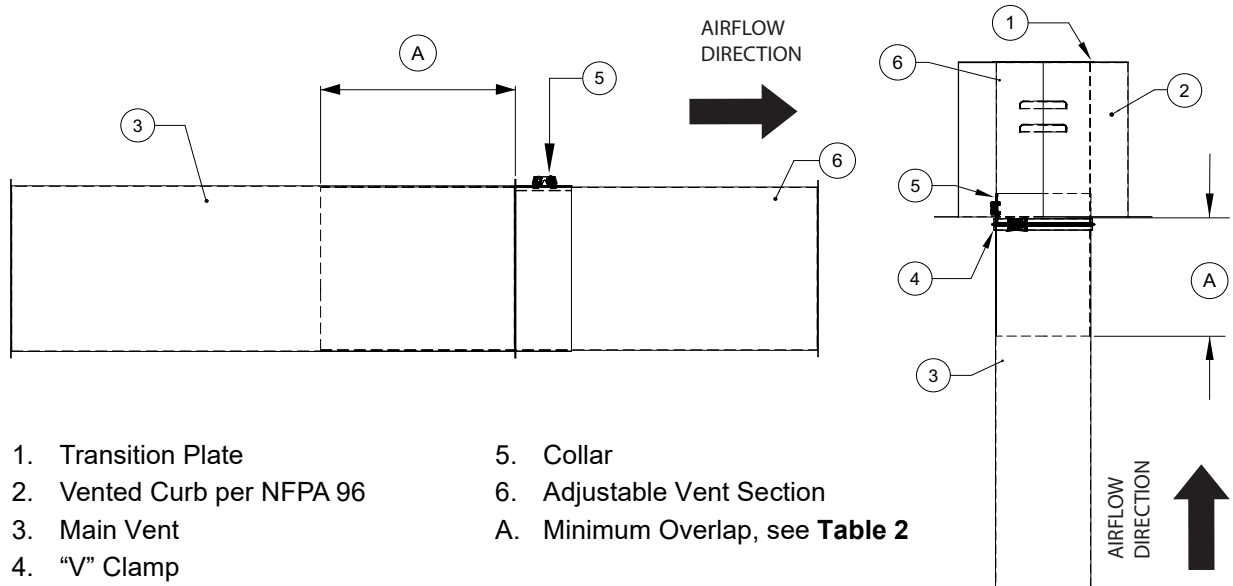
At present (June 1st 2016) Underwriters Laboratories, Inc. (UL) has no safety standard for these devices, so although they are shown in this document and condoned by the MANUFACTURER and others, UL has not independently investigated this product.

The collar and the adjustable vent length have two major functions: One function is to make up odd lengths of vent section as needed in short runs, as in termination of the vent at the exhaust cap. Another function is to serve as an expansion joint for thermal expansion in larger vent runs. Refer to **Figure 5** for adjustable duct assembly details.

When used in systems of any orientation, it can perform both functions simultaneously. The adjustable vent section is overlapped to allow condensation to drain back to the unit in both vertical and horizontal installations. The adjustable vent is flanged at one end only. The collar is constructed of the same material as the vent and is also designed with a 1/2" flange that is connected to the standard vent section using the **"Single Wall Vent & Chimney Joint Assembly"** on page 10 method. Collars are also sealed using high-temperature silicone that compresses around the adjustable vent when the collar hardware is tightened. The collar is designed to securely hold the adjustable vent while allowing for thermal expansion. If the protruding section interferes with mating parts in the vent run, you will need to field cut the adjustable section. Verify the minimum overlap is set correctly, refer to **Table 2**.

NOTE: When installing vent sections, verify the directional label is in the correct direction of airflow. Exception: When condensation is draining in a downward slope, the arrow should be opposite of airflow.

Figure 5 - Adjustable Vent Overlap



- | | |
|----------------------------|--|
| 1. Transition Plate | 5. Collar |
| 2. Vented Curb per NFPA 96 | 6. Adjustable Vent Section |
| 3. Main Vent | A. Minimum Overlap, see Table 2 |
| 4. "V" Clamp | |

Table 2 - Minimum Overlap

Diameter	Minimum Overlap for Adjustable Vent
5", 6", 7", 8"	4"
10"	5"
12", 14", 16", 20", 22", 24", 26", 28", 30", 32", 34", 36"	6"

Double Wall Adjustable Vent Standard Installation

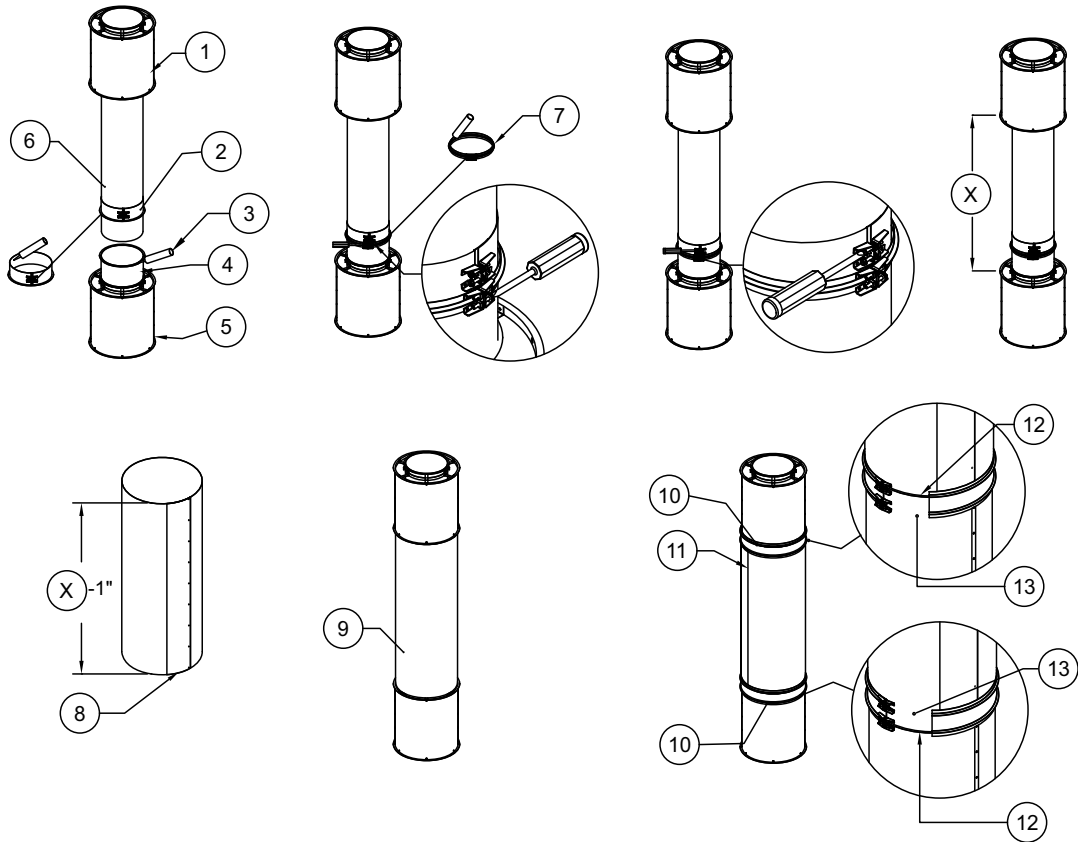
At present (June 1st 2016) Underwriters Laboratories, Inc. (UL) has no safety standard for these devices, so although they are shown in this document and condoned by the MANUFACTURER and others, UL has not independently investigated this product.

Adjustable vent lengths are used to make up variable lengths in the vent system(s). Adjustable sections should always be installed with the overlap to the inside of the standard vent section. Overlap should always be opposite the direction of airflow. This will allow water to run back to the appliance when the system is shut down. If the inner adjustable section is too long to fit into the adjacent section of vent without interfering with the flow path, it should be trimmed to the desired flange to flange length. Flange to flange length of adjustment can range from 5" to 26". Model -2V Type BH vent does not require joints to be sealed with the 3M Fire Barrier 2000+ Silicone Sealant per the listing report. Although -2V Type BH vent does not require the joints to be sealed, it is recommended for commercial appliances where condensation accumulation is present.

1. The 7" standard vent section in the adjustable assembly is installed the same as the **"Double Wall Vent Joint Assembly"** on page 11.
2. The adjustable collar is slipped onto the adjustable vent section. Make sure the adjustable collar flanges are opposite the adjustable vent section flange.
3. The adjustable section is pushed inside the 7" standard vent section. Verify the minimum overlap is set correctly, refer to **Table 3 on page 14**.
4. If the protruding section interferes with mating parts in the vent run, you will need to cut the adjustable section that is interfering with mating parts, refer to **Figure 9 on page 17**.
5. Once the overlap is set correctly, apply 3M Fire Barrier 2000+ Silicone to the flanges of the vent section and the adjustable collar.
6. Apply 3M Fire Barrier 2000+ Silicone to the single V-band groove. Install single V-band around adjustable collar flange and standard vent flange. Tighten the single V-band hardware to **40-60 in-lbs**.
7. Once the single V-band has been installed, tighten the adjustable collar hardware to **40-60 in-lbs**.
8. Measure the distance between mating vent flanges prior to installing insulation and outer shell cover.
9. Subtract 1" from the measured distance and cut the pre-rolled shell to this dimension.
10. After the single wall adjustable section has been installed, wrap the assembly using blanket insulation provided. Make sure all voids are adequately filled.
11. Wrap the pre-rolled outer shell cover around the insulation. Ratchet strap(s) may be used around outer shell to aid in compressing insulation.
12. Install the double wall V-band on either end of the assembly. Make sure the double wall V-band is secured onto the mating vent flange and overlapping onto the shell before tightening hardware.
13. The double wall V-band will close the pre-rolled shell as they are tightened. Once closed, secure the outer shell cover along the seam using the 1" sheet metal screws that have been provided.
14. Use 3M Fire Barrier 2000+ Silicone to seal the outer shell, if required or installed outside.

NOTE: Outer Shell Must Extend Behind the Double Wall V-band.

Figure 6 - Collar and Adjustable Vent Installation



- 1. Vent Section 1
- 2. Adjustable Collar
- 3. 3M Fire Barrier 2000 Plus
- 4. 7" Standard Vent Section
- 5. Vent Section 2
- 6. Adjustable Vent
- 7. Single V-band
- 8. Outer Shell Cover
- 9. Insulation
- 10. Double Wall V-band
- 11. Sheet Metal Screws
- 12. Mating Vent Flange
- 13. Shell Overlap
- X. Measured Distance

Table 3 - Minimum Overlap

Diameter	Minimum Overlap for Adjustable Sections
5", 6", 7", 8"	4"
10"	5"
12", 14", 16"	6"

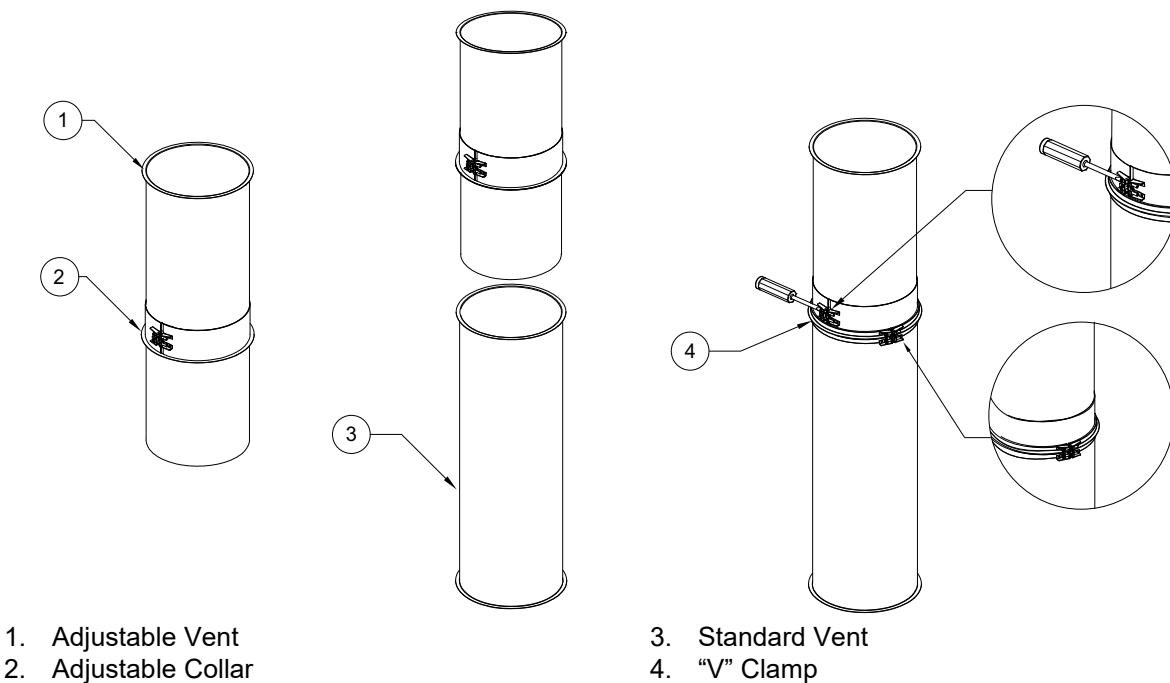
Single Wall Collar and Adjustable Vent Vertical Installation

At present (June 1st 2016) Underwriters Laboratories, Inc. (UL) has no safety standard for these devices, so although they are shown in this document and condoned by the MANUFACTURER and others, UL has not independently investigated this product.

When the adjustable length vent 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 vent joint immediately below the adjustable vent. This combination of parts will force the sliding inner and outer parts of the adjustable vent to overcome collar friction, allowing movement along the axis of the vent. This relieves expansion stresses, which would otherwise develop between the fixed points of the heated vertical vent. Refer to **Figure 7** for assembly details.

1. Slide the adjustable collar over the adjustable vent. Flanges should be opposite of each other.
2. Slide the adjustable vent into the standard vent to the point that the collar flange and the standard vent flange meet.
3. The adjustable collar and standard vent are joined and sealed using the **“Single Wall Vent & Chimney Joint Assembly”** on page 10 method.
4. Slide the adjustable vent into the standard vent to the desired length. If the protruding section interferes with mating parts in the vent run, you will need to cut the adjustable vent section that is interfering with mating parts. Minimum overlap dimensions are specific to the vent diameter. Refer to **Table 2 on page 12** for proper overlap specifications.
5. Once the desired overlap has been set, all mating parts must be sealed using 3M Fire Barrier 2000 Plus.
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 7 - Collar and Adjustable Vent Installation



Double Wall Adjustable Vent and Transition Plate

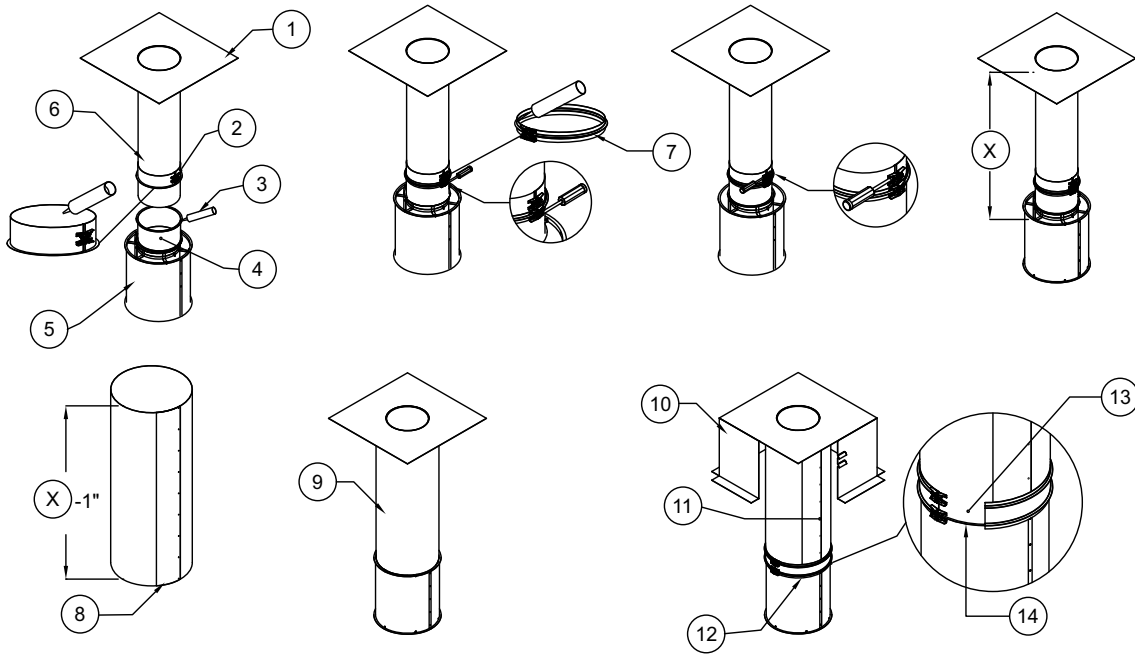
At present (June 1st 2016) Underwriters Laboratories, Inc. (UL) has no safety standard for these devices, so although they are shown in this document and condoned by the MANUFACTURER and others, UL has not independently investigated this product.

Adjustable vent sections may be used in conjunction with transition plates when they terminate at the cap. The adjustable vent section is fully welded to the transition plate, and then connected to the standard vent length using non-welded connections. Double wall adjustable vent sections are assembled in the field, as the exact length needed for the application is not known. Components for outer shell and insulation ship loose. Once fully assembled, the transition plate is secured to the curb using the method referenced in **Figure 37 on page 44**. Model -2V Type BH vent does not require joints to be sealed with the 3M Fire Barrier 2000+ Silicone Sealant per the listing report. Although -2V Type BH vent does not require the joints to be sealed, it is recommended for commercial appliances where accumulation is present. Refer to **Figure 8** for assembly details.

1. The 7" standard vent section in the adjustable assembly is installed the same as the **"Double Wall Vent Joint Assembly"** on page 11.
2. When adjustable vent assemblies are used with transition plates, the 7" standard section is connected to the mating vent section. The adjustable vent with single flange is welded to the transition plate.
3. The adjustable collar is slipped onto the adjustable section. Make sure the adjustable collar flanges are opposite the adjustable vent section flange. Apply 3M Fire Barrier 2000+ Silicone to the collar.
4. The adjustable section is pushed inside the 7" standard section. Verify the minimum overlap is set correctly, refer to **Table 3 on page 14**.
5. If the protruding section interferes with mating parts in the vent run, you will need to cut the adjustable section that is interfering with mating parts, refer to **Figure 9 on page 17**.
6. Once the overlap is set correctly, apply 3M Fire Barrier 2000+ Silicone to the flanges of the vent section and the adjustable collar.
7. Apply 3M Fire Barrier 2000+ Silicone to the single V-band groove. Install single V-band around adjustable collar flange and standard vent flange. Tighten the single V-band hardware to **40-60 in-lbs**.
8. Once the single V-band has been installed, tighten the adjustable collar hardware to **40-60 in-lbs**.
9. Measure the distance between mating vent flange and transition plate prior to installing insulation and outer shell cover.
10. Subtract 1" from the measured distance and cut the pre-rolled shell to this dimension.
11. After the single wall adjustable section has been installed, wrap the assembly using blanket insulation provided. Make sure all voids are adequately filled.
12. Wrap the pre-rolled outer shell cover around the insulation. Ratchet strap(s) may be used around outer shell to aid in compressing insulation.
13. Install the double wall V-band on either end of the assembly. Make sure the double wall V-band is secured onto the mating vent flange and overlapping onto the shell before tightening hardware.
14. The double wall V-band will close the pre-rolled shell as they are tightened. Once closed, secure the outer shell cover along the seam using the 1" sheet metal screws that have been provided.
15. Use 3M Fire Barrier 2000+ Silicone to seal the outer shell, if required or installed outside.

NOTE: Outer Shell Must Extend Behind the Double Wall V-band.

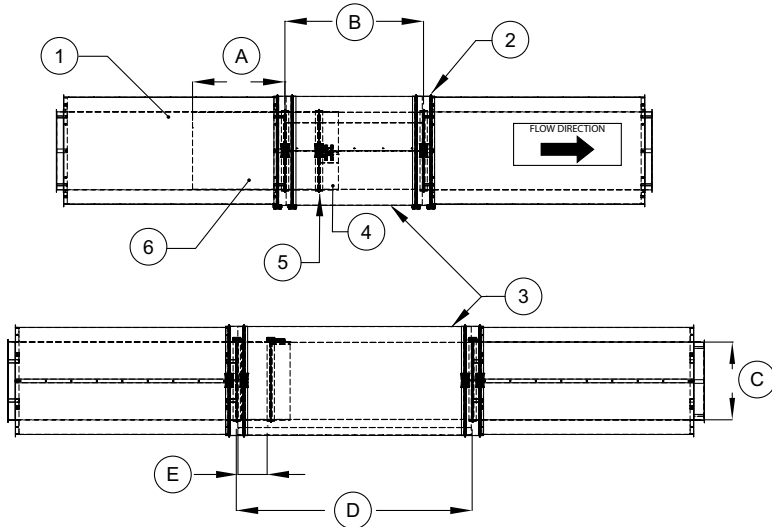
Figure 8 - Adjustable Vent and Transition Plate



- | | | |
|------------------------------|----------------------------|------------------------|
| 1. Transition Plate | 6. Adjustable Vent Section | 11. Sheet Metal Screws |
| 2. Adjustable Collar | 7. Single V-band | 12. Double Wall V-band |
| 3. 3M Fire Barrier 2000 Plus | 8. Outer Shell Cover | 13. Shell Overlap |
| 4. 7" Standard Vent Section | 9. Insulation | 14. Mating Vent Flange |
| 5. Mating Vent Section | 10. Curb | X. Measured Distance |

Figure 9 - Adjustable Vent Overlap

1. Vent
2. Double Wall V-band
3. Outer Shell Cover - Cut to size
4. Adjustable Collar
5. Single V-band
6. Adjustable Vent Section
- A. Adjustable Section Protrusion - May need to be cut
- B. Minimum Length
- C. Diameter
- D. Maximum Length
- E. Minimum Overlap



NOTE: Protruding section may need to be cut in the field if there is interference with mating parts in the vent run.

NOTE: When installing vent sections, verify directional label is in the correct direction of airflow. (Exception: When condensation is draining in a downward slope, the arrow should be opposite of airflow).

Single Wall Offset Distance

Refer to **page 18** through **page 20** for single wall offset details.

