

Installation Methods Guide for IPEX System 1738[®] Venting Systems for Gas-Burning Appliances Categories II and IV

- A. Examine all components for possible shipping damage prior to installation.
- B. Proper joint assembly is essential for a safe installation. Follow these instructions exactly as written. Check the integrity of joints, to be leak proof upon completion of assembly.
- C. This venting system must be free to expand and contract. This venting system must be supported in accordance with these instructions.
- D. Check for proper joint construction when joining pipe to fittings.
- E. Check for unrestricted vent movement through walls, ceilings, and roof penetrations.
- F. Different manufacturers have different joint systems and adhesives. DO NOT mix pipe, fittings or joining methods from different manufacturers.
- G. DO NOT use or mix System1738[®] components with other IPEX product.
- H. PRODUCT INSTALLATION AND SOLVENT WELD TRAINING IS RECOMMENDED.

System 1738 Pipe, Fittings and Cements are certified as a system and must be installed as such.

Table of Contents

System1738® Safety Alerts.....	1	Solvent Welding	13
Supplemental Information – DO’S and DON’TS .	2	Safety Precautions.....	13
Product Application	3	Solvent Welding Basics	14
Limits of Use and Application.....	3	Cement Shelf Life.....	14
Termination Requirements	4	Quantity of Solvent Cement.....	14
Side wall Terminations.....	5	Solvent Weld Appliance Service Time	15
Pitched Roof Terminations.....	7	Cold and Hot Weather Solvent Welding	16
Flat Roof Terminations	8	Surface Interaction in Solvent Weld Joint.....	16
Chimney Installations	9	Solvent Welding Preparation Guidelines	17
Support and Restraint Spacing.....	10	Priming Guidelines	18
Expansion and Contraction.....	11	Solvent Welding Guidelines.....	19
Firestops.....	11	System Repair.....	20
Appliance Testing.....	11	Maintenance.....	20
Vent Connection to the appliance	11	Vent Replacement	20
Handling and Storage of Pipe and Fittings.....	12	Warranty.....	20
Handling and Storage of Cement and Primer	12	Training	20
		Accessory Installation Instructions.....	21
		Access Tee	21
		Low Profile Side Wall Termination Kit.....	21
		Concentric Vent Termination Kit.....	23

System1738®

IT IS IMPORTANT TO READ AND UNDERSTAND THIS GUIDE. IT CONTAINS INFORMATION TO HELP MAINTAIN SAFETY AND PREVENT PROBLEMS.

Improper installation or use of System1738® can result in personal injury and/or property damage. It is important to be aware of and recognize safety alert messages as they appear in this manual.

The types of safety alert messages are described below.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid personal injury or death.

WARNING

"WARNING" Indicates a hazardous situation which, if not avoided, could result in severe injury or death.

CAUTION

"CAUTION" Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

"NOTICE" Indicates a hazardous situation which, if not avoided, could result in system failure and property damage.

"NOTE" signifies special instructions which are important but are not related to hazards.

System1738 Safety Alerts

⚠ WARNING

NEVER use or test System1738 with compressed air or other compressed gases.



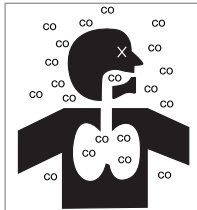
Use of compressed air or gas in System 1738 pipe and fittings can result in explosive failures and cause severe injury or death.

⚠ WARNING

Carbon monoxide (CO) can cause brain damage or death.

ONLY use a vent material approved by the appliance manufacturer for venting of combustion gases.

READ & UNDERSTAND the instruction manual and safety messages before installing a UL 1738 venting system.



⚠ WARNING

Follow all preparation and installation procedures.

NOTICE

Use only System1738 in flue gas venting applications for category II and IV appliances generating a max flue temp of 149°F (65°C).

NOTICE

System1738 must be installed in accordance with NFPA 54/ANSI Z223.1 National Fuel Gas Code.

Supplemental information – DO'S and DON'TS

CAUTION

Refer to the contents of this guide for complete instructions and guidelines.