Table 4 - Offset Center Line Distance 15 Degree Elbows

Diameter	Flange Diameter	Part Number	HT 1	CL 1
5"	6"	DW0515ASY	19"	2-1/2"
6"	7"	DW0615ASY	19-1/4"	2-1/2"
7"	8"	DW0715ASY	19-1/2"	2-1/2"
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"
26"	27"	DW2615ASY	24-1/2"	3-1/4"
28"	29"	DW2815ASY	25"	3-1/4"
30"	31"	DW3015ASY	25-1/2"	3-3/8"
32"	33"	DW3215ASY	26"	3-1/2"
34"	35"	DW3415ASY	26-1/2"	3-1/2"
36"	37"	DW3615ASY	27-1/8"	3-1/2"

Figure 10 - 15 Degree Offset Details

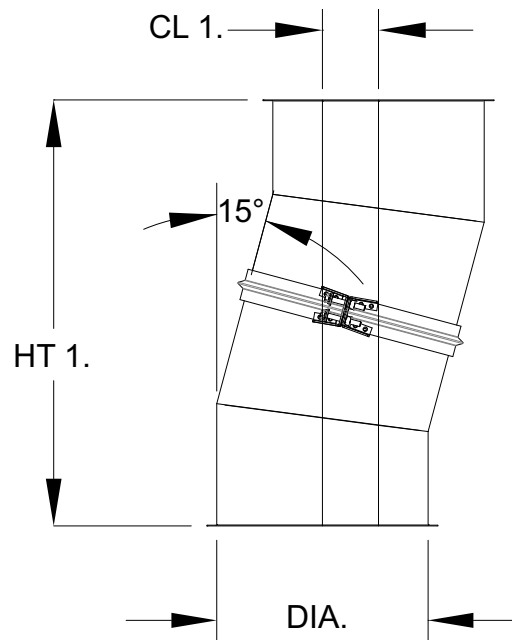


Table 5 - Offset Center Line Distance 30 Degree Elbows

Diameter	Flange Diameter	Part Number	HT 1	CL 1
5"	6"	DW0530ASY	19-3/8"	5-1/8"
6"	7"	DW0630ASY	19-7/8"	5-3/8"
7"	8"	DW0730ASY	20-3/8"	5-1/2"
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"
26"	27"	DW2630ASY	29-7/8"	8"
28"	29"	DW2830ASY	30-7/8"	8-1/4"
30"	31"	DW3030ASY	31-7/8"	8-1/2"
32"	33"	DW3230ASY	32-7/8"	8-3/4"
34"	35"	DW3430ASY	33-7/8"	9"
36"	37"	DW3630ASY	34-7/8"	9-3/8"

Figure 11 - 30 Degree Offset Details

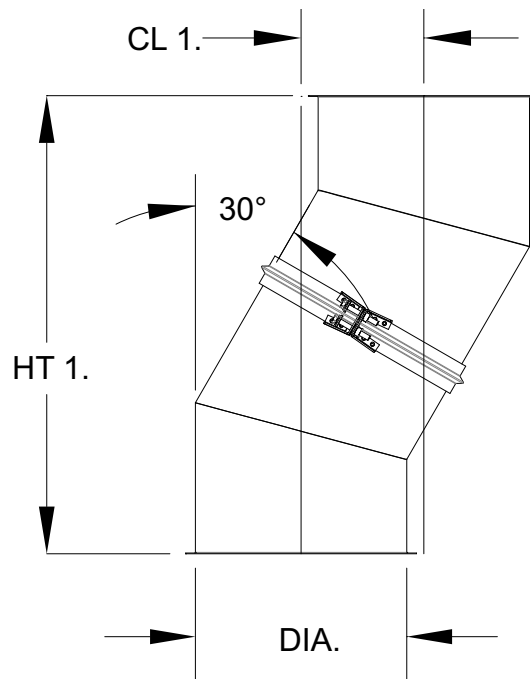
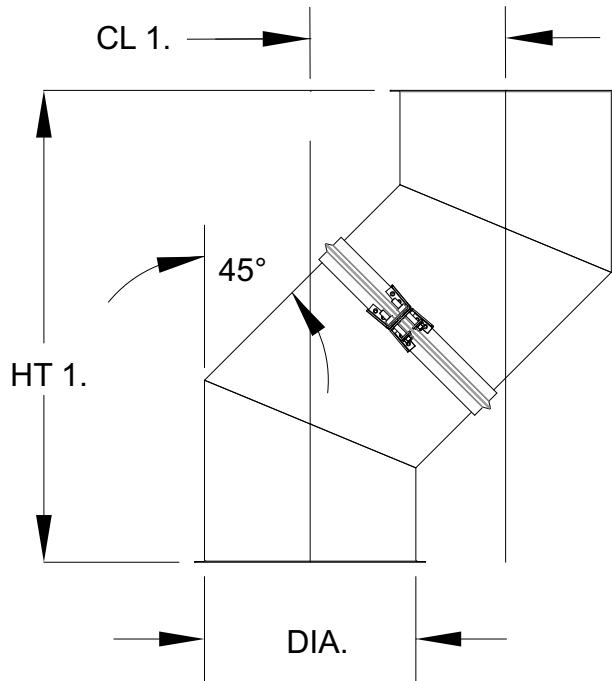


Table 6 - Offset Center Line Distance 45 Degree Elbows

Diameter	Flange Diameter	Part Number	HT 1	CL 1
5"	6"	DW0545ASY	18-7/8"	7-7/8"
6"	7"	DW0645ASY	19-5/8"	8-1/8"
7"	8"	DW0745ASY	20-3/8"	8-1/2"
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"
26"	27"	DW2645ASY	33-7/8"	14"
28"	29"	DW2845ASY	35-1/4"	14-1/4"
30"	31"	DW3045ASY	36-5/8"	15-1/4"
32"	33"	DW3245ASY	38"	15-3/4"
34"	35"	DW3445ASY	39-1/2"	16-3/8"
36"	37"	DW3645ASY	40-7/8"	17"

Figure 12 - 45 Degree Offset Details



Double Wall Offset Distance

Refer to **page 21** through **page 23** for double wall offset details.

Table 7 - Offset Center Line Distance 15 Degree Elbows

Diameter	Flange Diameter	Part Number	HT 1	CL 1
5"	6"	DW0515DWASY	19"	2-1/2"
6"	7"	DW0615DWASY	19-1/4"	2-1/2"
7"	8"	DW0715DWASY	19-1/2"	2-1/2"
8"	9"	DW0815DWASY	19-3/4"	2-1/2"
10"	11"	DW1015DWASY	20-3/8"	2-5/8"
12"	13"	DW1215DWASY	20-7/8"	2-3/4"
14"	15"	DW1415DWASY	21-3/8"	2-7/8"
16"	17"	DW1615DWASY	21-7/8"	2-7/8"

Figure 13 - 15 Degree Offset Details

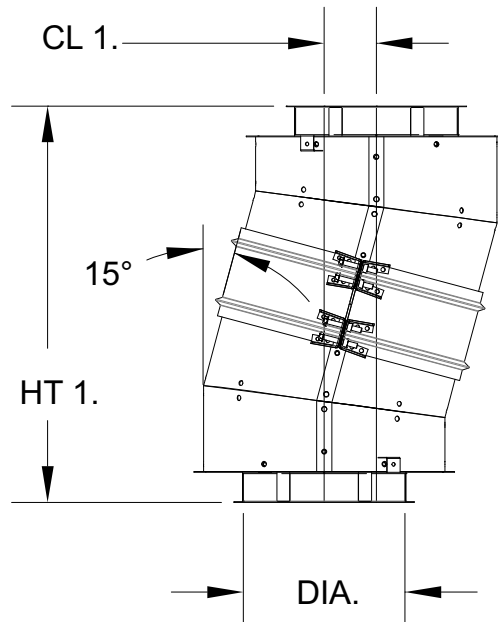


Table 8 - Offset Center Line Distance 30 Degree Elbows

Diameter	Flange Diameter	Part Number	HT 1	CL 1
5"	6"	DW0530DWASY	19-3/8"	5-1/8"
6"	7"	DW0630DWASY	19-7/8"	5-3/8"
7"	8"	DW0730DWASY	20-3/8"	5-1/2"
8"	9"	DW0830DWASY	20-7/8"	5-1/2"
10"	11"	DW1030DWASY	21-7/8"	5-7/8"
12"	13"	DW1230DWASY	22-7/8"	6-1/8"
14"	15"	DW1430DWASY	23-7/8"	6-3/8"
16"	17"	DW1630DWASY	24-7/8"	6-5/8"

Figure 14 - 30 Degree Offset Details

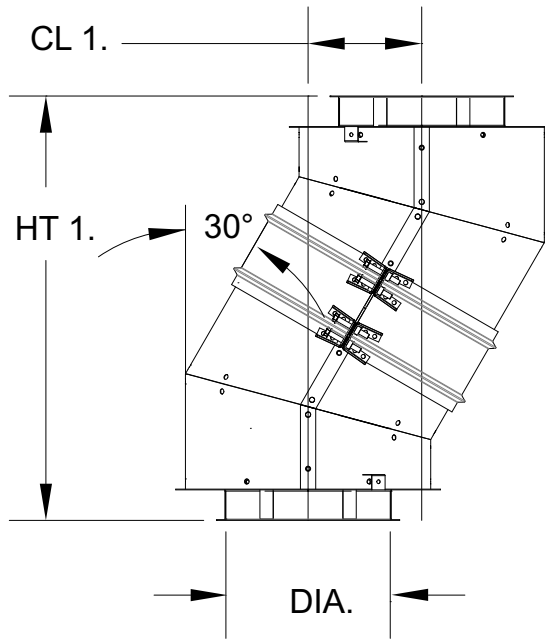
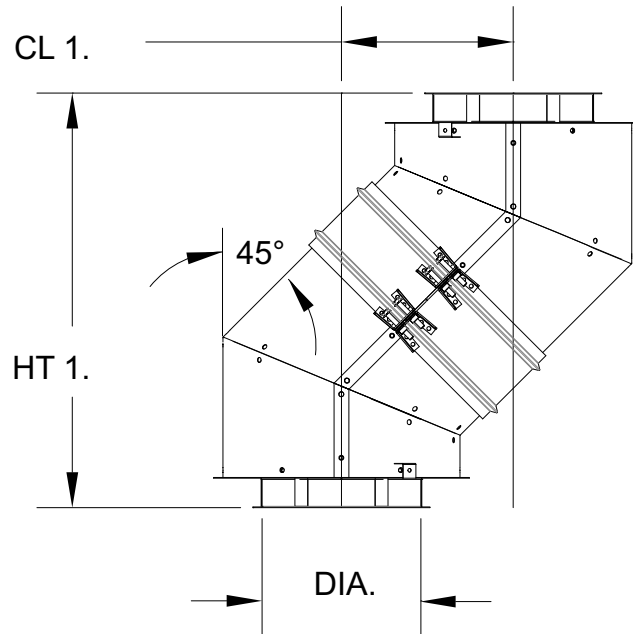


Table 9 - Offset Center Line Distance 45 Degree Elbows

Diameter	Flange Diameter	Part Number	HT 1	CL 1
5"	6"	DW0545DWASY	18-7/8"	7-7/8"
6"	7"	DW0645DWASY	19-5/8"	8-1/8"
7"	8"	DW0745DWASY	20-3/8"	8-1/2"
8"	9"	DW0845DWASY	21"	8-3/4"
10"	11"	DW1045DWASY	22-1/2"	9-3/8"
12"	13"	DW1245DWASY	23-7/8"	9-7/8"
14"	15"	DW1445DWASY	25-3/8"	10-1/2"
16"	17"	DW1645DWASY	26-3/4"	11"

Figure 15 - 45 Degree Offset Details



Single Wall Clearances and Clearance Plates

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 vent must be enclosed in a continuous enclosure. This enclosure will be from the lowest fire-rated ceiling or floor above the appliance, 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. When installed in an open room where an enclosure is not required, double wall vents may be located at clearance to combustibles in accordance with **Table 10. All through floor and wall penetrations will contain an insulated section of double wall -2V vent that allows for a reduced clearance.**

Table 10 - Building Heating Appliance Vent Clearances (For Commercial Applications Only)

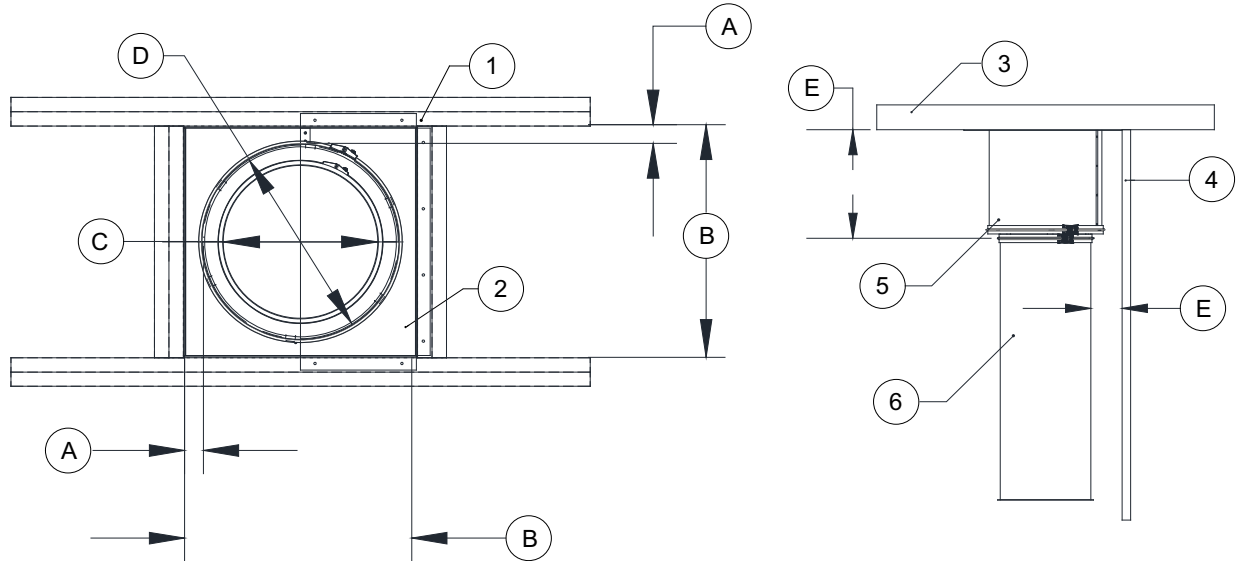
Single Wall -V Vent Diameter (ID)	-V Thimble Assembly Vent Shell Diameter (Thru Penetration)	-V Thimble Assembly Clearance to Combustibles (Shell to Joist)	Clearance To Combustibles (Vent to Ceiling/Wall)	Clearance To Non- Combustibles	Through Wall/Floor Opening
5"	9"	1"	3"	0"	13-1/2"
6"	10"	1"	3"	0"	14-1/2"
7"	11"	1"	3"	0"	15-1/2"
8"	12"	1"	3"	0"	16-1/2"
10"	14"	1"	3"	0"	18-1/2"
12"	16"	2"	4"	0"	20-1/2"
14"	18"	2"	4"	0"	22-1/2"
16"	20"	3"	5"	0"	26-1/2"
18"	22"	3"	5"	0"	28-1/2"
20"	24"	3"	5"	0"	30-1/2"
22"	26"	4"	6"	0"	34-1/2"
24"	28"	4"	6"	0"	36-1/2"
26"	30"	5"	7"	0"	40-1/2"
28"	32"	5"	7"	0"	42-1/2"
30"	34"	6"	8"	0"	46-1/2"
32"	36"	6"	8"	0"	48-1/2"
34"	38"	7"	9"	0"	52-1/2"
36"	40"	7"	9"	0"	54-1/2"

*The information in **Table 10** represents air space, in inches, to surroundings.*

NOTE: For 5"-10" vent diameters, a 1" clearance is permitted without the use of clearance plates. If clearance plates are used, a 2" clearance to combustibles will be maintained.

Note: Table 10 shows two different clearances; vent clearance is from the vent's outer diameter (OD) to the combustible ceiling/wall. The thimble assembly clearance is from the vent's shell OD to the combustible joist. It is important that all clearance to combustibles noted in Table 10 on page 24 and on the UL label are followed.

Figure 16 - V Type Vent Clearance



- 1. Combustible Surface
- 2. Clearance Plates - Half plate removed for clarity.
- 3. Ceiling
- 4. Wall
- 5. -2V Double Wall Assembly
- 6. Single Wall Vent Section

- A. Clearance to Combustibles (Shell to Joist), refer to **Table 10**
- B. Wall/Floor Opening, refer to **Table 10**
- C. Vent Diameter
- D. -2V Shell Outer Diameter (OD)
- E. Clearance to Combustibles (Vent to Ceiling/Wall), refer to **Table 10**

Single Wall Supports and Clearance Plates

Floor and wall support assemblies are used to support vent sections that penetrate a floor or wall. Each of these support assemblies consists of a main support, refer to **Figure 18**, and a set of clearance plates. Clearance plates can be used as the main support shown in **Figure 17** or used in conjunction with support assemblies. Clearance plates are designed to maintain the clearance to combustibles while keeping the vent centered in the floor or opening. Clearance plates may be removed if a tighter clearance is desired, refer to **Table 10 on page 24** for measurements and more information.

Figure 17 - Wall Support Assembly

1. Wall
2. Ceiling
3. Single Wall Section
4. Clearance Plates
- A. Clearance to Combustibles (Ceiling/Wall), refer to **Table 10**
- B. Clearance to Combustibles (Shell to Joist), refer to **Table 10**

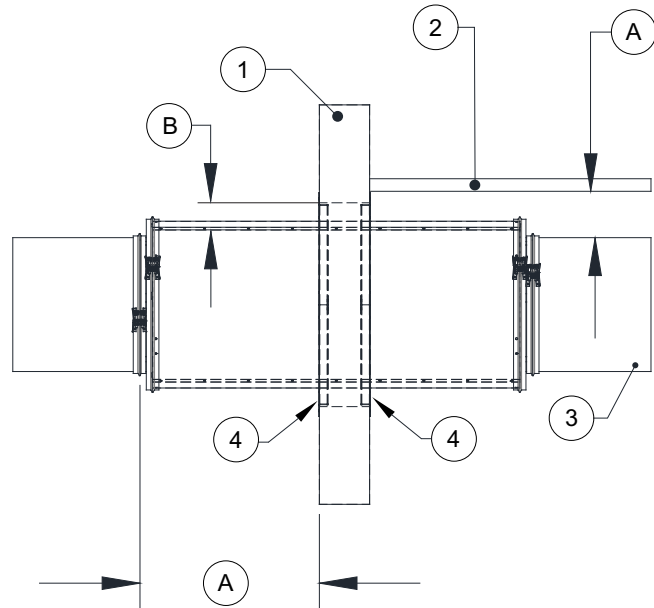
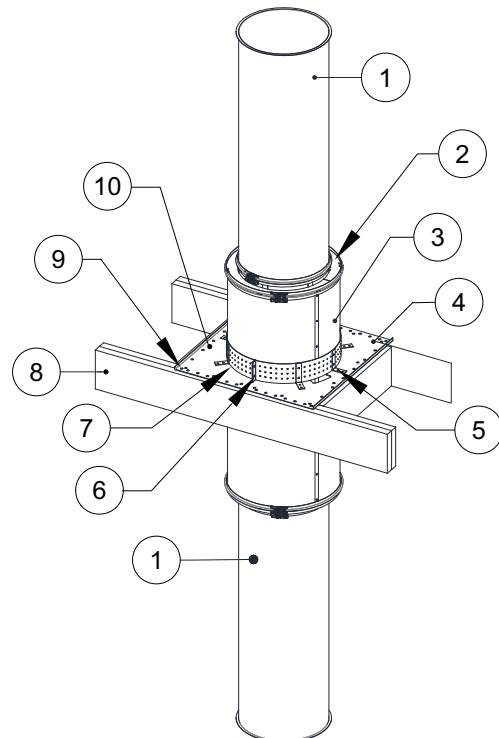


Figure 18 - Floor Support Assembly

1. Single Wall Section
2. End Cap
3. -2V Double Wall Vent
4. Floor Support Assembly
5. 5/16"-18 x 1-1/2" Self Drilling Screws.
6. 1/4"-20 Whiz Nuts and Bolts.
7. Vertical Support Ring
8. Joist
9. Substrate Hardware, refer to **Table 11**
10. Vertical Support Plate

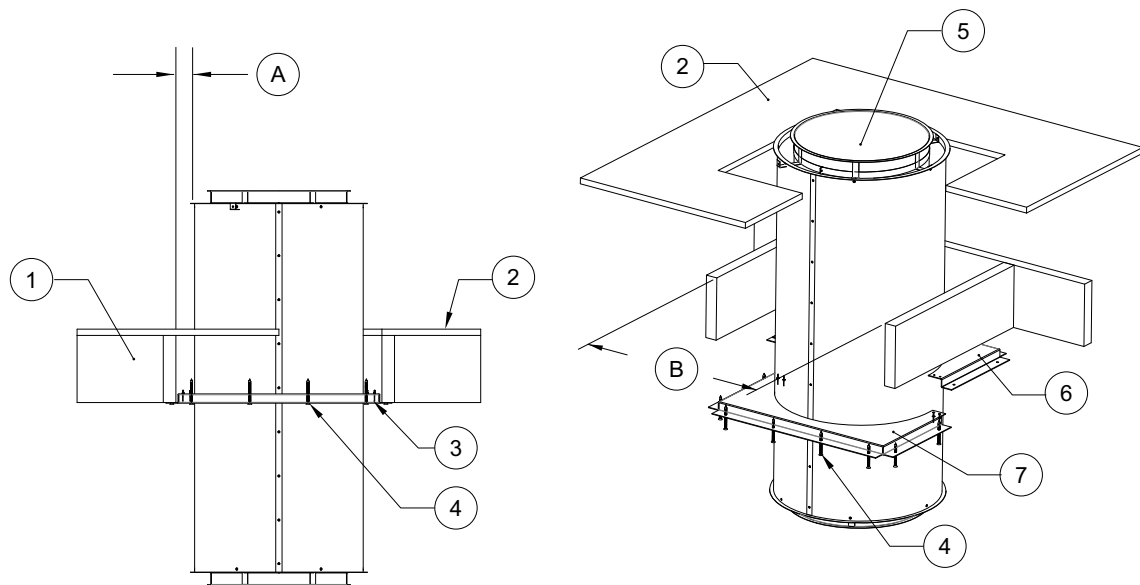


Single Wall Annular Distance -V Type Clearance

Vent clearance plates are used to maintain clearance to combustibles for -V Type listed vents. These clearance plates are not a hanging substitute for through penetration and fire stop plates. Vent clearance plates are designed to center the vent in the recommend opening and maintain clearance to combustibles as shown in **Figure 16 on page 25**. Vent clearance plates consist of two half plates; the plates are designed so they are inserted into the opening. The plates are installed on the bottom side of the floor or on both sides of a wall. Frame or cut the opening in the floor/wall, refer to **Table 10 on page 24**. Insert the vent into the opening, then insert one half of the clearance plate. Secure the half plate using appropriate hardware for substrate construction, refer to **Table 11**. Insert the second half plate and secure. Once both plates are secure, the vent will be centered in the opening with a clearance to combustibles. **All through floor and wall penetrations will contain an insulated section of double wall -2V vent that allows for a reduced clearance.**

WARNING: Clearance (air space) to combustibles must be free from any type of insulation.

Figure 19 - Vent Clearance Plates (Floor Installation Shown)



1. Joist
2. Floor
3. Clearance Plates - Shown installed
4. Clearance Plate Hardware
5. Vent

6. Clearance Plate 1
7. Clearance Plate 2
- A. Clearance to Combustibles (Shell to Joist), refer to **Table 10**
- B. Floor Opening, refer to **Table 10**

Table 11 - Substrate Hardware Table

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

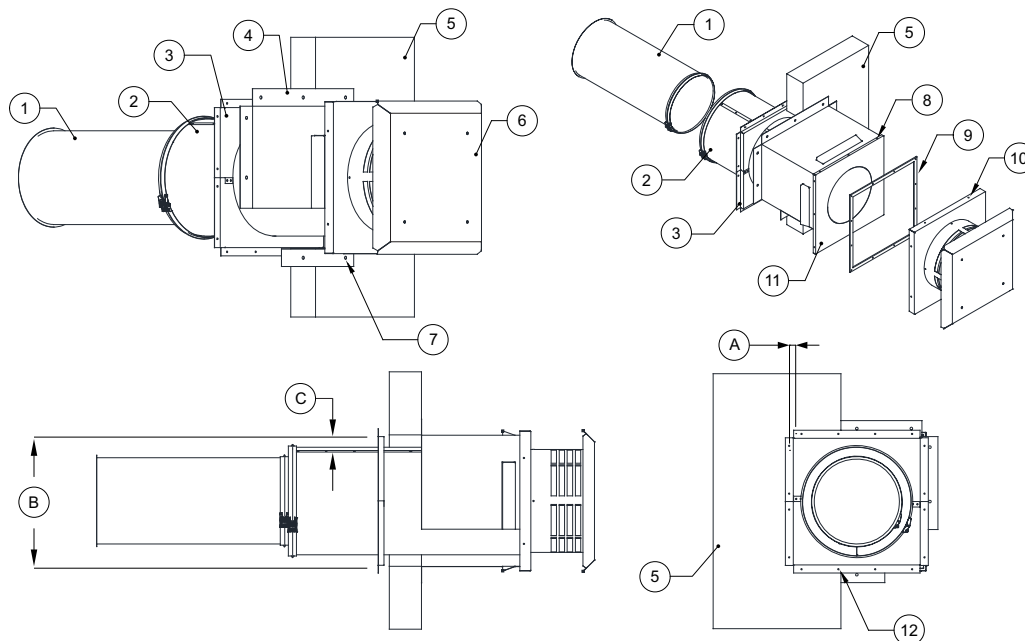
Single Wall Horizontal Cap Thimble Assembly Installation

Refer to **Table 10 on page 24** for clearance to combustibles and wall opening dimensions. Once the opening has been cut, install the vented curb on the outside of the wall. Center the vented curb in the opening and secure using the appropriate type and size fastener, refer to **Table 11 on page 27**. Push the insulated vent section through the top of the vented curb until the transition plate hits the top of the curb.

Install the transition plate. Secure the transition plate to the curb using 1/4"-20 x 1-1/2" zinc plated self-drilling screws where the pre-punched holes are located. Install the clearance plates on the opposite side of the wall opening. Install the bottom half of the plate first using the appropriate type and size fastener, then install the top section of the clearance plate. Fasten the two plates together using #8 x 1/2" self-drilling screws.

Verify clearance to combustibles for the insulated vent section coming through the wall, refer to **Table 10 on page 24**. Apply high temp gasket to the outside edge of the transition plate. Install the vent cap using 1/4"-20 x 2" zinc plated self-drilling screws. Inspect the thimble assembly to make sure all hardware is secure and clearance to combustibles is correct.

Figure 20 - Horizontal Cap Thimble Details



- | | |
|--|--|
| 1. Single Wall Vent Section | 9. High-Temperature Gasket |
| 2. -2V Vent Section | 10. 1/4"-20 x 2" Zinc Plated Self-Drilling Screws |
| 3. Clearance Plates | 11. Transition Plate - Welded to inner vent |
| 4. Vented Curb | 12. Clearance Plate Mounting Screws - Secures clearance plates to combustible surface. |
| 5. Substrate - Wood, Concrete or Steel | A. Edge Distance, refer to Table 11 on page 27 |
| 6. CAT II, III, IV Vent Cap | B. Wall Opening, refer to Table 10 on page 24 |
| 7. Substrate Hardware, refer to Table 11 on page 27 | C. Clearance to Combustibles (Shell to Joist), refer to Table 10 on page 24 |
| 8. 1/4"-20 x 1-1/2" Zinc Plated Self-Drilling Screws | |

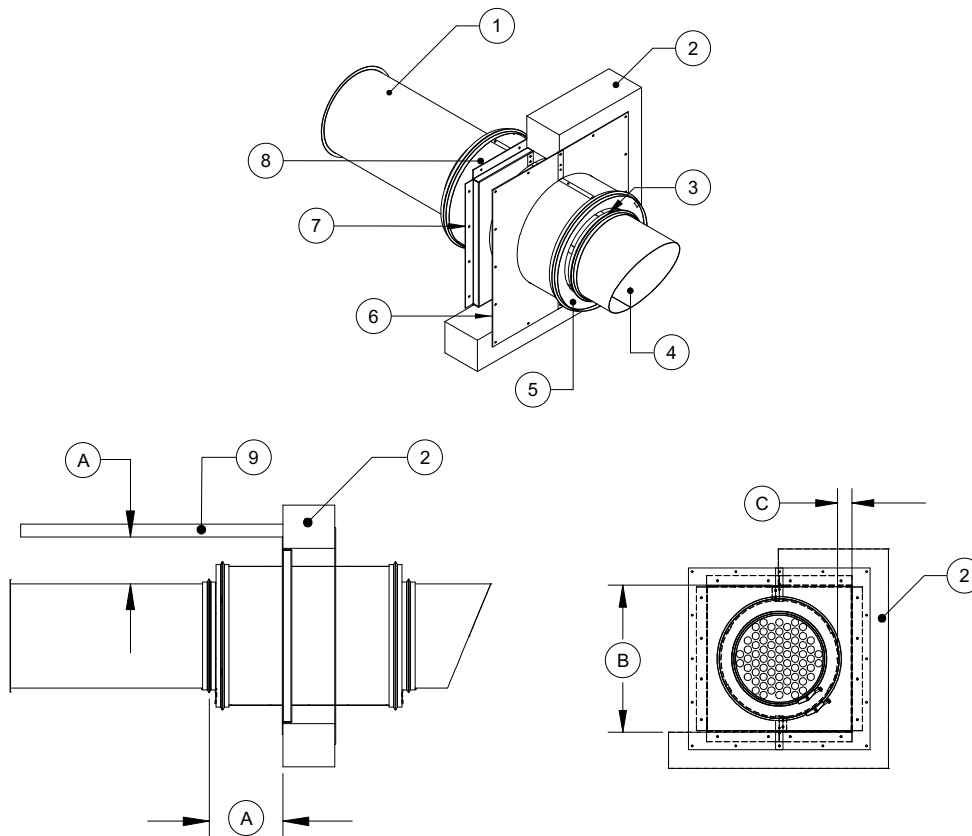
Single Wall Horizontal Vent Cap

Refer to **Table 10 on page 24** for clearance to combustibles and wall opening dimensions. Once the opening has been cut, install the -2V section. Center the clearance plate on the inside of the wall and the outer cover on the outside of the wall. Secure using the provided hardware kit.

Install the single wall vent section to the -2V vent section. Secure sections and double wall end cap with V-bands. Install the discharge section to the double wall vent section. Secure sections and double wall end cap with V-bands.

Verify clearance to combustibles for the insulated vent section coming through the wall, refer to **Table 10 on page 24**. Inspect the thimble assembly to make sure all hardware is secure and clearance to combustibles is correct.

Figure 21 - Single Wall Vent Cap Assembly Details



1. -V Single Wall Vent Section (5"-36")
 2. Wall
 3. Single Wall V-band*
 4. Discharge Vent Section*
 5. Single Wall V-band/Double Wall End Cap*
 6. Outer Cover*
 7. Clearance Plates*
 8. -2V Vent Section (5"-36")*
 9. Ceiling
- * Components included with Vent Cap Assembly

- A. Clearance to Combustibles (Vent to Ceiling/Wall), refer to **Table 10 on page 24**
- B. Wall Opening, refer to **Table 10 on page 24**
- C. Clearance to Combustibles (Shell to Joist), refer to **Table 10 on page 24**

Single Wall Vertical Cap Thimble Assembly Installation

Refer to **Table 10 on page 24** for clearance to combustible and floor opening dimensions.

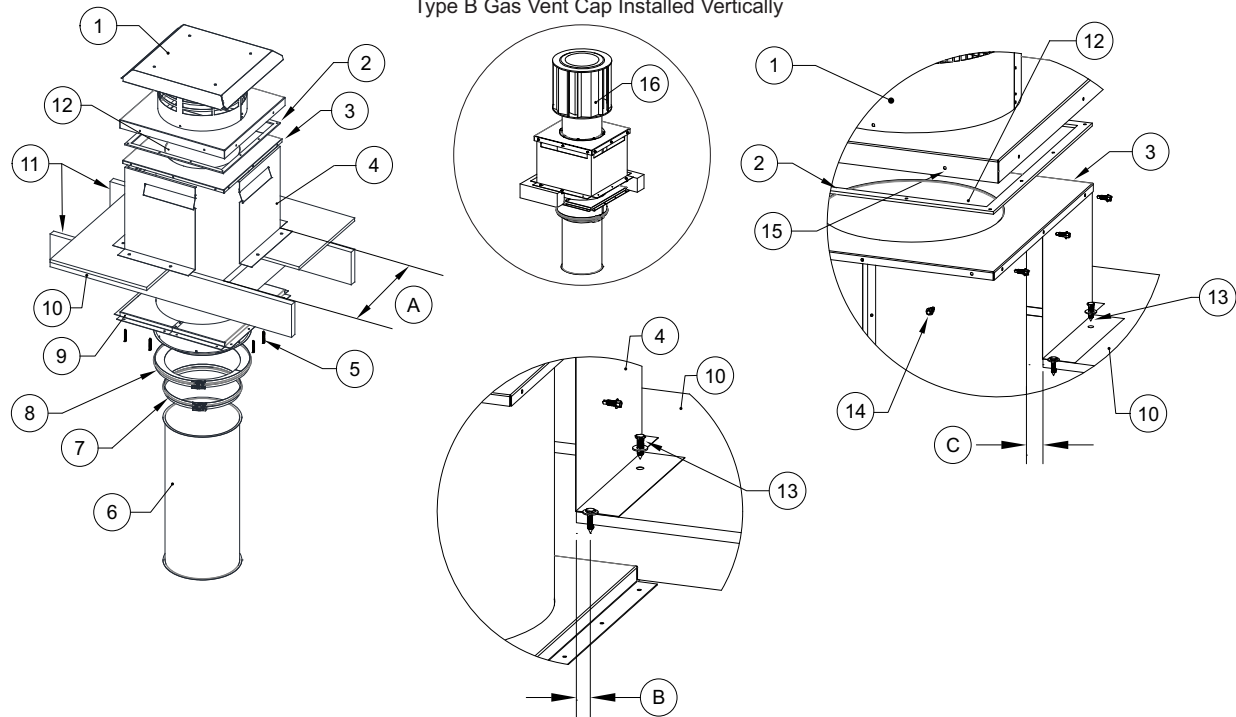
Once the opening has been cut, install the vented curb to the floor. Center the vented curb in the opening. Use the appropriate type and size fastener to secure curb, refer to **Table 11 on page 27**. Push the insulated vent section through the top of the vented curb until the transition plate hits the top of the curb.

Install the transition plate. Secure the transition plate to the curb using 1/4"-20 x 1-1/2" zinc plated self-drilling screws where the pre-punched holes are located. Install the clearance plates on the opposite side of the roof opening. Install the bottom half of the plate first using the appropriate type and size fastener, then install the top section of the clearance plate. Fasten the two plates together using #8 x 1/2" self-drilling screws.

Verify clearance to combustibles for the insulated vent section coming through the roof, refer to **Table 10 on page 24**. Apply high-temp gasket to the outside edge of the transition plate. Install the vent cap using 1/4"-20 x 2" zinc plated self-drilling screws. Inspect the thimble assembly to make sure all hardware is secure and clearance to combustibles are correct.

Figure 22 - Roof Termination Details using Thimble Assembly

Type B Gas Vent Cap Installed Vertically



- | | |
|---|--|
| 1. CAT II, II, IV Vent Cap | 12. Inner Vent |
| 2. High Temperature Gasket | 13. Substrate Hardware, refer to Table 11 on page 27 |
| 3. Transition Plate - Welded to inner vent | 14. 1/4"-20 x 1-1/2" Zinc Plated Self-Drilling Screws |
| 4. Vented Curb | 15. 1/4"-20 x 2" Zinc Plated Self-Drilling Screws |
| 5. Clearance Plate Mounting Screws - Secures clearance plates to combustible surface. | 16. UL Listed Type B Gas Vent Cap (For use with Category I Applications only) |
| 6. Single Wall Vent Section | A. Through Size Opening, refer to Table 10 on page 24 |
| 7. Single Wall V-band | B. Edge Distance, refer to Table 11 on page 27 |
| 8. Single Wall V-band with Thimble End Cap | C. Clearance to Combustibles (Shell to Joist), refer to Table 10 on page 24 |
| 9. Clearance Plates | |
| 10. Substrate - Wood, Concrete or Steel | |
| 11. Joist | |

Double Wall Clearances and Clearance Plates

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 vent must be enclosed in a continuous enclosure. This enclosure will be from the lowest fire-rated ceiling or floor above the appliance, 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. When installed in an open room where an enclosure is not required, double wall vents may be located at clearance to combustibles in accordance with **Table 12**.

Table 12 - Building Heating Appliance Vent Clearances (For Commercial Applications Only)

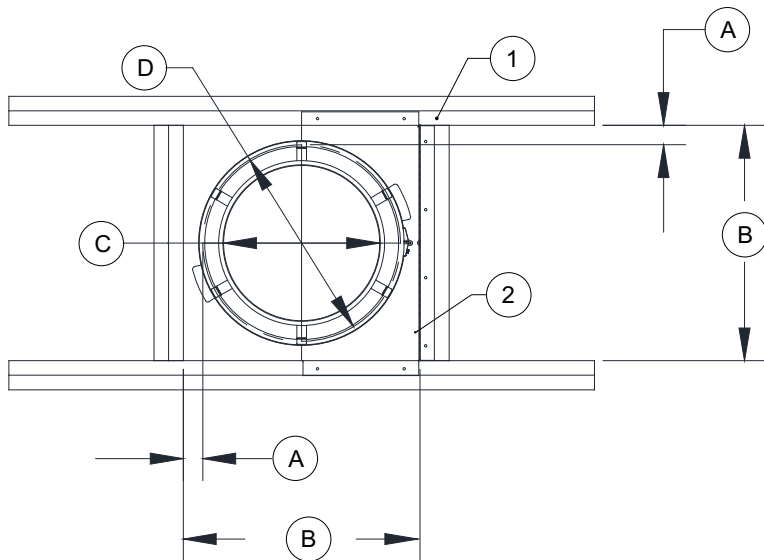
-2V Vent Diameter (ID)	-2V Thimble Assembly Vent Shell Diameter (Thru Penetration)	-2V Thimble Assembly Clearance to Combustibles (Shell to Joist)	Clearance To Non-Combustibles	Through Wall/Floor Opening
5"	9"	3"	0"	15-1/2"
6"	10"	3"	0"	16-1/2"
7"	11"	3"	0"	17-1/2"
8"	12"	3"	0"	18-1/2"
10"	14"	3"	0"	20-1/2"
12"	16"	3"	0"	22-1/2"
14"	18"	3"	0"	24-1/2"
16"	20"	3"	0"	26-1/2"

The information in **Table 12** represents air space, in inches, to surroundings.

DW -2V Type BH: unenclosed, 3" clearance to combustibles from the surface of the vent outer shell.

Figure 23 - 2V Type BH Vent Clearance

1. Combustible Surface
2. Clearance Plates - Half plate removed for clarity.
- A. 3" Reduced Clearance
- B. Wall/Floor Opening, refer to **Table 12**
- C. Vent Diameter
- D. -2V Shell Outer Diameter (OD)



Double Wall Supports and Clearance Plates

Through floor or wall clearance plate support assemblies are used to support vent sections that penetrate a floor or wall. The full support ring is installed under the double V-band, and the struts are connected to the support ring with supplied 5/16"-18 hardware. Once the struts have been connected, they are secured to the floor/wall using appropriate type and size fasteners supplied by others. The clearance plate support is designed to support the penetrating vent section and maintain annular distance.

Figure 24 - Wall Support Assembly

1. Wood Studs
2. Sealant
3. To Appliance
4. Inner Wall Surface
5. Clearance Plates
6. To Termination
7. Outer Wall Surface
- A. 3" Clearance

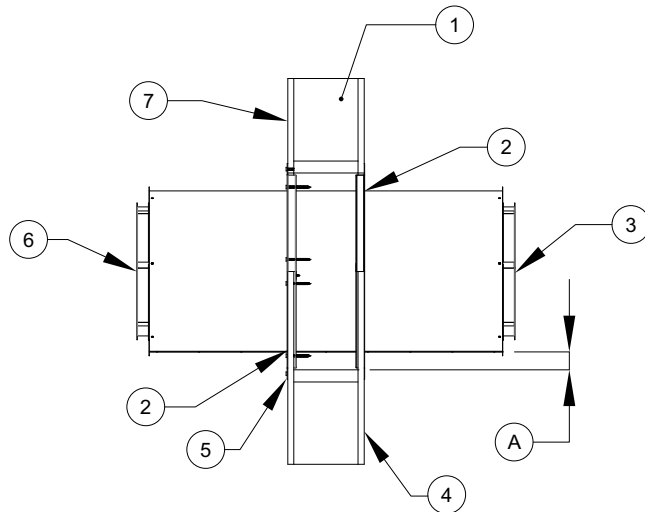
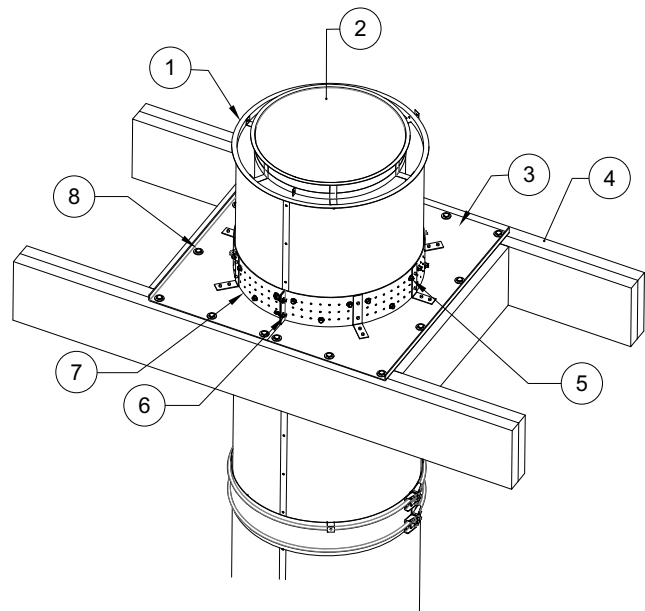


Figure 25 - Floor Support Assembly

1. -2V Shell
2. Inside Vent
3. Vertical Support Plate
4. Combustible Surface
5. 5/16"-18 x 1-1/2" Self Drilling Screws.
6. 1/4"-20 Whiz Nuts and Bolts.
7. Vertical Support Ring
8. Substrate Hardware, refer to **Table 13 on page 33**

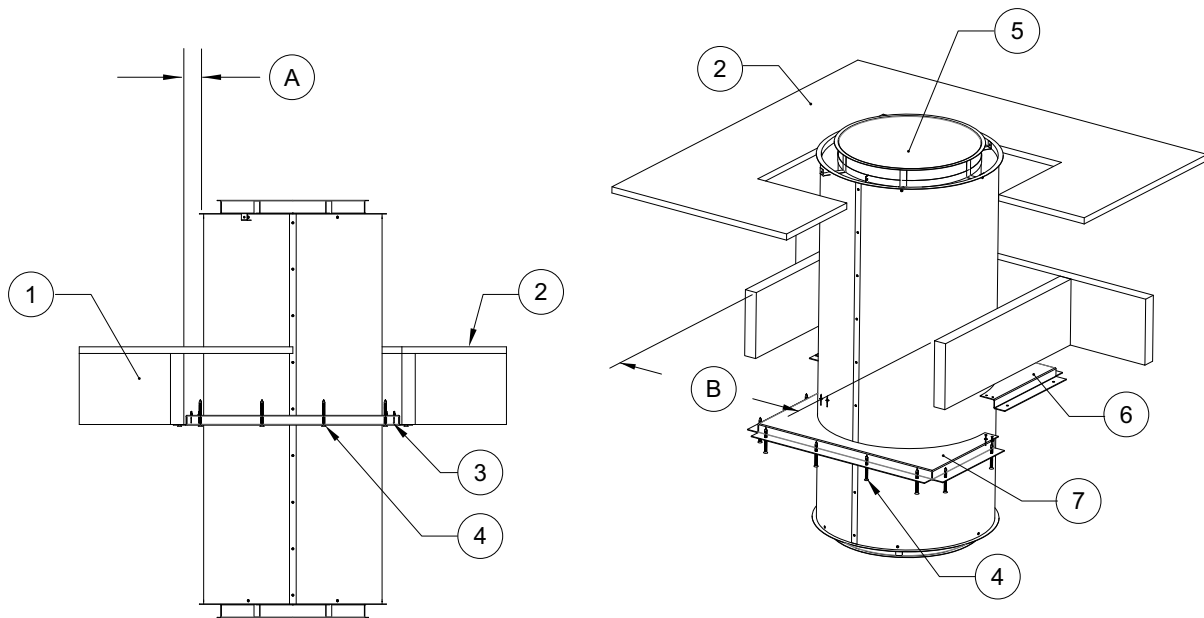


Double Wall Annular Distance -2V Type BH Clearance

Vent clearance plates are used to maintain clearance to combustibles for -2V Type BH listed vents. These clearance plates are not a hanging substitute for through penetration and fire stop plates. Vent clearance plates are designed to center the vent in the recommend opening and maintain 3" clearance to combustibles as shown in **Figure 23 on page 31**. Vent clearance plates consist of two half plates; the plates are designed so they are inserted into the opening. They are installed on the bottom side of the floor or on the backside of the wall. Frame or cut the opening in the floor/wall, refer to **Table 12 on page 31**. Insert the vent into the opening, then insert one half of the clearance plate. Secure the half plate using appropriate hardware for substrate construction, refer to **Table 13**. Insert the second half plate and secure. Once both plates are secure, the vent will be centered in the opening with a 3" clearance to combustibles.

WARNING: Clearance (air space) to combustibles must be free from any type of insulation.