DO's

- Read the appliance and vent manufacturer's installation instructions and install product accordingly
- Follow recommended safe work practices
- System1738 may only be used for venting categories II and IV appliances generating a maximum flue gas temperature of 149°F (65°C)
- Make certain that fire-stop materials are compatible with System1738 product
- Keep pipe and fittings clean and in original packaging until needed
- If pipe and fittings are stored outdoors, cover with a well-ventilated white tarp and never store other products on top of pipe
- Follow handling and storage procedures found in this guide
- Only use tools, on System1738 pipe and fittings, as described in this guide
- Use a drop cloth to protect interior finishes
- Cut the pipe ends squarely
- Deburr and bevel the pipe end with a chamfering tool before solvent welding
- Check joint and seams for gas tightness
- Slowly rotate the pipe a quarter turn when inserting pipe in fitting socket when solvent welding
- Avoid puddling of solvent cement in fittings and pipe
- Ensure excess primer and solvent cement does not run inside pipe and fittings
- Follow System1738 recommended set times found in this guide before commissioning the vent system
- Allow for movement due to expansion and contraction
- Only use products listed to UL 1738 for venting or combustion gases.
- Contact Local Building or Fire Officials about restrictions and installation inspection in your area.
- Always adhere to local jobsite and workplace safety regulations.

DON'Ts

- DO NOT mix pipe, fitting or joining methods from different manufacturers
- DO NOT use solvents or cements other than what is required by this guide
- DO NOT install adhesive tape, insulated wire, or cable in direct contact with System1738 product
- DO NOT use solvent cement that has exceeded its shelf life or has become discolored or jelled
- DO NOT drill System1738 pipe
- DO NOT use solvent cement near sources of heat or open flame, or when smoking
- DO NOT subject vent system to compressed air
- DO NOT cut pipe with dull or broken cutting-tool blades
- DO NOT use ratchet cutters or reciprocating saw to cut pipe
- DO NOT use System1738 product that's been stored unprotected outdoors and is faded in color
- DO NOT allow threaded rod to come in contact with the pipe; for example, threaded rods used to connect pipe hangers
- DO NOT use PVC/CPVC pipe and fittings listed for plumbing applications for venting of combustion gases

System1738® PVC Categories II and IV Gas Venting System is third party certified to UL 1738, latest edition. The following installation methods have been prepared in conformity with the requirements of section 47 of UL Standard 1738.

Product Application

- (a) System1738 PVC Gas Venting System is intended for venting of Categories II and IV gas fired appliances
- (b) System 1738 PVC Venting System is suitable for a maximum flue gas temperature of 149°F (65°C)
- (c) System 1738 PVC has a zero clearance to combustible construction

Limits of Use and Application

- (a) The vent sizing and maximum vent length of plastic piping for Categories II and IV appliances shall be accordance with the appliance manufacturer's instructions.

⚠ WARNING

Improper installation of System1738 PVC systems may result in personal injury or death. Only qualified personnel should attempt the installation of gas burning equipment and vent, following the gas appliance and vent manufacturers directions.

- (b) All System1738 gas venting pipe and fittings must be carefully inspected by qualified personnel before use to ensure no damage has occurred during transportation. Any damaged product must be replaced. No attempt at repairs are to be made at the job site.
- (c) The common temperature changes in a gas venting application will cause the system to expand and contract accordingly. Proper care must be taken to allow for this movement through walls, ceilings, and roof penetrations. The venting system must be supported in accordance with these instructions.
- (d) Only certified System1738 PVC primer and cement shall be used to assemble System1738 PVC venting systems.

NOTICE

Follow IPEX solvent welding procedures as shown in this guide, and check for proper joint construction when joining pipe to fittings.

As per UL 1738 standard, DO NOT mix pipe, fittings or joining methods from different Manufacturers as they have different joint systems and adhesives. This can result in unsafe conditions and will void certification and warranty.