Figure 26 - Vent Clearance Plates (Floor Installation Shown)



- | | | |
|---------------------------------------|----------------------|---|
| 1. Joist | 5. Inside Vent | A. Clearance to Combustibles (Shell to Joist), refer to Table 12 |
| 2. Floor | 6. Clearance Plate 1 | B. Floor Opening, refer to Table 12 |
| 3. Clearance Plates - Shown installed | 7. Clearance Plate 2 | |
| 4. Clearance Plate Hardware | | |

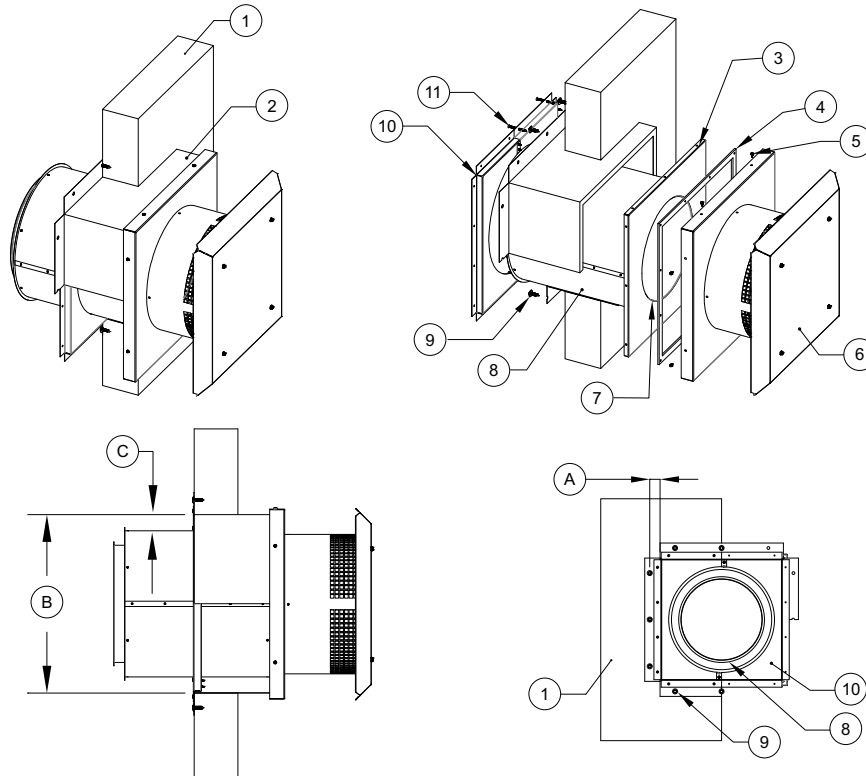
Table 13 - Substrate Hardware

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

Double Wall Horizontal Cap Thimble Assembly Installation

Vent clearance plates are used to maintain clearance to combustibles for -2V Type BH listed vents. These clearance plates are not a hanging substitute for through penetration and fire stop plates. Vent clearance plates are designed to center the vent in the recommend opening and maintain 3" clearance to combustibles as shown in **Figure 23 on page 31**. Vent clearance plates consist of two half plates; the plates are designed so they are inserted into the opening. They are installed on the backside of the wall. Frame or cut the opening in the wall, refer to **Table 12 on page 31**. Insert the vent into the opening, then insert one half of the clearance plate. Secure the half plate using appropriate hardware for substrate construction, refer to **Table 13 on page 33**. Insert the second half plate and secure. Once both plates are secure, the vent will be centered in the opening with a 3" clearance to combustibles.

Figure 27 - Horizontal Installation Through Wall Details using Thimble Assembly



1. Wall - Wood, Concrete, or Steel
 2. Vented Curb
 3. 1/4"-20 x 1-1/2" Zinc Plated Self-Drilling Screws
 4. High Temperature Gasket
 5. 1/4"-20 x 2" Zinc Plated Self-Drilling Screws
 6. CAT II, III, IV Vent Cap
 7. Transition Plate - Welded to Thimble Assembly
 8. Thimble Assembly
 9. Substrate Hardware, refer to **Table 13 on page 33**
 10. 3" Clearance Plates
 11. Clearance Plate Mounting Screws - Secures clearance plates to combustible surface.
- A. Edge Distance, refer to **Table 13 on page 33**
 B. Wall/Floor Opening, refer to **Table 12 on page 31**
 C. Clearance to Combustibles (Shell to Joist), refer to **Table 12 on page 31**

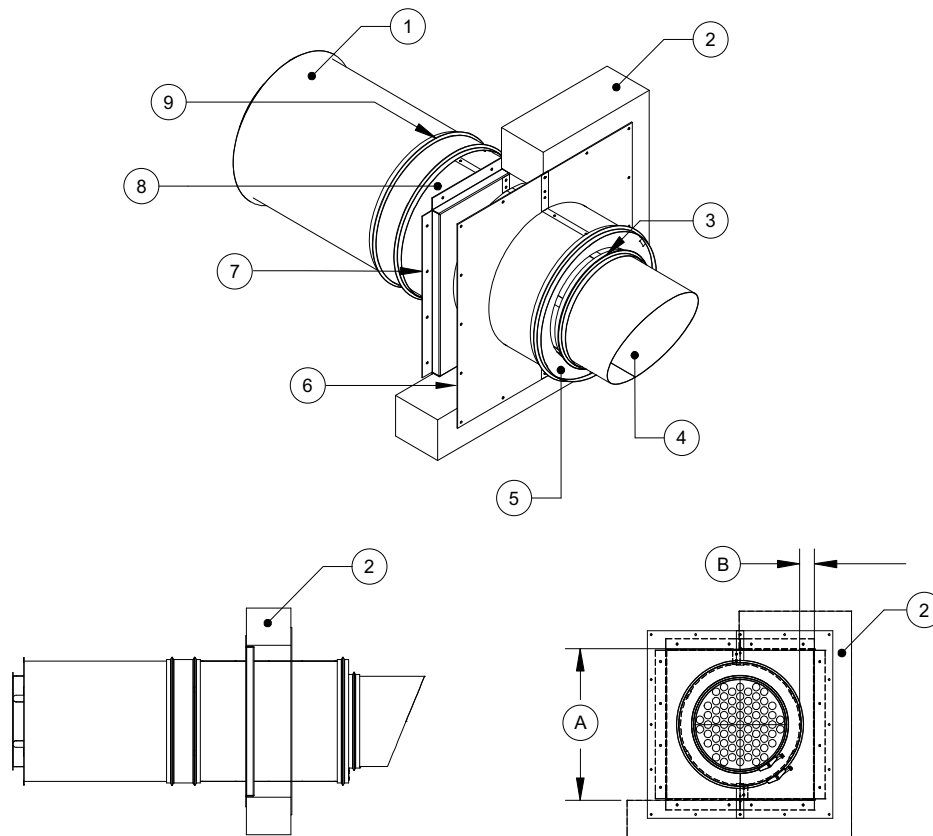
Double Wall Horizontal Vent Cap

Refer to **Table 12 on page 31** for clearance to combustibles and wall opening dimensions. Once the opening has been cut, install the -2V vent section provided with the kit. Center the clearance plate on the inside of the wall and the outer cover on the outside of the wall. Secure using the provided hardware kit.

Install the -2V vent section to the -2V vent section mounted to the wall. Secure sections and double wall end cap with V-bands. Install the discharge section to the double wall vent section. Secure sections and double wall end cap with V-bands.

Verify clearance to combustibles for the insulated vent section coming through the wall, refer to **Table 12 on page 31**. Inspect the thimble assembly to make sure all hardware is secure and clearance to combustibles is correct.

Figure 28 - Double Wall Vent Cap Assembly Details



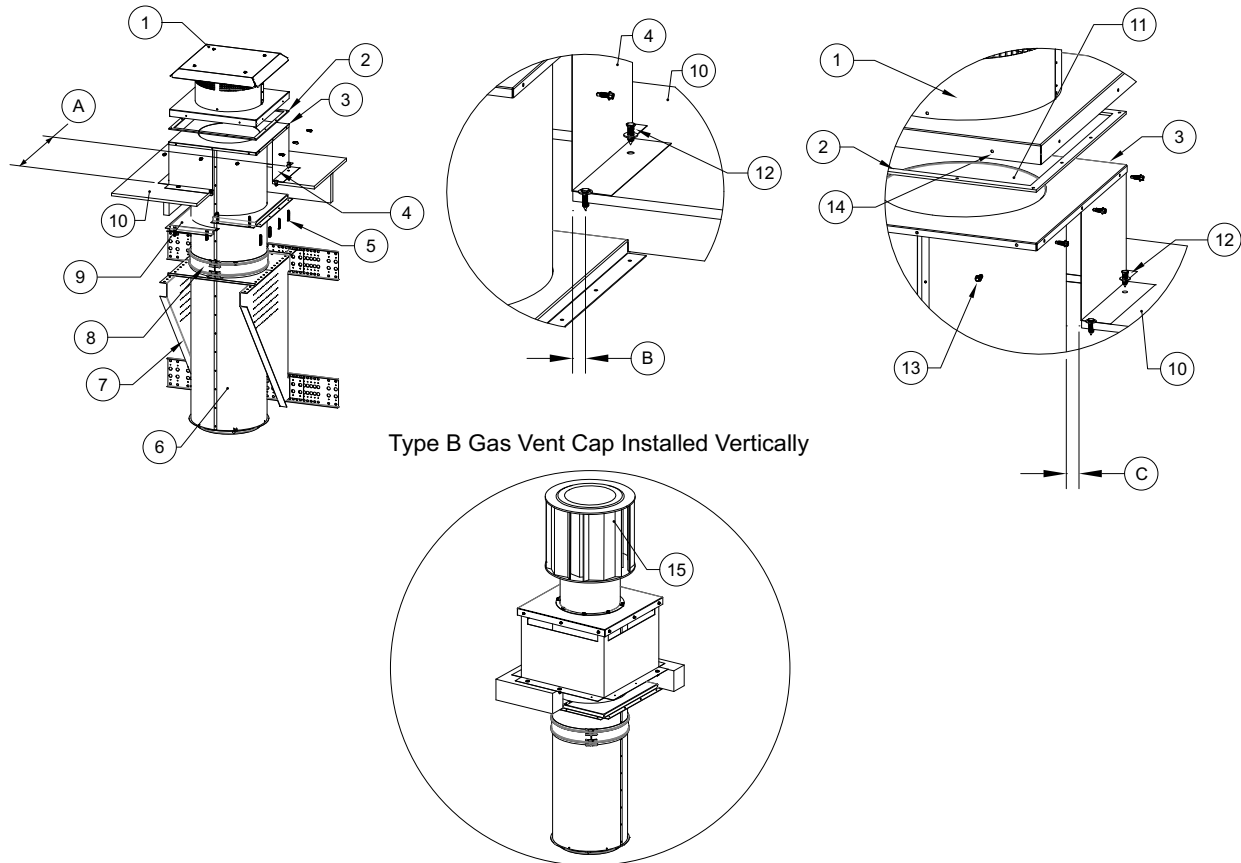
1. -2V Double Wall Vent Section (5"-16")
 2. Wall
 3. Single Wall V-band*
 4. Discharge Vent Section*
 5. Single Wall V-band/Double Wall End Cap*
 6. Outer Cover*
 7. Clearance Plates*
 8. -2V Vent Section (5"-16")*
 9. Double Wall V-band*
- * Components included with Vent Cap Assembly

- A. Wall Opening, refer to **Table 12 on page 31**
- B. Clearance to Combustibles (Shell to Joist), refer to **Table 12 on page 31**

Double Wall Vertical Cap Thimble Assembly

Vent clearance plates are used to maintain clearance to combustibles for - 2V Type BH listed vents. These clearance plates are not a hanging substitute for through penetration and fire stop plates. Vent clearance plates are designed to center the vent in the recommend opening and maintain 3" clearance to combustibles as shown in **Figure 23 on page 31**. Vent clearance plates consist of two half plates; the plates are designed so they are inserted into the opening. They are installed on the backside bottom side of the roof. Frame or cut the opening in the roof, refer to **Table 12 on page 31**. Insert the vent into the opening, then insert one half of the clearance plate. Secure the half plate using appropriate hardware for substrate construction, refer to **Table 13 on page 33**. Insert the second half plate and secure. Once both plates are secure, the vent will be centered in the opening with a 3" clearance to combustibles.

Figure 29 - Roof Termination Installation Details using Thimble Assembly



Type B Gas Vent Cap Installed Vertically

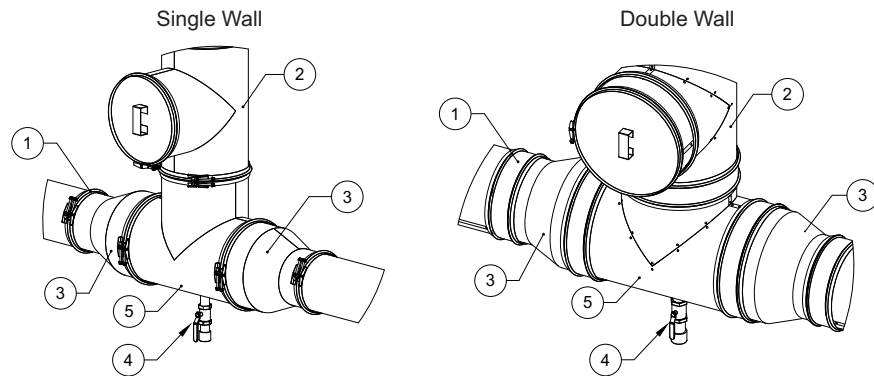
- | | |
|---|---|
| 1. CAT II, III, IV Vent Cap | 12. Substrate Hardware, refer to Table 13 on page 33 |
| 2. High Temperature Gasket | 13. 1/4"-20 x 1-1/2" Zinc Plated Self-Drilling Screws |
| 3. -2V Double Wall Assembly/Transition Plate | 14. 1/4"-20 x 2" Zinc Plated Self-Drilling Screws |
| 4. Vented Curb | 15. UL Listed Type B Gas Vent Cap (For use with Category I Applications only) |
| 5. Clearance Plate Mounting Screws - Secures clearance plates to combustible surface. | A. Through Size Opening, refer to Table 12 on page 31 |
| 6. Double Wall Vent | B. Edge Distance, refer to Table 13 on page 33 |
| 7. Vertical Wall Support Assembly | C. Clearance to Combustibles (Shell to Joist), refer to Table 12 |
| 8. Double V-band | |
| 9. 3" Clearance Plates | |
| 10. Substrate - Wood, Concrete or Steel | |
| 11. Inner Vent | |

Single Wall and Double Wall Drains

Drains are used to provide a point at which low points in the vent system can be drained. Condensation and low lying water leftover from vent cleaning can be drained easily with the installation of a ball valve drain. Drains are designed to aid in vent cleaning and can be used to drain accumulation into an approved collection reservoir. When an access door cannot be fitted directly to a tee/drain, the mating part should be a tee with an access door. Adapters and/or other components should be used to create a low point in the system, not less than 1". Drains can be hard piped to an approved collection reservoir, remove the cap and connect to the 1-1/2" NPT threads.

Figure 30 - Vent Drain

1. V-band
2. Tee Section with Access Door
3. Adapter Section
4. Drain
5. Tee Section



Single Wall and Double Wall Condensate Drain Details

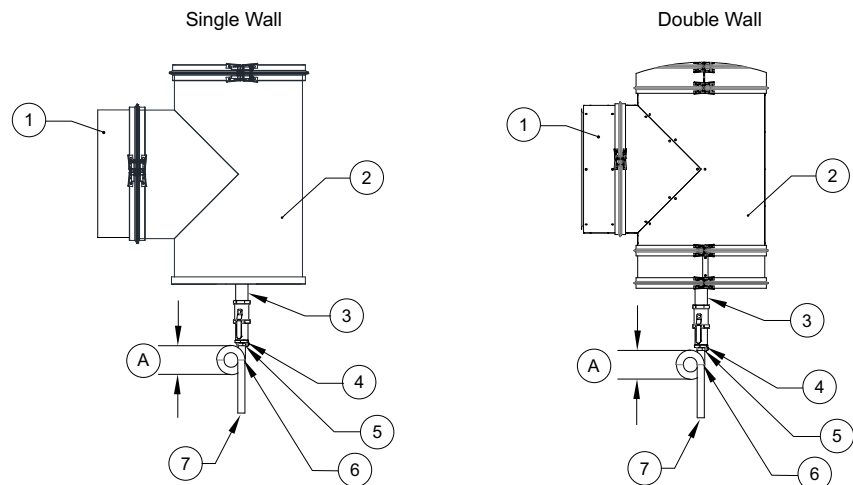
A trap loop must be formed into the drain hose. The trap loop diameter must be at least four times the appliance's rated stack pressure in inches of water column (w.c.) or 3 inches, whichever is greater.

Route drain hose to drain system to dispose of condensate according to local code.

Do not install a condensate drain on the exterior of the building in cold climate areas. This may result in dangerous icy conditions on surfaces near the drain and may cause damage to the vent system and/or the exterior of the building.

Figure 31 - Drain Details

1. Appliance Adapter
2. Vertical Tee Drain or Drain Fitting
3. Drain
4. Locknut (by others)
5. Hose Clamp (by others)
6. Cable Tie (by others)
7. Pipe (by others)
- A. Trap Loop Diameter =
Must be at least four times the appliance's rated stack pressure in inches of water column (w.c.) or 3 inches, whichever is greater.



Single Wall and Double Wall Draft Control Dampers

Draft control dampers are used for commercial and industrial applications. Draft control provides precise draft regulators for solid fuels, oil, gas or oil/gas appliances. For any installation with 10" or larger diameter vent pipe, specify the draft control damper. This damper may be adapted to any fuel type. The moving part (gate) rests on a long, thin, stainless steel knife edge, which in turn, is supported by self-aligning and self-cleaning bearings. When the heavy gauge gate moves, only the knife edge rests on the bearing for minimum friction and maximum sensitivity to draft changes.

Static pressure of the cool air exerts pressure on the outside of the furnace or boiler, the breaching, and stack. The pressure difference between the room air and heated gas (air) causes products of combustion to flow (draft) through the unit and rise through the breach and vent system. Room temperature air enters through the barometric draft control in the precise amount needed to overcome the excess drafts caused by temperature variations, wind fluctuations, and barometric pressure changes. Combustion of fuel is complete and the process is stabilized. The velocity of combustion gases through the heat exchanger is slowed so more heat is extracted. The unit operates more efficiently, reliably, and requires less maintenance.

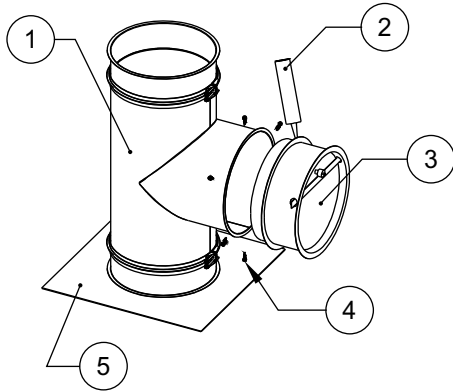
Refer to **Figure 32 on page 39** when installing draft control dampers.

NOTE: An adapter may be required for the following sizes - 22", 26", 30", 34", 36". Refer to Figure 32 Detail D.

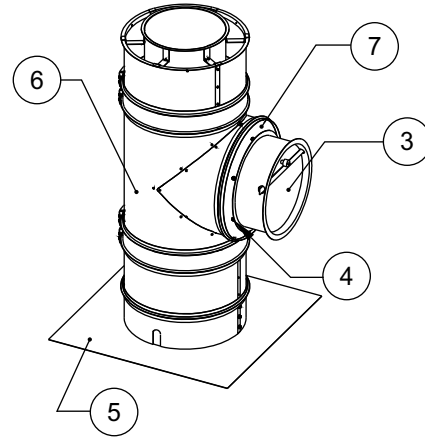
1. Install the damper into duct tee. For double wall assemblies, install double wall end cap before installing damper. Refer to **Figure 32 Detail D**.
2. Apply a continuous bead of 3M Fire Barrier 2000 + Silicone Sealant around the flange to be joined. The bead should be 1/4" thick and continuous. Refer to "**Joint Sealant**" on page 9 for sealant details.
3. To secure the damper to the duct tee, use #8 x 1/2" self-drilling screws. Equally space 10 screws around the perimeter.

Figure 32 - Damper Installation Details

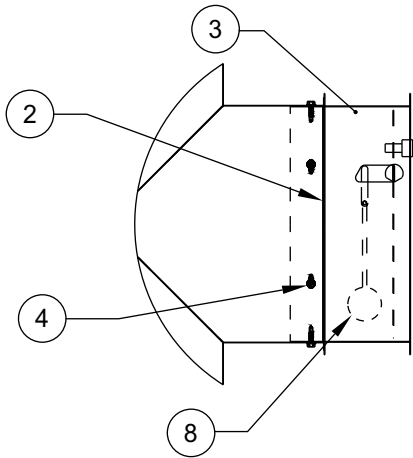
**Detail A
Single Wall**



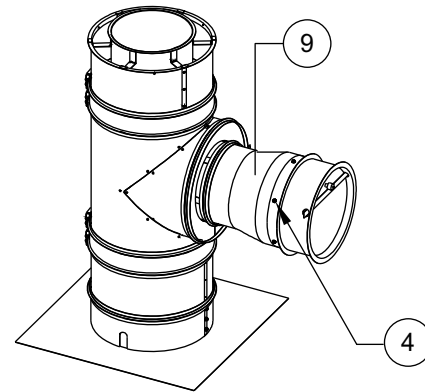
**Detail B
Double Wall**



**Detail C
Tee Assembly Detail**



**Detail D
Adapter Installation (if required)**



1. Single Wall Tee
2. 3M Fire Barrier 2000 Plus
3. Barometric Damper
4. #8 x 1/2" Self-Drilling Screws
5. Equipment

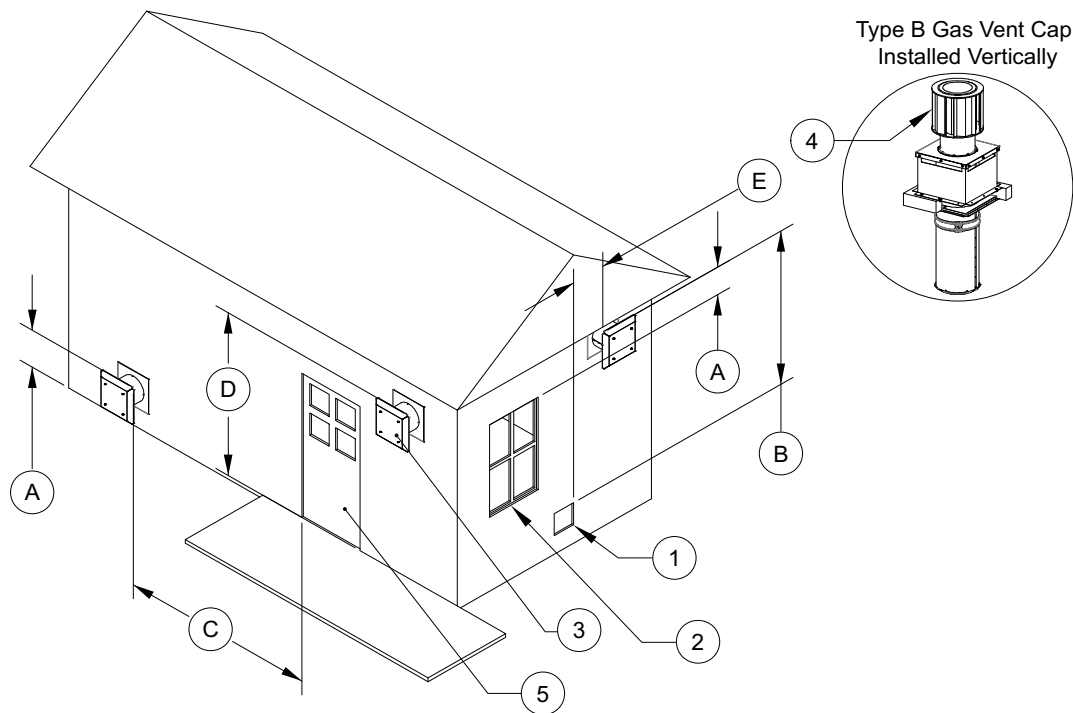
6. Double Wall Tee
7. Double Wall End Cap
8. Balancing Arm
9. Adapter - Required for duct sizes 22", 26", 30", 34", 36"

Single Wall and Double Wall Installation

Refer to **Figure 33** when installing the Special Gas Vent system. Follow these steps:

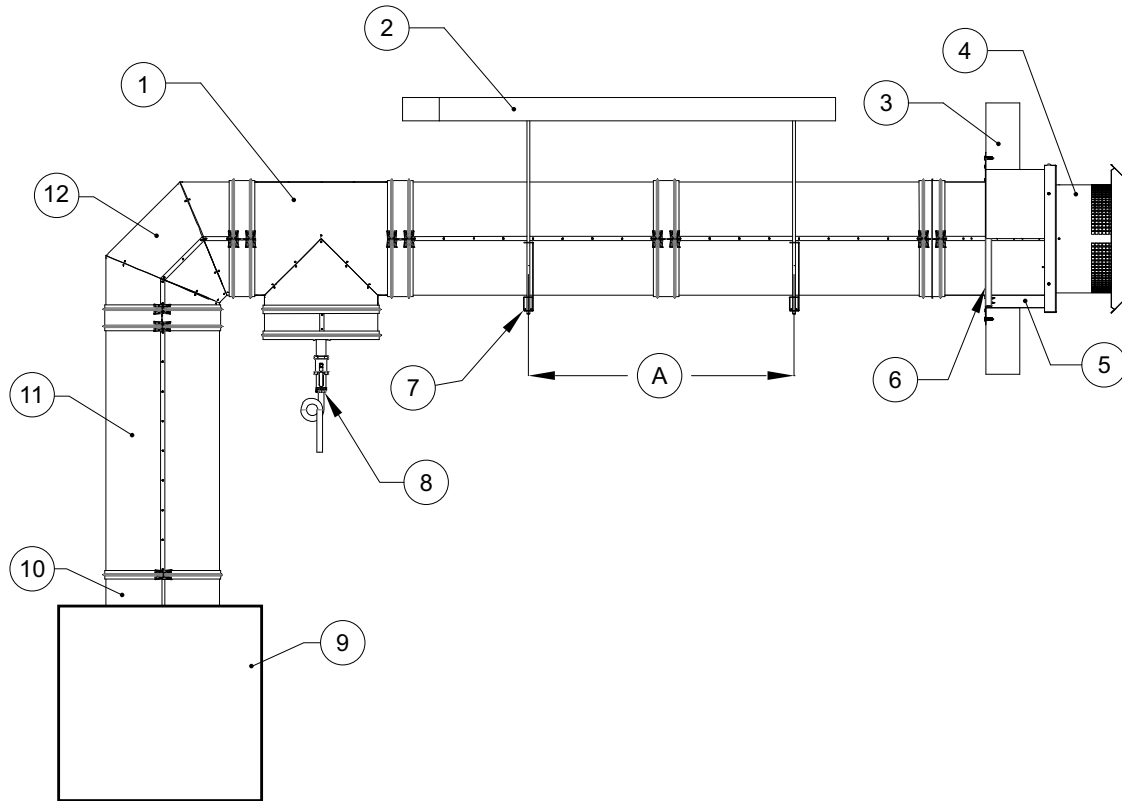
- If installing through a sidewall, the vent termination shall be at least 1 foot (305 mm) above grade. When installing in a geographical area where snow accumulates, keep above snow line.
- The vent termination shall be at least 1 foot (305 mm) above doors and windows.
- The vent shall terminate at least 4 feet (1.2 m) horizontally from doors and windows.
- Keep the ventilation routing out of traffic areas such as walkways, unless the venting system is at least 7 feet (2.13 meters) above the ground.
- The vent shall terminate at least 3 feet (0.91 m) above any forced air inlet or any other building opening, gas, utility meter, service regulator or the like.
- The vent termination shall be at least 8 feet (2.4 m) horizontally from any combustion air intake, located above it.
- Keep 6 feet (1.8 meters) or more from the combustion air intake of any appliance.
- It is recommended that exterior mounted venting systems must be enclosed below the roofline. This is to limit condensation and protect against mechanical damage.
- Do not route the Special Gas Vent through or within any other vent, such as existing masonry or other factory built channel. The exception would be if no other appliance is vented through the same existing masonry or other factory built channel. Verify sizing with appliance specifications.

Figure 33 - Horizontal Venting



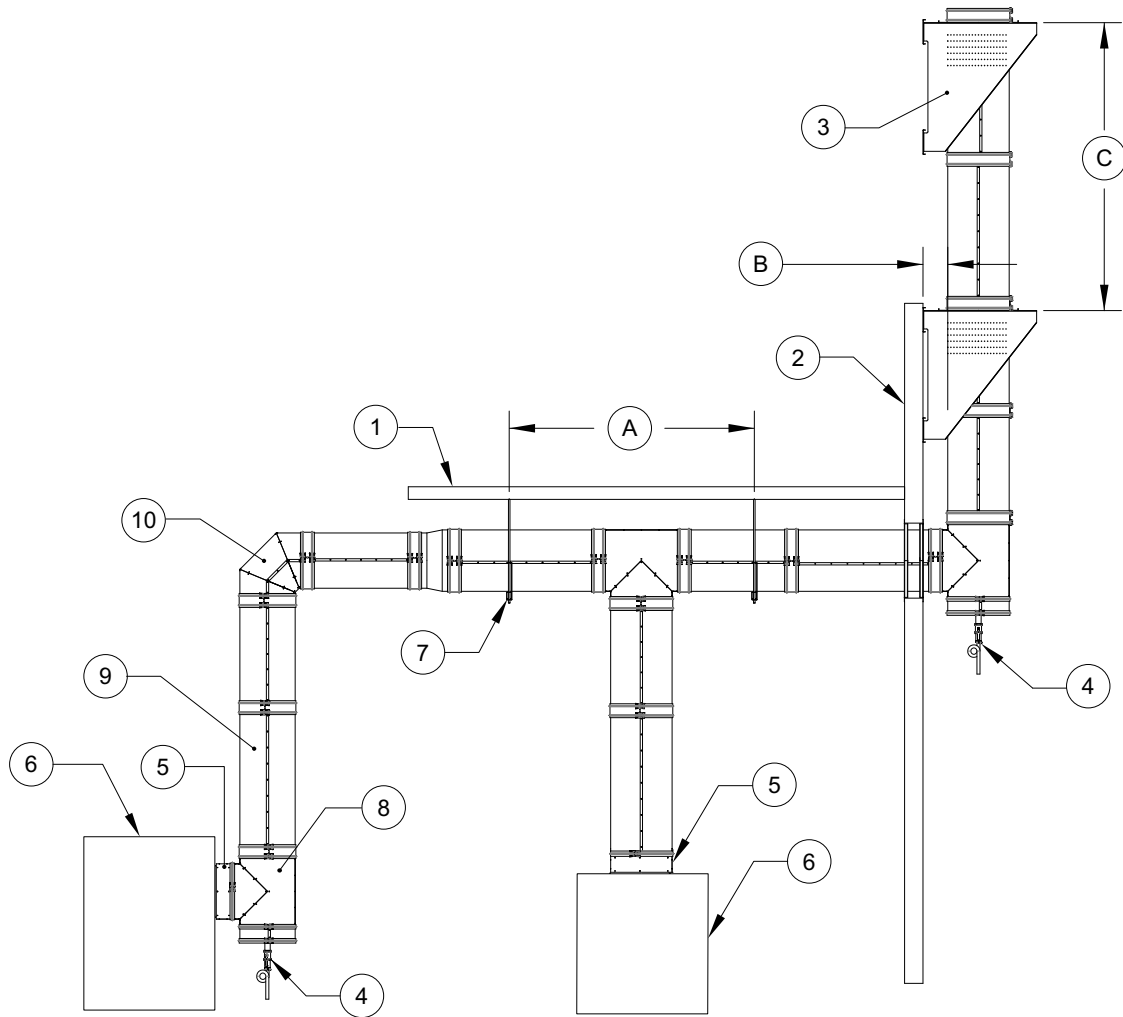
- | | |
|--|---------------------------|
| 1. Air Intake | A. Distance = 1' (305 mm) |
| 2. Window | B. Distance = 3' (0.9 m) |
| 3. CAT II, III, IV Vent Cap | C. Distance = 4' (1.2 m) |
| 4. UL Listed Type B Gas Vent Cap (For use with Category I Applications only) | D. Distance = 7' (2.1 m) |
| 5. Door | E. Distance = 8' (2.4 m) |

Figure 34 - Double Wall Side Wall Installation



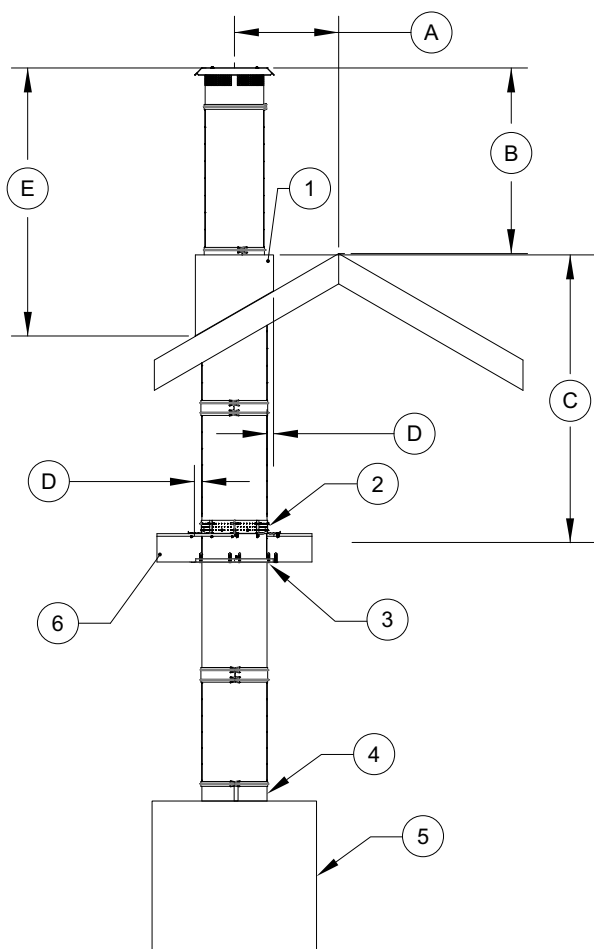
- | | |
|--|---|
| <ul style="list-style-type: none"> 1. Horizontal Tee Drain or Drain Fitting 2. Ceiling 3. Outside Wall 4. CAT II, III, IV Vent Cap 5. Wall Penetration 6. Clearance Plates 7. Horizontal Supports, refer to Figure 38 on page 46 | <ul style="list-style-type: none"> 8. Drain Routing, refer to Figure 31 on page 37 9. Heating Appliance 10. Appliance Adapter 11. Vent Section 12. Vent Elbow A. Horizontal Support Spacing, refer to Table 15 on page 45 |
|--|---|

Figure 35 - Double Wall Exterior Installation

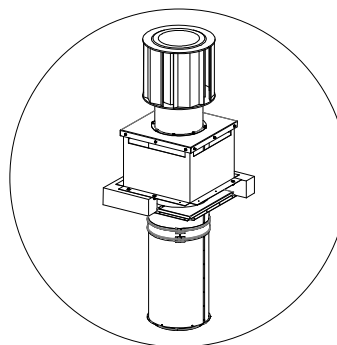


- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Ceiling 2. Exterior Wall 3. Vertical Support 4. Drain Routing, refer to Figure 31 on page 37 5. Appliance Adapter 6. Appliance 7. Horizontal Supports, refer to Figure 38 on page 46 8. Vertical Tee Drain | <ul style="list-style-type: none"> 9. Vent Section 10. Vent Elbow A. Horizontal Support Spacing, refer to Table 15 on page 45 B. Clearance to Combustibles, refer to Table 12 on page 31 C. Vertical Support Spacing, refer to Table 18 on page 52 |
|--|--|

Figure 36 - Double Wall Vertical Venting



Type B Gas Vent Cap
Installed Vertically



1. Storm and Vertical Collar Support
2. Vertical Floor Support Plate
3. Clearance Plates - Located under joist. Used to maintain correct clearance from vent casing to combustible surface.
4. Appliance Adapter
5. Appliance
6. Floor Joist

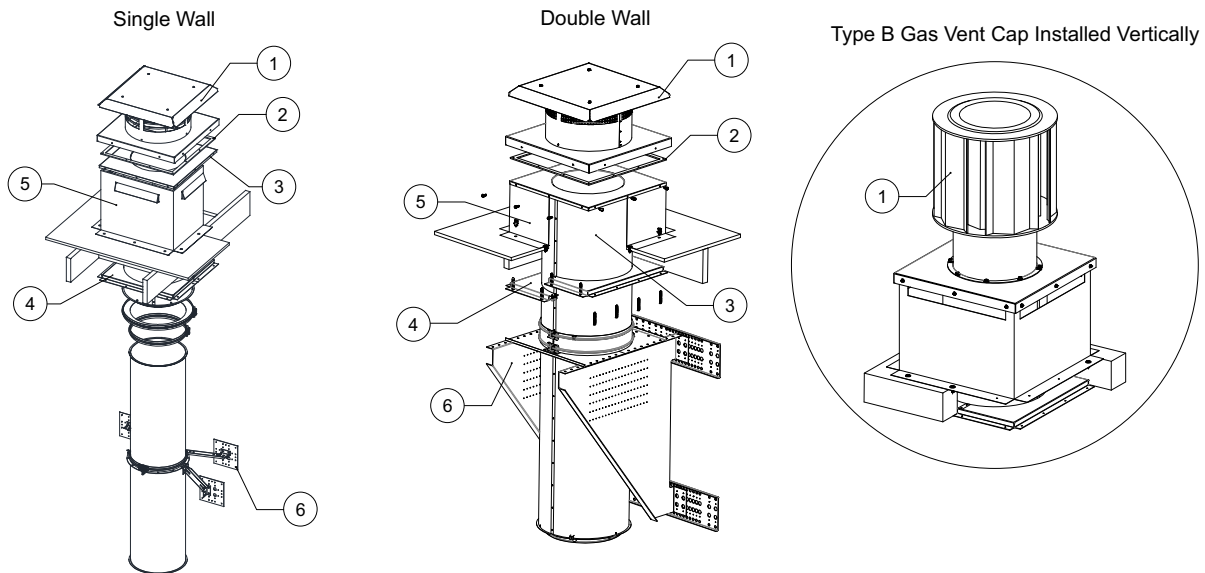
- A. Required Distance = 10' or More
- B. 2' Minimum Height Above Any Roof Surface Within 10' Horizon.
- C. Vertical Support Spacing, refer to **Table 18 on page 52**
- D. 3" Minimum Clearance to Combustible Surface
- E. Roof Support Assembly without Support:
 - Maximum Distance for -2V is 8'
 - Maximum Distance for -V (5"-18") is 8'
 - Maximum Distance for -V (20"-36") is 3'

Transition Plate

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

WARNING: NO INSULATION SHALL BE PLACED WITHIN THE REQUIRED CLEARANCE SPACE.

Figure 37 - Transition Plate



Thimble Assembly consists of call-outs 1-5

6. Vertical Support

1. CAT II, III, IV Vent Cap or UL Listed Type B Gas Vent Cap (For use with Category I Applications only)
2. High Temperature Gasket
3. -2V Double Wall Assembly/Transition Plate
4. Clearance Plates
5. Vented Curb

Prevention of Condensate Accumulation in Horizontal Vent

Any horizontally installed portion of the Special Gas Vent shall have a slope (upwards for Category II, III, or IV appliances or downwards for Category III or IV appliances) not less than 1/4 inch (6.4 mm) every 12 inches (305 mm) to prevent collection of condensate at any location within the assembly.

Alignment & Bracing of Vent

The Special Gas Vent has characteristics of a continuous stainless steel pipe and will expand and contract along its entire length with changes in temperature. For this reason, conventional methods of attaching guides and braces to the outer wall of the gas vent cannot be used. Correctly installed support rings, saddles and wall guide assemblies will serve to keep the vent aligned, provide for adequate resistance to lateral loads and allow the free axial expansion and contraction movement. A simplified rule for vent 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.

Single Wall Horizontal Support and Support Spacing

Horizontal vent runs are supported using 2" x 2" x 1/8" angle, Unistrut and saddle combination, or Unistrut only. Refer to **Table 14** for horizontal support spacing. When cutting the angle or Unistrut to length, there must be a minimum of 2" on either side of the vent shell to allow for rod attachment. Once the angle has been cut to length it is suspended using 1/2" threaded rod (minimum). Appropriately sized holes are drilled/punched in either end of the angle. The 1/2" threaded rod is secured to the angle or Unistrut using 1/2" grade 5 hex nuts and 1/2" hardened washers, see **Figure 38 on page 46**.

NOTE: Double hex nuts are used as locking nuts to make sure hardware does not come loose over time.

Table 14 - Single Wall Horizontal Support Spacing

Diameter (Inches)	Horizontal Support Spacing (Feet)
5", 6", 7", 8", 10", 12", 14", 16", 18", 20"	24'
22", 24", 26", 28", 30", 32", 34", 36"	12'

IMPORTANT: HORIZONTAL SUPPORTS REFERRED TO IN THIS MANUAL ARE REQUIRED. SUPPORTS BY OTHERS MUST BE APPROVED BY THE MANUFACTURER AND AHJ.

Double Wall Horizontal Support and Support Spacing

Horizontal vent runs are supported using 2" x 2" x 1/8" angle, Unistrut and saddle combination, or Unistrut only. B12 Unistrut is recommended. Refer to **Table 15** for horizontal support spacing. When cutting the angle or Unistrut to length, there must be a minimum of 2" on either side of the vent shell to allow for rod attachment. Once the angle has been cut to length it is suspended using 1/2" threaded rod (minimum). Appropriately sized holes are drilled/punched in either end of the angle. The 1/2" threaded rod is secured to the angle or Unistrut using 1/2" grade 5 hex nuts and 1/2" hardened washers, see **Figure 38 on page 46**.

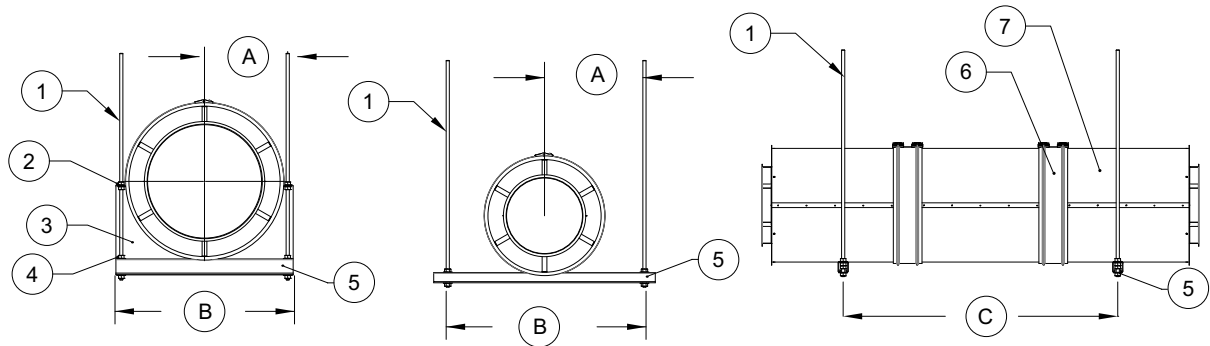
NOTE: Double hex nuts are used as locking nuts to make sure hardware does not come loose over time.

Table 15 - Double Wall Grease Duct/Chimney Horizontal Support Spacing

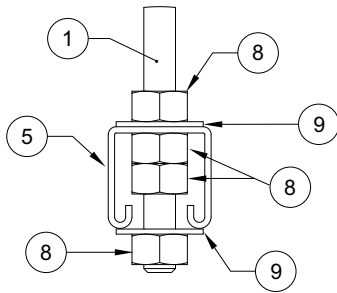
Diameter (Inches)	Horizontal Support Spacing (Feet)
5", 6", 7", 8", 10", 12", 14", 16"	7'

IMPORTANT: HORIZONTAL SUPPORTS REFERRED TO IN THIS MANUAL ARE REQUIRED. SUPPORTS BY OTHERS MUST BE APPROVED BY THE MANUFACTURER AND AHJ.

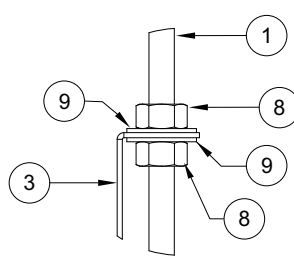
Figure 38 - Horizontal Support Details



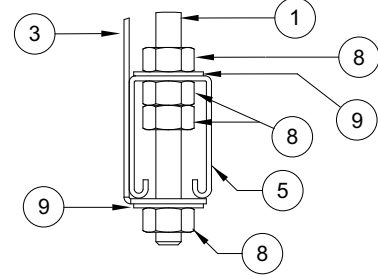
Unistrut - Bottom Connection



Saddle Top Connection



Saddle Bottom Connection



1. 1/2" Threaded Rods
2. Saddle Top Connection
3. Saddle
4. Saddle Bottom Connection
5. B12 Unistrut
6. V-band
7. Vent
8. 1/2" Hex Nuts (Grade 5)
9. 1/2" Hardened Washers

- A. Center of Vent
- B. Vent Diameter plus 4"
- C. Horizontal Support Spacing:
 - Refer to **Table 14 on page 45** for Single Wall
 - Refer to **Table 15 on page 45** for Double Wall

Single Wall 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 39 on page 48**. The ring, which is split into 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 vent. This is to allow for thermal expansion.

The wall support should be installed at the joint of the vent 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 vent 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 vent. The horizontal struts allow for attachment to the wall after the vent has been positioned. The angle of attachment may vary as needed for the vent to wall clearance. Wall supports shall be used at the proper spacing shown in **Table 16** for vertical vent 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 vent is mounted, see **Figure 42 on page 51** 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 vent. TPDB is used when the vent 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 vents. The curb/transition plate combination is considered part of the vertical support system. The curb/transition plate combination support spacing is shown in **Table 16**. See "**Transition Plate**" on **page 44** for more information on transition plates.