- (e) Venting should be as direct as possible with a minimum number of fittings. The maximum vertical rise or horizontal run of vent pipe plus the effective length of all fittings in a single vent installation shall not exceed the maximum vent length requirements outlined in the appliance manufacturer's installation instructions.
- (f) All framing requirements for floor and ceiling penetrations shall be in accordance with the local building code and/or the local regulatory authority.
- (g) All penetrations of fire rated floors and walls shall be firestopped as described in the Firestop section of this guide.
- (h) Roof penetrations should be sealed with a plumbing roof boot or equivalent flashing as per the local building code, or as permitted by the local regulatory authority. Chemical attack can cause product failure. Only use PVC chemically compatible sealants, gaskets and adhesives.
- (i) If spray foam insulation comes in contact with System1738, it is recommended that foam be applied in a maximum layer thickness of 2 inches (50mm) until the required thickness of insulation is achieved.
- (j) All horizontal sections of the venting system must be installed with a slope not less than 0.25 in./ft. down towards the appliance in order to collect condensate and remove condensate generated inside the line. The removal of condensate will help reduce the possibility of ice buildup and blockage. Refer to the appliance manufacturers' installation instructions for further details regarding the installation of necessary condensate drains.

⚠ WARNING

NEVER use compressed air or gas in System1738 pipe and fittings

NEVER test PVC pipe and fittings with compressed air or gas, or air-over-water boosters.



Use of compressed air or gas in System 1738 pipe and fittings can result in explosive failures and cause severe injury or death.

Termination Requirements

- (a) Installation and location of terminations must be in accordance with the latest edition of appliance manufacturer's installation instructions, local building code requirements and NFPA 54 / ANSI Z223.1 National Fuel Gas Code.
- (b) Intake and vent pipes may be routed either horizontally through an outside wall (see Figure 1) or vertically through the roof (see Figure 2).
- (c) Except for: 1) appliances certified to ANSI Z21.10.3 / CSA 4.3 (Gas-fired Water Heaters, Volume III, Storage water heaters with input ratings above 75,000 Btu per hour, circulating and instantaneous) and 2) appliances certified to ANSI Z21.13 / CSA 4.9 (Gas-fired low pressure steam and hot water boilers) insulating in unconditioned space is required for all vent piping. Insulation should also be considered for inlet piping near the outside wall to prevent pipe condensation (See Figure 2). Insulation must have an R value sufficient to prevent freezing of condensate. Consult with the insulation manufacturer for compatibility of insulation with System1738 pipe and fittings.
- (d) THE FOLLOWING RECOMMENDATIONS ARE NOT TO SUPERSEDE LOCAL BUILDING CODE REQUIREMENTS.
- Clothes Dryer Clearances for Side wall Terminations:**
Domestic Type Clothes Dryers (Type 1):
 A moisture-exhaust duct from a domestic type clothes dryer shall not terminate within 3 feet in any direction of any System1738 pressure regulator vent termination or fresh air intake.
- Commercial Type Clothes Dryers (Type 2):**
 A dryer shall be connected to a metal moisture-exhaust duct that terminates outdoors and shall not be less than 3 feet from any System1738 pressure regulator vent terminations and not less than 10 feet from a fresh-air intake.