Table 16 - Single Wall Vertical Support Spacing

Diameter (Inches)	Vertical Wall Support Spacing (Feet)	Vertical Curb/Floor Support Spacing (Feet)
5", 6", 7", 8", 10", 12", 14", 16", 18", 20"	50'	24'
22", 24", 26", 28", 30", 32", 34", 36"	25'	24'

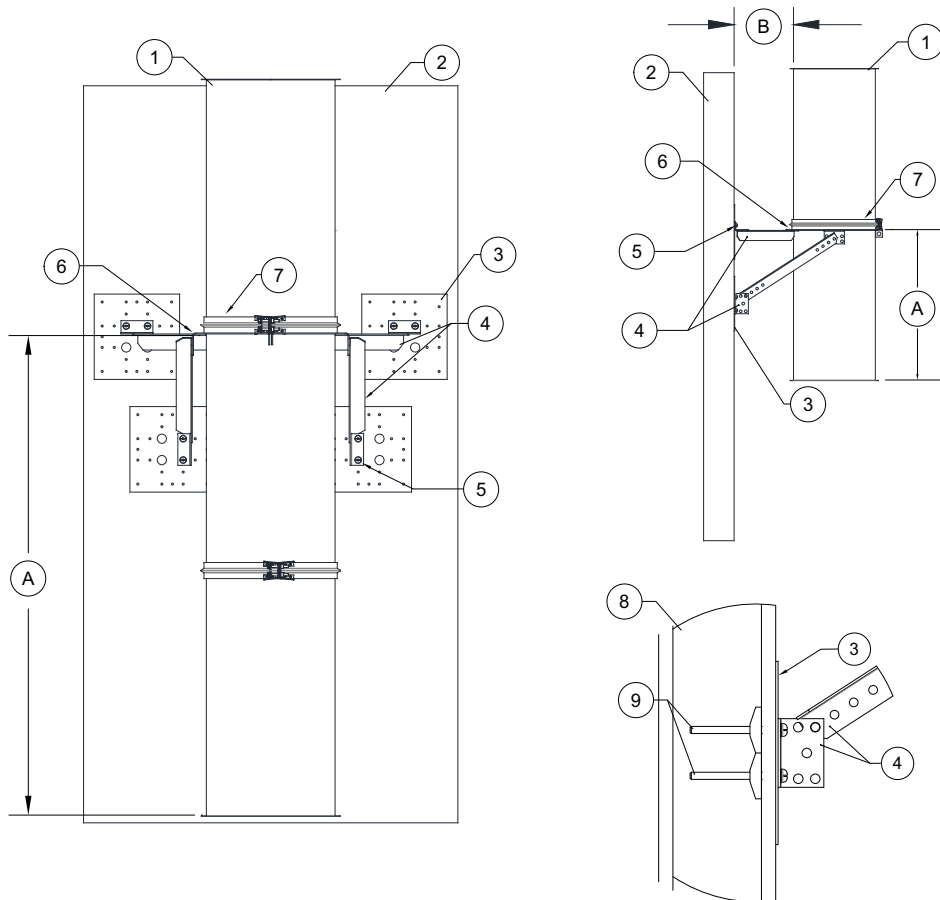
Vertical support systems must be attached only to the building structure or supported with rigid structural members. Refer to Table 16 for maximum support spacing. It is recommended that vertical support systems are attached to block, concrete, or steel with clearance that is adequate for installation and access.

Single Wall Vertical Wall Support (Wood, Concrete, Steel)

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 vent 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 vent assembly and to connect the wall support plates and brackets.
3. Locate the support bracket assembly. Verify there is no interference. Refer to **Table 10 on page 24** for clearance to combustibles specifications.
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 vent V-clamp is installed above the support ring.

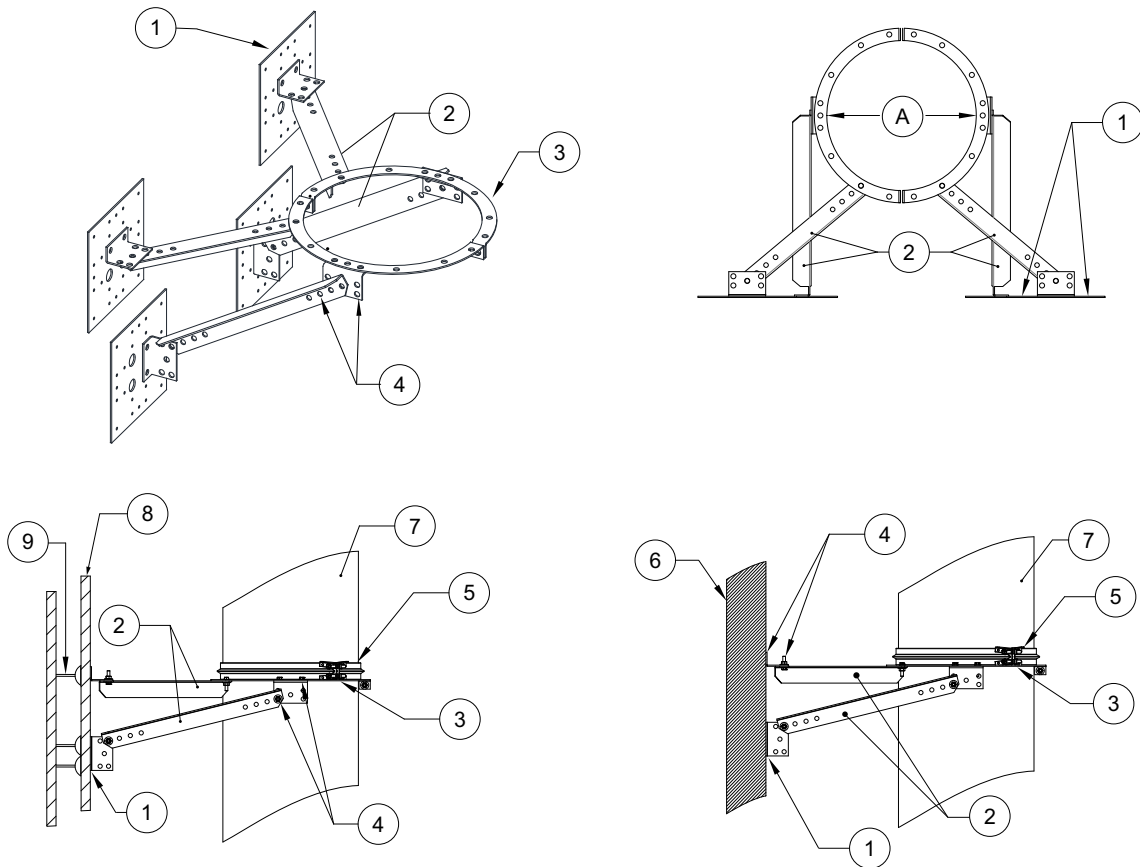
Figure 39 - Vertical Wall Support



1. Vent.
 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 16 or page 47**.
- B. Clearance to Combustibles (Vent to Ceiling/ Wall), refer to **Table 10 on page 24**.

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 40 - Vertical Support Details



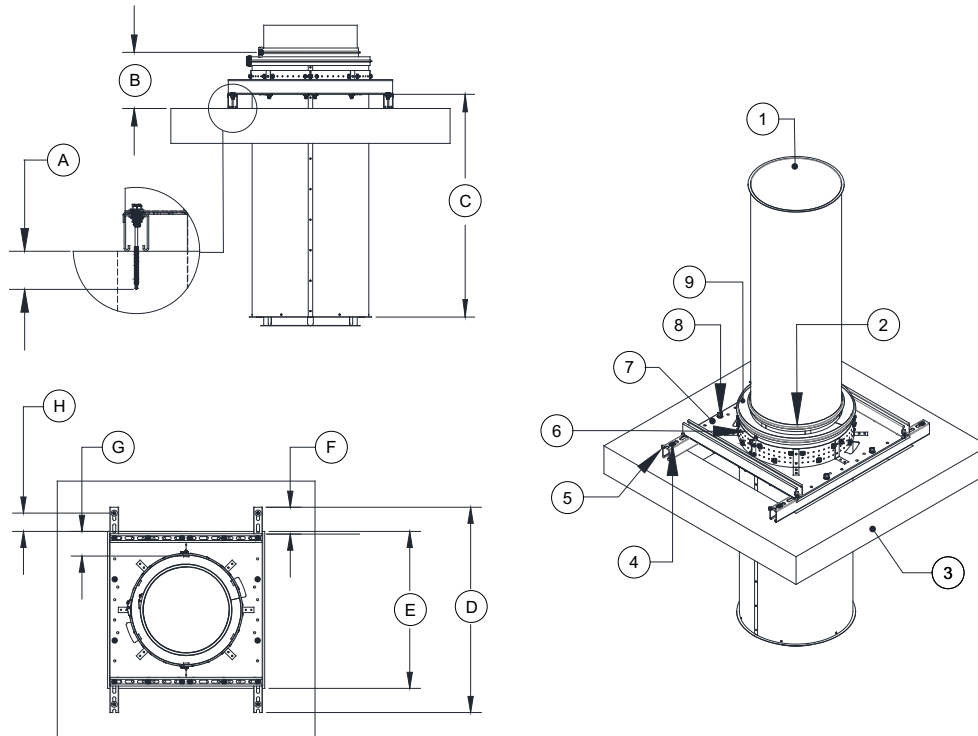
- 1. Wall Support for 5"-16"
- 2. Strut
- 3. Full Support Ring
- 4. 5/16"-18 Hardware (by others)
- 5. V-clamp
- 6. Solid Wall

- 7. Vent
- 8. Open Wall Gypsum
- 9. 5/16" x 4" Toggle Bolt - used for open wall cavities.
- A. Vent Outer Diameter (OD) + 1/8"

Single Wall Floor 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.

Figure 41 - Chase Floor Support



1. Vent
2. Single Wall V-band
3. Substrate
4. Substrate Fastener, refer to **Table 17**
5. B12 Unistrut
6. Floor Support Band
7. Vertical Support Plate
8. 3/8" Hardware
9. Single Wall V-band and End Cap

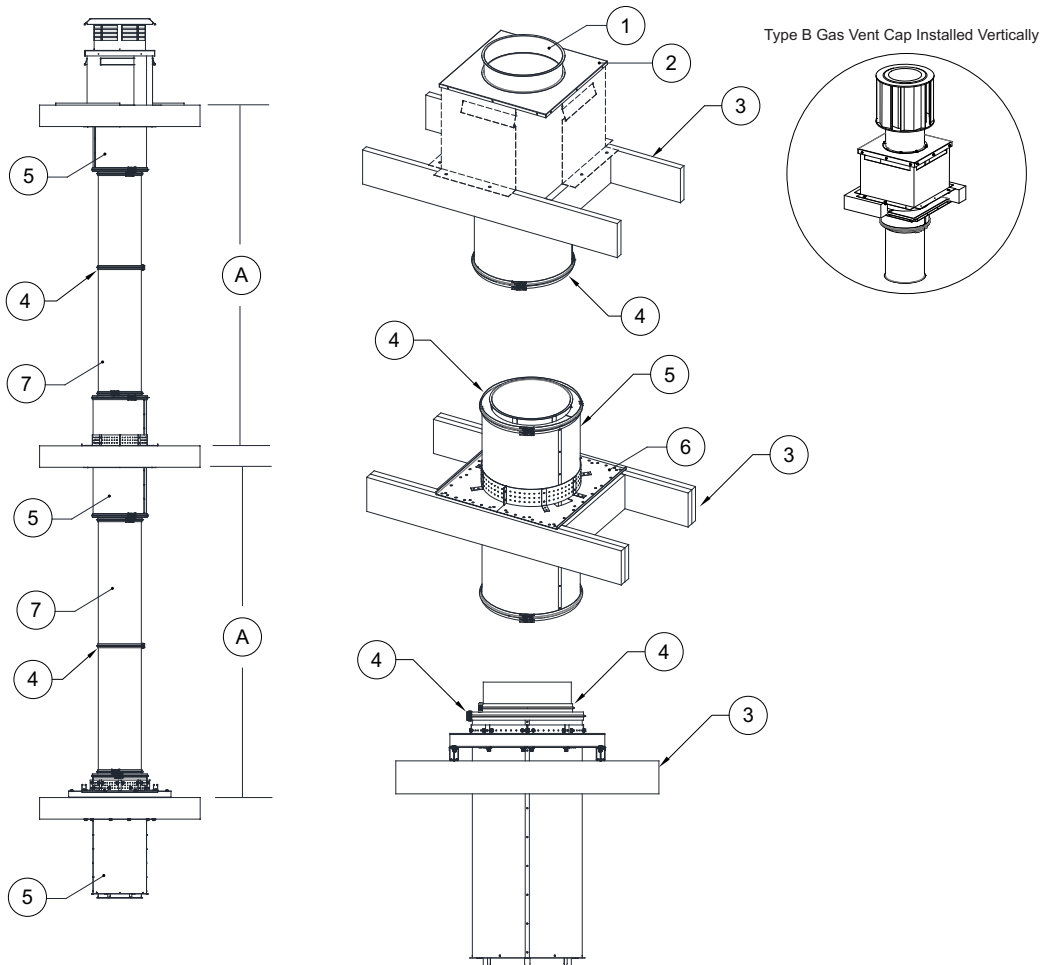
- A. Minimum Thread Penetration, refer to **Table 17**
- B. Clearance to Combustibles (Vent to Ceiling/Wall), refer to **Table 10 on page 24**
- C. Vertical Support Spacing, refer to **Table 16 on page 47**
- D. 60" Maximum Distance
- E. Minimum Open Area Chase, refer to **Table 17**
- F. 5" Maximum Distance
- G. Clearance to Combustibles (Shell to Joist), refer to **Table 10 on page 24**
- H. Minimum Edge Distance, refer to **Table 17**

Table 17 - Substrate Hardware

Decking Material	Hardware	Minimum Thread Penetration	Minimum Edge Distance	Minimum Open Chase Area
Wood - Minimum G.42	Zinc Plated Steel Hex Head Lag Screw 3/8" x 2-1/2" with 3/8" washer	2"	1-1/2"	Refer to Table 10 on page 24 Through Wall/Floor Opening specifications.
Concrete - 2500 Minimum PSI	Hilti Kwik Bolt - 3/8" Diameter TZ Expansion Anchor with 3/8" washer	2-5/16"	3"	
Steel Roof Truss	Dril-Flex Self-Drilling Screws 1/4"-14 Min. 1/2" Through with 1/4" washer	12 Gauge or 1/8" Thick	3/8"	

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 42 - Vertical Curb Support Details View



- | | |
|--|--|
| 1. Riser or fitting welded to transition plate. | 7. Single Wall Section |
| 2. Transition Plate | A. Vertical Support Spacing, refer to Table 16 on page 47 |
| 3. Decking Floor/Roof - Wood, Concrete, or Steel | |
| 4. V-band | |
| 5. Through Penetration -2V Double Wall Assembly | |
| 6. Floor Support Assembly | |

Double Wall Vertical Support & Vertical Support Spacing

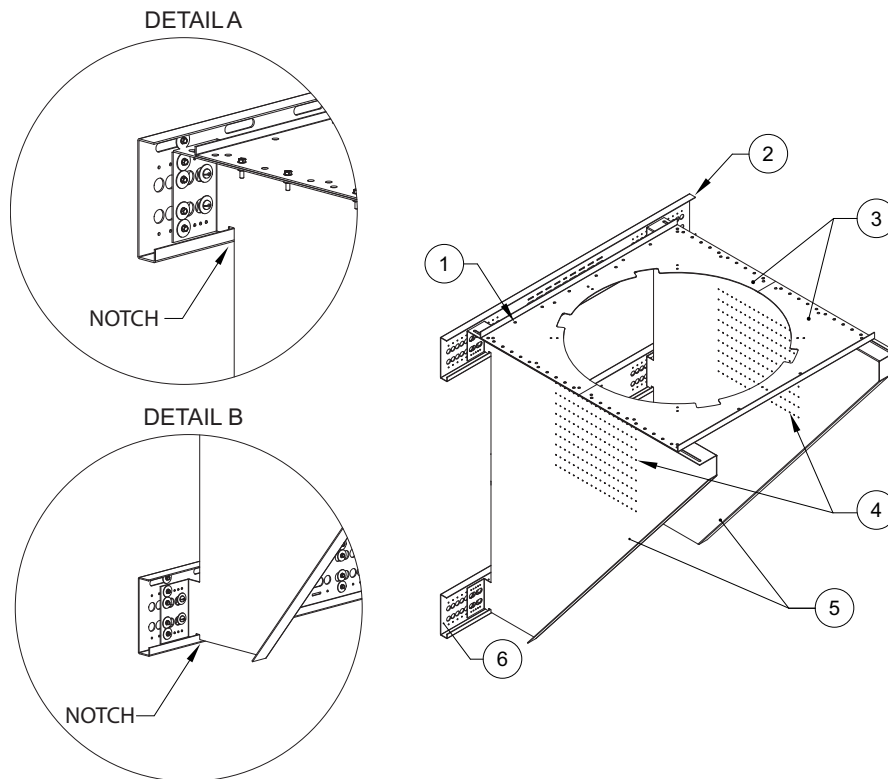
Vent system(s) require supports along vertical runs. There may be multiple vertical supports used for vent installations. Each support assembly is designed for a specific type of installation. Review installation site before selecting supports. There are three different types of hardware supplied depending on the type of wall that the vent system will be supported on. There are three types of wall construction listed below; gypsum with wooden studs, gypsum with 25 gauge steel studs, and concrete/masonry. Each wall construction type requires different hardware to be used when installing the support assembly. Maximum vertical support spacing is shown in **Table 18**. Do not exceed this listed vertical spacing.

Table 18 - Double Wall Vertical Support Spacing

Diameter (Inches)	-2V Type BH Vent Wall Support Spacing (Feet)	-2V Type BH Vent Vertical Curb/ Floor Support Spacing (Feet)
5", 6", 7" 8", 10", 11", 12", 14", 16"	20'	24'

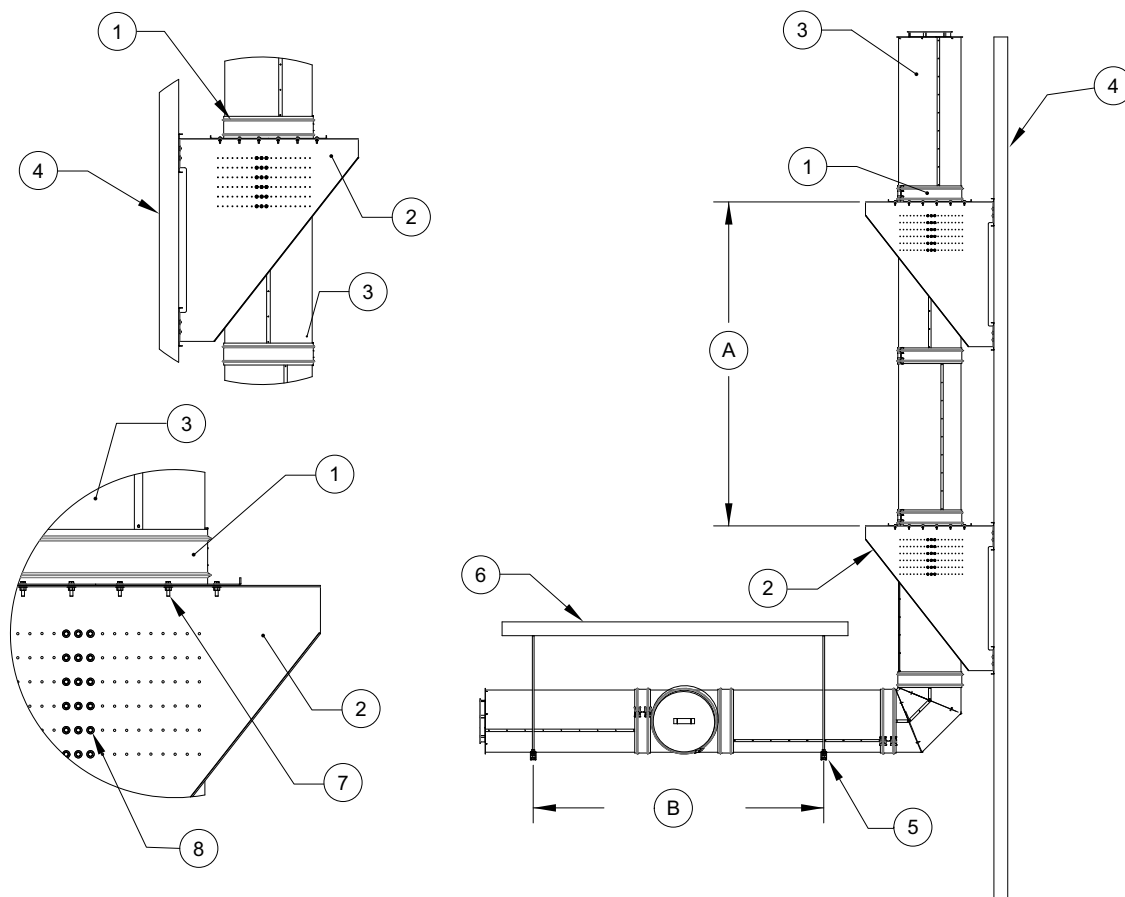
IMPORTANT: VERTICAL & HORIZONTAL SUPPORTS SHOWN IN THIS MANUAL ARE REQUIRED. VENT SYSTEMS MUST USE THE SUPPORTS LISTED IN THE MANUAL, SUPPORTS BY OTHER ARE NOT ALLOWED. SUPPORT SPACING MUST BE AS STATED IN THIS MANUAL.

Figure 43 - Vertical Wall Support Kit



1. 5/16"-18 Whiz Nuts and Bolts. Used to secure top plate to the side plate.
2. Wall Support Plate (Top)
3. Flat Support Plates
4. 5/16"-18 x 1-1/2" Self Drilling Screws. Used to secure double wall vent shell.
5. Side Support Plates
6. Wall Support Plate (Bottom)

Figure 44 - Vertical Support Details

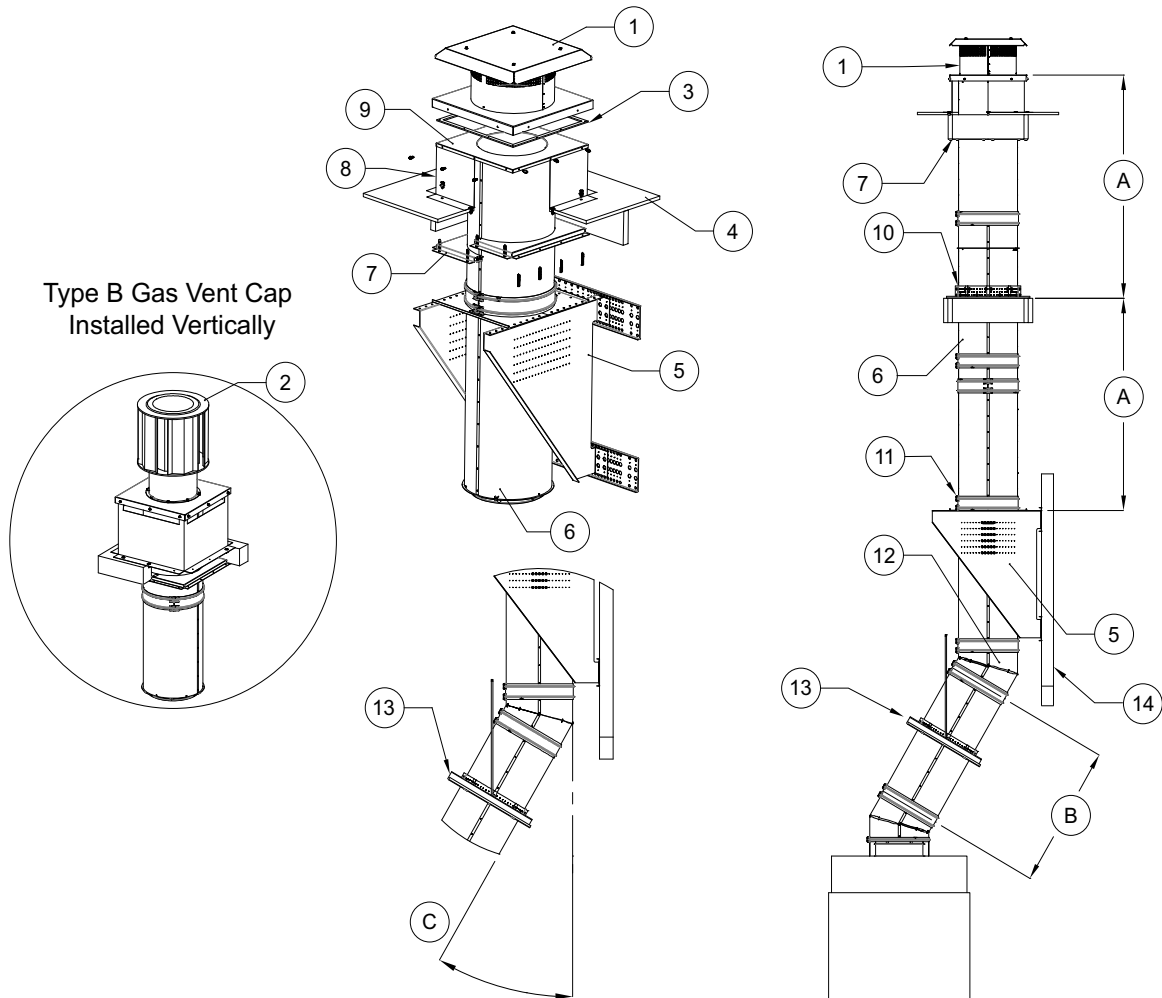


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|--|--|
| <ul style="list-style-type: none"> 1. Double V-band - V-band located above vertical support. 2. Vertical Support 3. Vent System 4. Types of Wall Construction: 2" x 4" Wooden Studs, 2" x 4" (25) Gauge Studs, Concrete/Masonry 5. Horizontal Support | <ul style="list-style-type: none"> 6. Ceiling 7. 5/16" Whiz Nuts and Bolts. Used to secure top plate. 8. 5/16"-18 x 1-1/2" Self-Drilling Screws A. Vertical Support Spacing, refer to Table 18 on page 52 B. Horizontal Support Spacing, refer to Table 15 on page 45 |
|--|--|

There is no limit on the angle or slope of an offset for gas or liquid fuel burning appliances, but with a solid fuel burning appliance the slope must not be greater than 30 degrees (USA) or 45 degrees (Canada) from vertical.

Vents for combination fuel heating appliances which are capable of burning solid fuel or are convertible to solid fuel are limited to the same 30 degrees (USA) or 45 degrees (Canada) slope even if the current choice of fuel is gas or oil.

Figure 45 - Vertical Floor Details



- | | |
|---|--|
| <ol style="list-style-type: none"> 1. CAT II, III, IV Vent Cap 2. UL Listed Type B Gas Vent Cap (For use with Category I Applications only) 3. Ceramic Gasket 4. Floor 5. Vertical Wall Support Kit 6. Vent Section 7. Clearance Plates 8. Vented Curb 9. Transition Plate 10. Vertical Floor Support Kit | <ol style="list-style-type: none"> 11. Double V-band - Located above wall support kit 12. Elbow 13. Vertical Floor Support with 1/2" Threaded Rod 14. Wall <p>A. Vertical Support Spacing, refer to Table 18 on page 52</p> <p>B. Maximum Straight Length = 8'</p> <p>C. Maximum Angle = Not to exceed 30° USA (45° Canada) when being used with solid fuel</p> |
|---|--|

Double Wall Vertical Support (Wood, Steel, Concrete)

The V-band will sit on top of the flat support plates after the wall support kit installation is complete.

1. Verify wall construction and hardware kit.
 - For wood wall construction, the wall must be constructed of 2" x 4" wooden studs with a maximum spacing of 24" on center and covered with 5/8" gypsum. Use hardware kit DWVESU-HARDWARE-W. Refer to **Figure 46 on page 56** for wood/steel installation details.
 - For steel stud wall construction, the wall must be constructed of 2" x 4" 25 gauge (minimum) with a maximum spacing of 24" on center and covered with 5/8" gypsum. Use hardware kit DWVESU-HARDWARE-S. Refer to **Figure 46 on page 56** for wood/steel installation details.
 - For concrete/masonry construction, use hardware kit DWVESU-HARDWARE-CM. Refer to **Figure 47 on page 57** for concrete/masonry installation details.
2. The wall support plate has specific holes that locate the side plates so that when installed, they will match the outer shell diameter. Measure the shell diameter, then measure from the wall plate center holes to the radius of the opening to locate the first side plate.

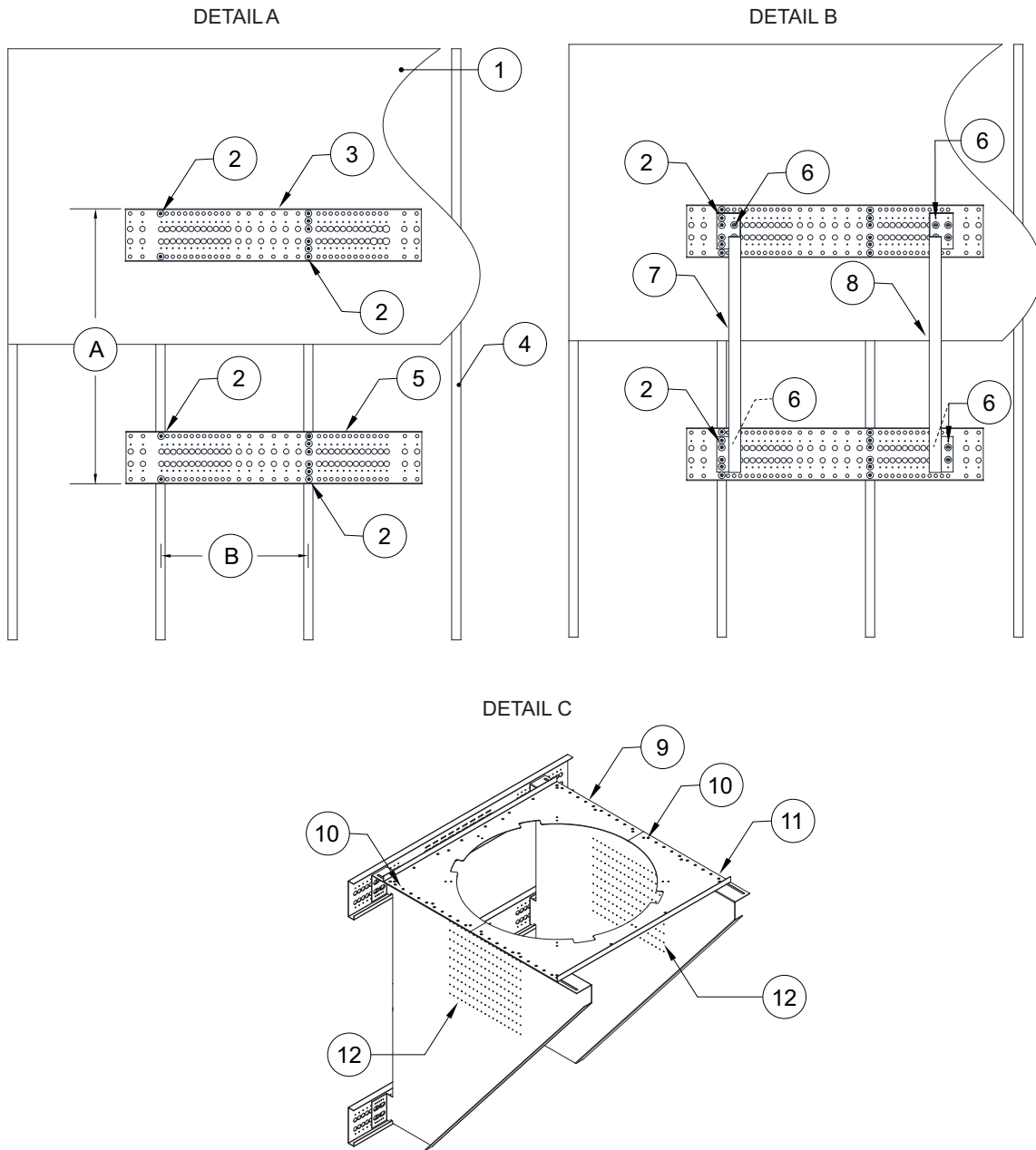
For example: If the shell being installed has a 30" outside diameter, measure from the center of the wall plate 15". This will locate the inside of the side support plate to the wall plate. Side support plate mounting holes should be on the outside.

3. Once the first wall support plate is located, use the 7/8" holes that are 24" on center from the side plate mounting holes to secure the first support plate. In some cases, the mounting holes may have to be drilled to align with studs.
4. Follow the instructions above and mount the second wall support plate. Measurement will be 44" from the top of the first wall support to the bottom of the second wall support.

NOTE: For steel studs, alternate self-drilling screws and toggle bolts when installing side plates into stud locations.

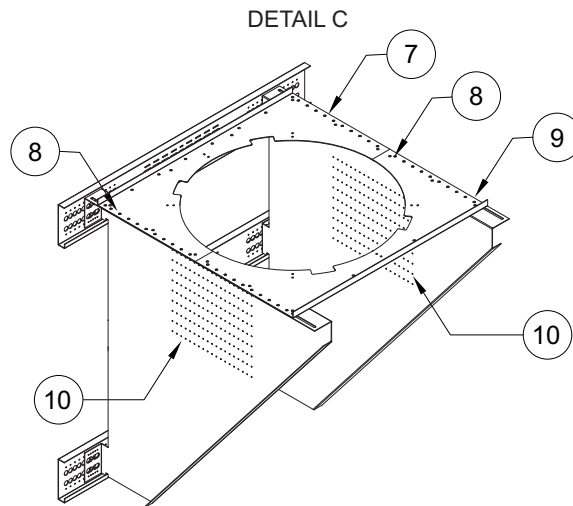
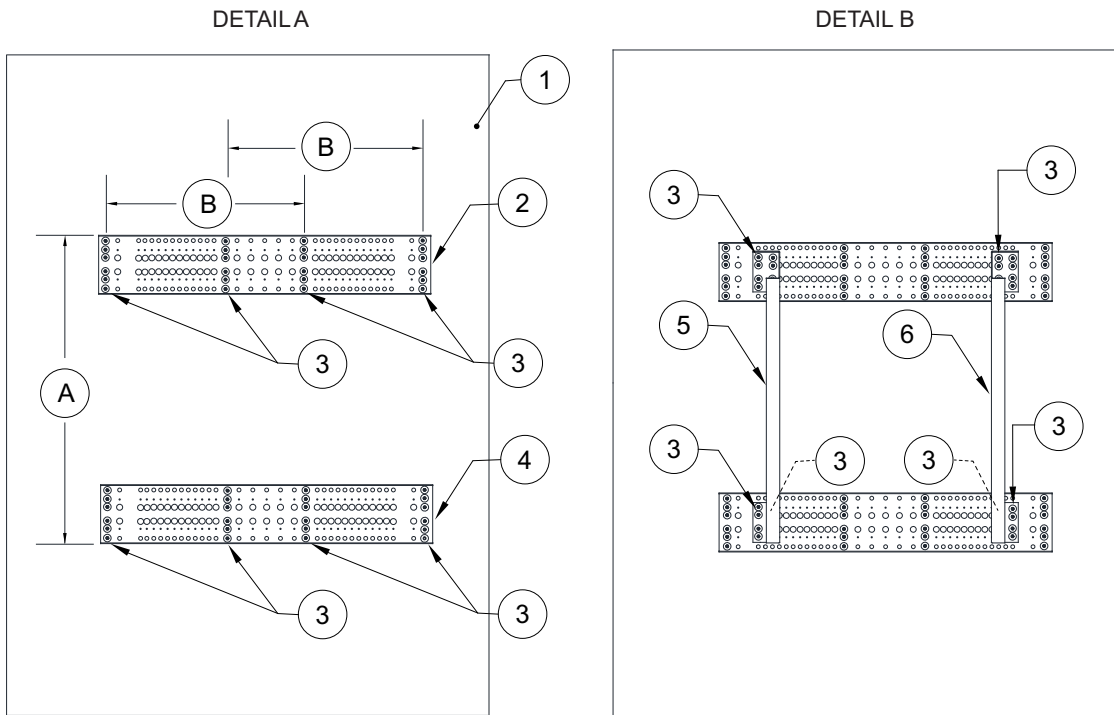
5. Install one of the side support plates. Use the notches on the side plates to mount to the wall plates. This will allow for adjustment before hardware installation. Refer to Detail A and B in **Figure 43 on page 52**.
6. Measure from the center of the wall support plate to locate the first side support plate. Measure 24" from the hardware installed in step 3. Secure wall support plates to the wall.
7. Measure from the center and install the second side plate.
8. Repeat the installation process so that both wall supports and side plates are installed and secure.
9. Install the rear flat support plate using nuts and bolts. Mount the shell so the V-band is above the flat support plates. Secure by installing the front flat support plate. The V-band should be sitting on top of the flat plate. A cutout is provided in the flat plate, align the V-band bracket with the cutout so it does not interfere with the top of the plate.
10. Use self-drilling screws to secure the side support left and right plates to the outer vent shell. Use the guide holes to locate the shell center and fill all holes at the center, center left and center right.

Figure 46 - Vertical Support (Wood, Steel)



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| <ol style="list-style-type: none"> 1. Wall Substrate (Wood, Steel) 2. Hardware for Stud Installation - Wood/Steel <ul style="list-style-type: none"> • Wood - 5/16" x 3-1/2" Lag Bolts and Washers • Steel - 5/16" x 1-1/2" Self-Drilling Screws and 5/16" x 4" Toggle Bolts 3. Wall Support Plate #1 4. Stud (Wood/Steel) 5. Wall Support Plate #2 6. 5/16" x 4" Toggle Bolts | <ol style="list-style-type: none"> 7. Side Support Plate #1 8. Side Support Plate #2 9. Rear Flat Support Plate 10. 5/16"-18 Hardware, secures flat plates to the side plates 11. Front Flat Support Plate 12. 5/16"-18 x 1-1/2" Self-Drilling Screws <p>A. 44" Spacing Distance
B. 24" Centered Spacing Distance</p> |
|---|---|

Figure 47 - Vertical Support (Concrete)



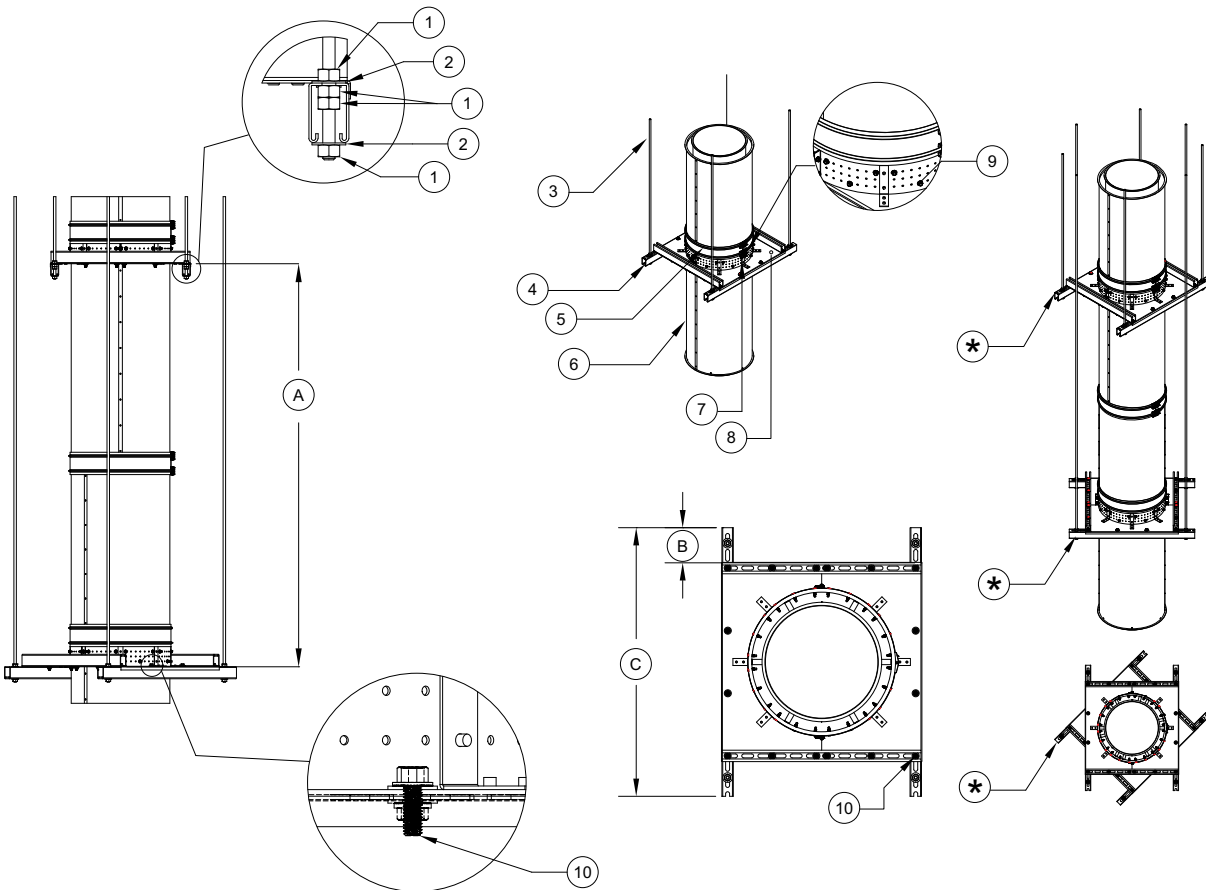
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|---|---|
| <ol style="list-style-type: none"> 1. Wall Substrate (Concrete) 2. Wall Support Plate #1 3. Hardware from Mounting Kit for Concrete - 5/16" x 2-1/4" Concrete/Masonry Screws and Washers 4. Wall Support Plate #2 5. Side Support Plate #1 6. Side Support Plate #2 | <ol style="list-style-type: none"> 7. Rear Flat Support Plate 8. 5/16"-18 Hardware, secures flat plates to the side plates 9. Front Flat Support Plate 10. 5/16"-18 x 1-1/2" Self-Drilling Screws <p>A. 44" Spacing Distance
B. 24" Centered Spacing Distance</p> |
|---|---|

Double Wall Vertical Ceiling Support

1. The vertical ceiling support system is used when a wall support cannot be used or installed.
2. After all-thread has been installed, install Unistrut with provided 1/2" hardware. Install floor support plates to Unistrut with 3/8" hardware. B12 Unistrut is recommended.
3. When installing Special Gas Vent, make sure that the floor support fastener band and floor support are located under the V-band. Refer to **Table 18 on page 52** for vertical spacing specifications.
4. Secure the floor support fastener band to the outer shell using the 5/16"-18 x 1-1/2" self-drilling screws. Use the guide holes to locate the shell center. Install screw into center, center left and center right. A minimum of 18 screws must be used on each side of the Special Gas Vent.

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

Figure 48 - Vertical Ceiling Support



- | | |
|---|--|
| 1. 1/2" Nut | 8. Floor Support |
| 2. 1/2" Washer | 9. 5/16"-18 x 1-1/2" Self-Drilling Screws |
| 3. 1/2" All-Thread - Supplied by others | 10. 3/8" Hardware - 18 pieces |
| 4. B12 Unistrut | A. Vertical Support Spacing, refer to Table 18 on page 52 |
| 5. Double Wall V-band | B. 5" Maximum Distance |
| 6. Double Wall Shell | C. 60" Maximum Distance |
| 7. Floor Support Fastener Band | |

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

Double Wall Vertical Floor Support (Wood, Concrete, Steel)

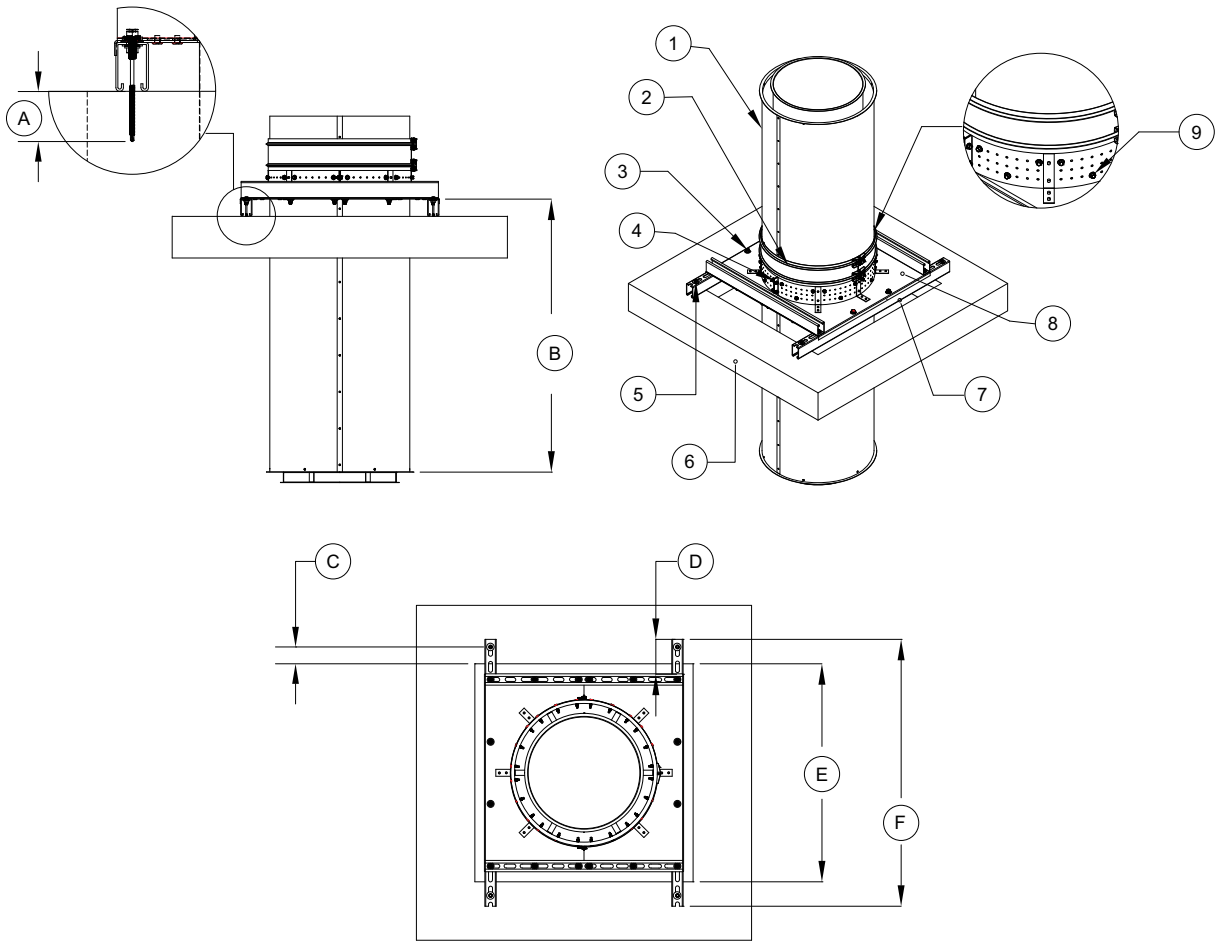
1. Vertical floor supports are used when the vent system is passing through a floor opening. Vertical floor support assemblies consist of two floor support plates and support bands. The support plates are used to span the floor opening, the support bands connect the floor plates to the outer shell of the double wall vent shell.
2. The floor opening is sized per the double wall vent outer shell. Verify the floor opening, refer to **Table 12 on page 31**.
3. If there is an existing opening in the floor or chase, you must verify the opening. If the opening is larger than the dimension referenced in **Table 12 on page 31**, you must re-frame the opening or change to a chase support. Refer to **Figure 49 on page 60** for chase support details.
4. Chase supports are used when the floor opening is larger than the floor support plates and the floor support plates cannot be secured to the floor.
5. Unistrut is bolted to the floor support plates (chase support). Refer to **Figure 49 on page 60** for details. B12 Unistrut is recommended.
6. Unistrut is designed to span larger opening in floors when the opening cannot be changed.

NOTE: If there is an existing opening in the floor that exceeds 5” maximum clearance, then re-frame the opening or use “Double Wall Vertical Ceiling Support” on page 58.

Table 19 - Substrate Hardware

Decking Material	Hardware	Minimum Thread Penetration	Minimum Edge Distance
Wood - Minimum G.42	Zinc Plated Steel Hex Head Lag Screw 3/8" x 2-1/2" with 3/8" washer	2"	1-1/2"
Concrete - 2500 Minimum PSI	Hilti Kwik Bolt 3/8" Diameter TZ Expansion Anchor with 3/8" washer	2-5/16"	3"
Steel Roof Truss	Dril-Flex Self-Drilling Screws 1/4"-14 Min. 1/2" Through with 1/4" washer	12 Gauge or 1/8" Thick	3/8"

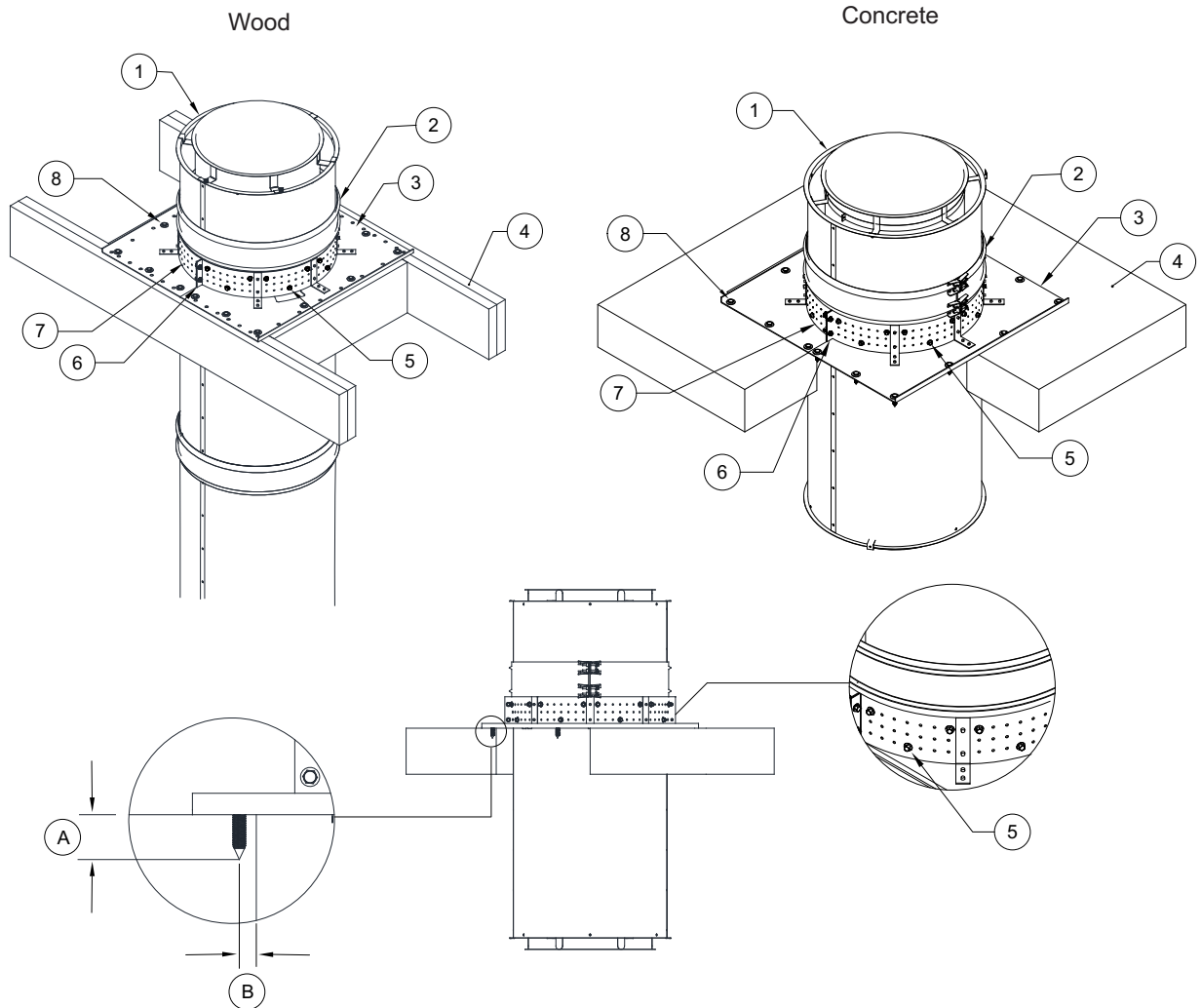
Figure 49 - Chase Floor



1. Double Wall Shell
2. Double Wall V-band
3. 3/8" Hardware
4. Floor Support Fastener Band
5. Substrate Fastener - Supplied by others
6. Substrate
7. B12 Unistrut
8. Floor Support
9. 5/16"-18 x 1-1/2" Self-Drilling Screws (Use minimum 3 screws per opening in the band)

- A. Minimum Thread Penetration, refer to **Table 19 on page 59**
- B. Vertical Support Spacing, refer to **Table 15 on page 45**
- C. Minimum Edge Distance, refer to **Table 19 on page 59**
- D. 5" Maximum Distance
- E. Open Area Chase
- F. 60" Maximum Distance

Figure 50 - Floor Support

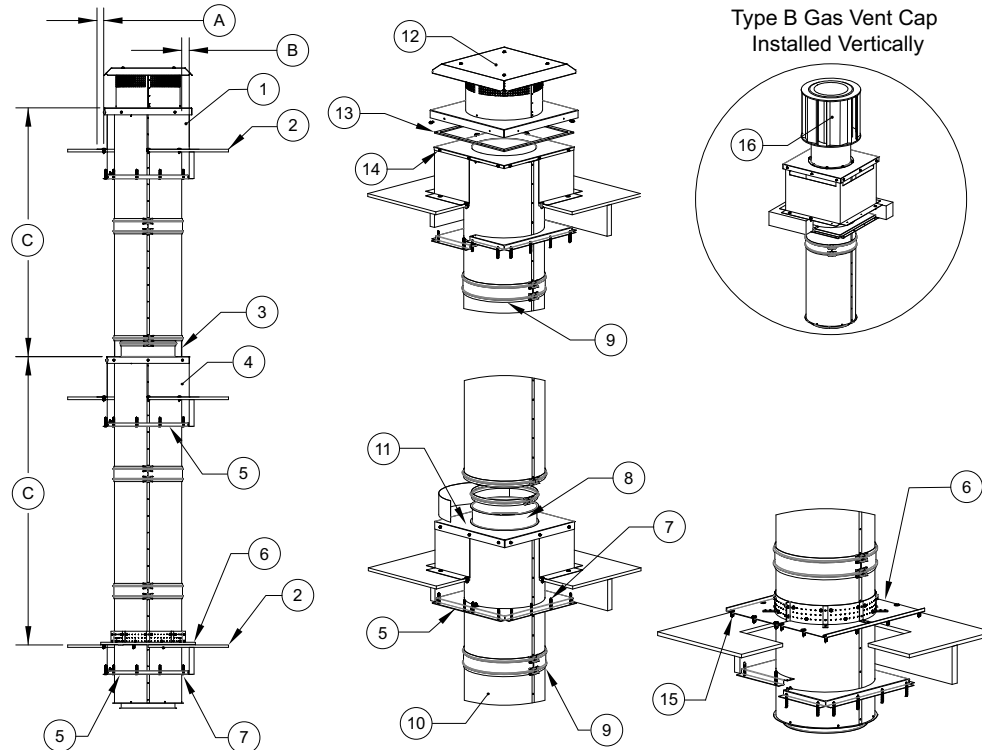


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| <ul style="list-style-type: none"> 1. Double Wall Shell 2. Double Wall V-band 3. Floor Support 4. Substrate 5. 5/16"-18 x 1-1/2" Self-Drilling Screws (Use a minimum of 3 screws per opening in the band) 6. 1/4"-20 Whiz Nuts and Bolts | <ul style="list-style-type: none"> 7. Floor Support Fastener Band 8. Substrate Hardware, refer to Table 19 on page 59 A. Minimum Thread Penetration, refer to Table 19 on page 59 B. Minimum Edge Distance, refer to Table 19 on page 59 |
|--|---|

Double Wall Vertical Installation Floor or Roof

Use a high temperature gasket to seal the transition plate to the vent cap. The transition plate secures to the curb using 1/4"-20 x 1-1/2" zinc plated self-drilling screws. The vent cap secures to the vented curb using 1/4"-20 x 2" zinc plated self-drilling screws. Welded sections are dye tested from the factory.

Figure 51 - Floor or Roof Installation Details



- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Vented Curb Roof Termination 2. Substrate - Wood, Concrete or Steel 3. Riser Cover 4. Through Curb Support with TPDB 5. 3" Clearance Plates 6. Floor Support Assembly 7. Clearance Plate Mounting Screws 8. Inner Vent 9. Double V-band 10. Vent Section 11. Vent Pipe Fully Welded to Transition Plate. | <ol style="list-style-type: none"> 12. CAT II, III, IV Vent Cap 13. High Temperature Gasket 14. 1/4"-20 x 1-1/2" Zinc Plated Self-Drilling Screws 15. Substrate Hardware, refer to Table 20 on page 62 16. UL Listed Type B Gas Vent Cap (For use with Category I Applications only) <p>A. Edge Distance, refer to Table 20 on page 62
 B. 3" Clearance
 C. Vertical Support Spacing, refer to Table 18 on page 52</p> |
|---|---|

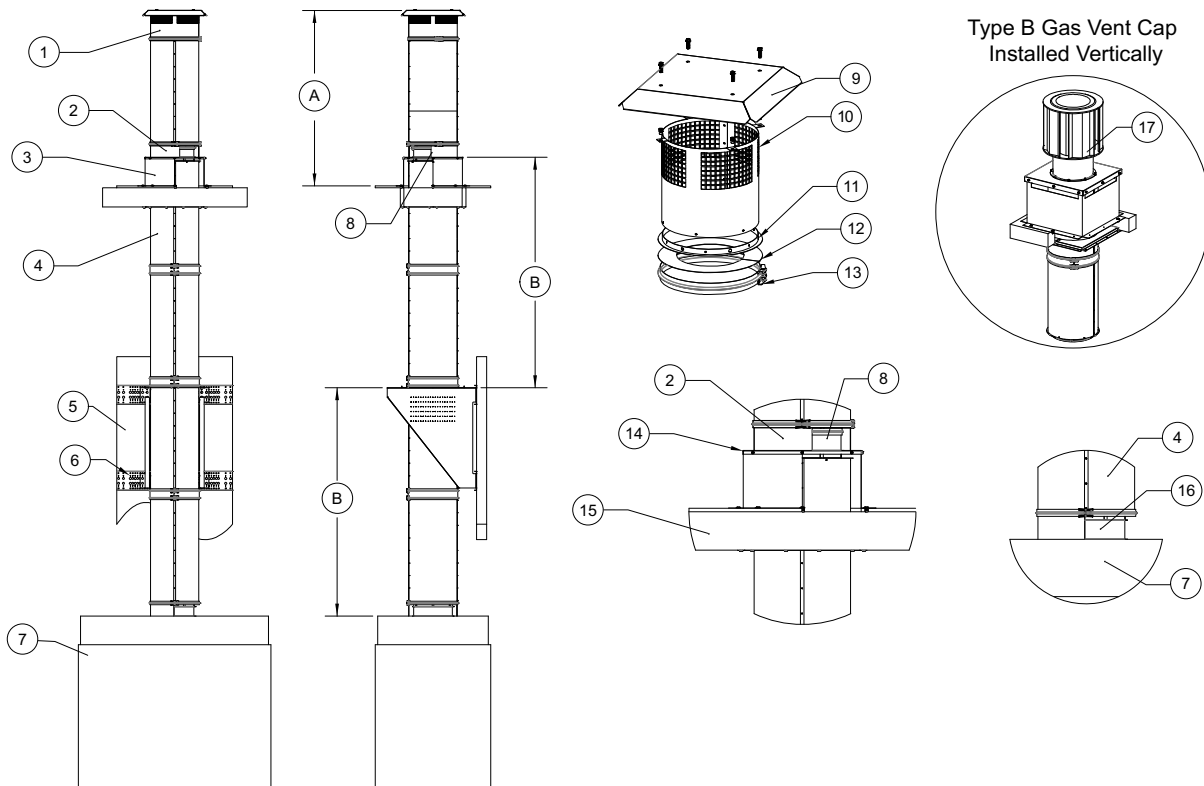
Table 20 - Substrate Hardware Table

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

Double Wall Vent Assembly

The illustrations shown provide useful information on the installation of a vent system. Each installation is specific to the application and the job site. If you encounter a situation not covered by this illustration, refer to the guide or consult the factory. The vent systems illustrated in this manual have been tested to and comply with UL 1738 and ULC-S636-08, Factory-Built Vents for Building Heating Appliances, for commercial applications only.

Figure 52 - Vent Installation Guide Details View 1



1. CAT II, III, IV Vent Cap
2. Top Riser Cover and V-band
3. Vented Curb
4. Vent Shell
5. Wall
6. Vertical Wall Support
7. Appliance
8. Top Riser Connection
9. Cap
10. Airshaft

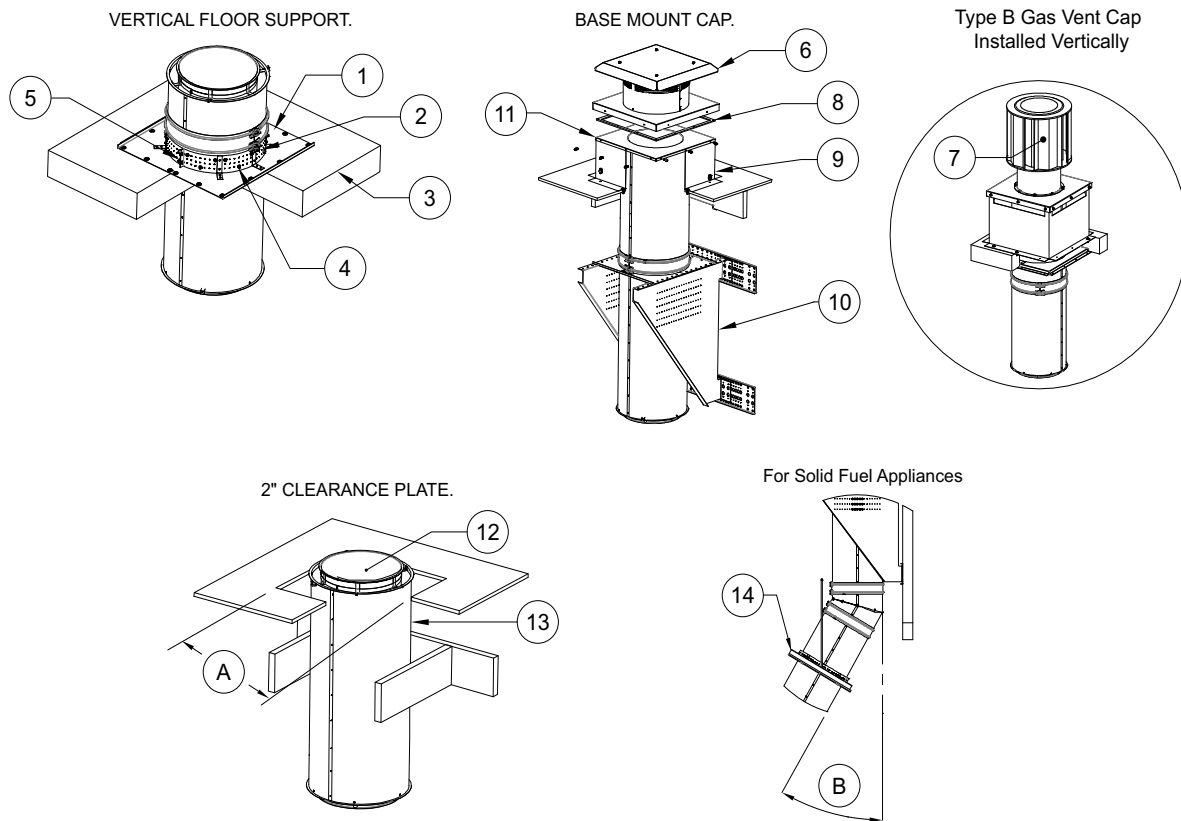
11. Flange Ring
 12. End Cap
 13. Single V-band
 14. Transition Plate
 15. Substrate Surface
 16. Connection to Appliance - May be welded/ bolted or field installed
 17. UL Listed Type B Gas Vent Cap (For use with Category I Applications only)
- A. Roof support assembly without support:
- Maximum Distance for -2V is 8'
 - Maximum Distance for -V (5"-18") is 8'
 - Maximum Distance for -V (20"-36") is 3'
- B. Vertical Support Spacing, refer to **Table 18 on page 52**

The illustrations shown provide useful information on the installation of a vent system. Each installation is specific to the application and the job site. If you encounter a situation not covered by this illustration, refer to the guide or consult the factory. The vent systems illustrated in this manual have been tested to and comply with UL 1738 and ULC-S636-08, Factory-Built Vents for Building Heating Appliances, for commercial applications only.

There is no limit on the angle or slope of an offset for gas or liquid fuel burning appliances, but with a solid fuel burning appliance the slope must not be greater than 30 degrees (USA) or 45 degrees (Canada) from vertical, even if a fan is providing ventilation to the system.

Vents for combination fuel heating appliances which are capable of burning solid fuel or are convertible to solid fuel are limited to the same 30 degrees (US) or 45 degrees (Canada) slope even if the current choice of fuel is gas or oil.

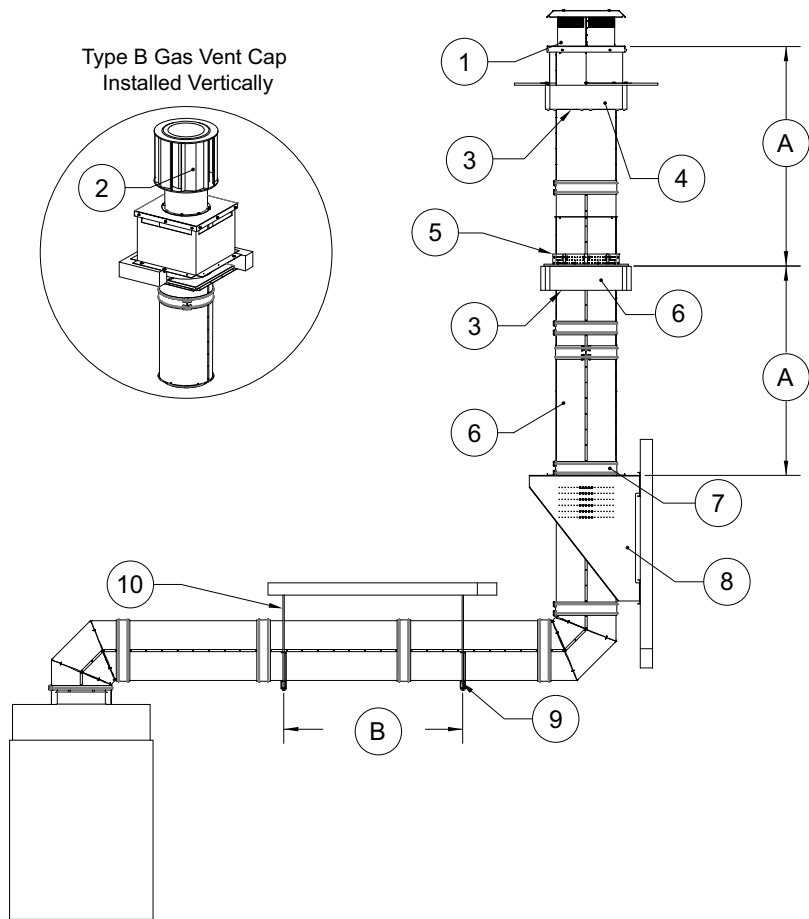
Figure 53 - Vent Installation Guide Details View 2



- 1. Vertical Support Plate
- 2. Vertical Support Ring
- 3. Substrate
- 4. 5/16"-18 x 1-1/2" Self Drilling Screws
- 5. 1/4"-20 Whiz Nuts and Bolts
- 6. CAT II, III, IV Vent Cap
- 7. UL Listed Type B Gas Vent Cap (For use with Category I Applications only)
- 8. Ceramic Gasket
- 9. Vented Curb

- 10. Vertical Support
- 11. Transition Plate
- 12. Inside Shell
- 13. Vent Shell
- 14. Vertical Floor Support with Threaded Rod
- A. Floor Opening, refer to **Table 12 on page 31**
- B. Maximum angle not to exceed when being used with solid fuel applications - 30° USA (45° Canada)

Figure 54 - Vent Installation Guide Details View 3



- | | |
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| <ul style="list-style-type: none"> 1. CAT II, III, IV Vent Cap 2. UL Listed Type B Gas Vent Cap (For use with Category I Applications only) 3. 3" Clearance Plates Installed 4. Combustible Surface 5. Support Fastener Band 6. Vent Shell 7. Double V-band | <ul style="list-style-type: none"> 8. Vertical Support 9. Horizontal Support 10. 1/2" Threaded Rod (Minimum) A. Vertical Support Spacing, refer to Table 18 on page 52 B. Horizontal Support Spacing, refer to Table 15 on page 45 |
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Methods Used to Test Vent 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 the 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 vent system, a leakage test shall be performed. Vents shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the system from being visually inspected on all sides. The permit holder shall be responsible to provide the necessary equipment and perform a system 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 vent section to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the vent walls. A test shall be performed for entire vent system, including the hood-to-duct connection. The system 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 generating equipment containing chlorine or chlorinated chemicals must not be used. Consult the factory for any questions regarding the smoke equipment and vent compatibility.

EXCEPTION: When performing a Capture and Containment (C&C) test on a ventilation hood, smoke candles (cartridges) are allowed. Only use non-toxic smoke with low chloride concentration <20%. Testing should be conducted with all exhaust fans running to dilute the air.

After installing the vent, allow the listed sealant to cure for a minimum of 24 hours. Place the smoke equipment at the bottom of the vent system. The natural upward draft will pull the smoke to the top of the vent system. Various length vent runs may require multiple smoke tests. Once the smoke has reached the top of the vent run, cap the vent securely. Inspect all joints for leakage.

Method 3 - Pressure Testing per SMACNA's HVAC Air Duct Leakage

A 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 before being covered, concealed, insulated, or wrapped before final installation to the exhaust fan, kitchen exhaust hood, or other equipment.

All wall joint connections have been tested to Seal Class A, Leakage Class 1 specifications per SMACNA's HVAC Air Duct Leakage Test Manual. In the absence of local code testing procedures, use SMACNA's HVAC Air Duct Leakage Test Manual for inspection and testing guidelines. Recommended Air Leakage Tester: Dalt Model 6900. Refer to **Figure 55**.

NOTE: If the duct system is modified or altered, the entire system will require re-testing.

Figure 55 - Leakage Test