Figure 1
Top View: Typical Wall Snorkel Termination

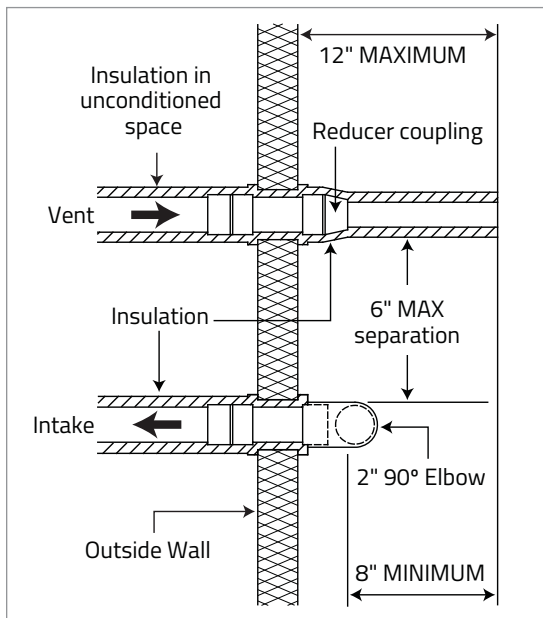
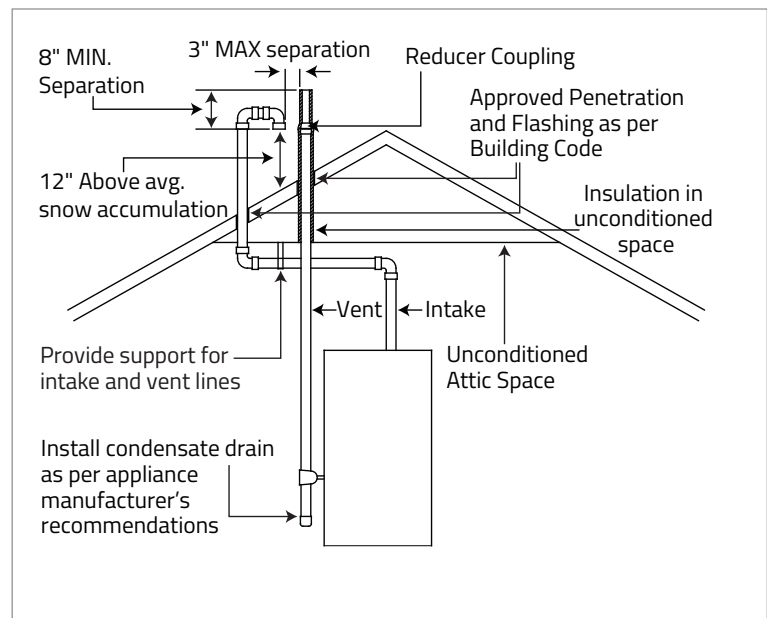


Figure 2
Typical Roof Snorkel Termination



Side Wall Terminations

Snorkel termination:

- (a) The runs of intake and vent pipes for terminations in general should be installed as close together as possible. A sidewall penetration shall maintain a 6" maximum separation (see Figure 3)
- (b) For wall penetrations, the vent should be straight out or elevated (see Figure 4).
- (c) On wall terminations intake piping should point straight down through the use of one 90° elbow. (see Figure 4).
- (d) The termination of the fresh air intake through the wall should be such that the bottom of the 90° elbow must be at a level of at least 12 inches above the expected height of snow accumulation (see Figure 4).
- (e) A reducer may be used on the vent termination to increase the velocities of the exiting gases away from the intake (see Figures 3 & 4). Do not direct exhaust to window wells, alcoves or stairwells.
- (f) The exit points of gas venting pipe must not be less than 3 ft. from an opening into another building.

Figure 3
Top View: Typical Wall Snorkel Termination

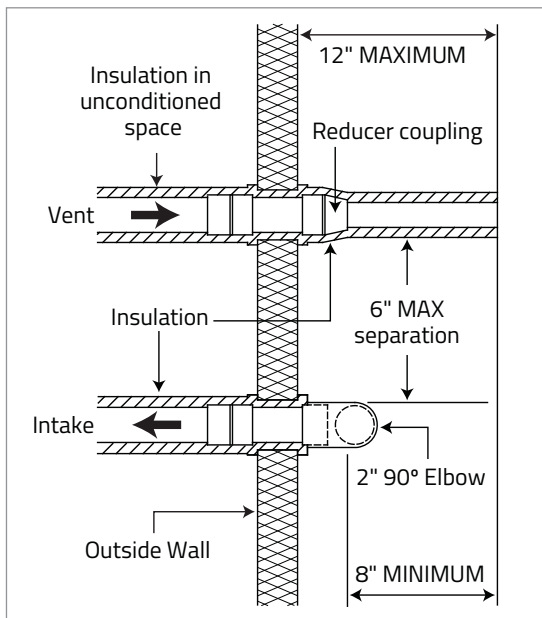
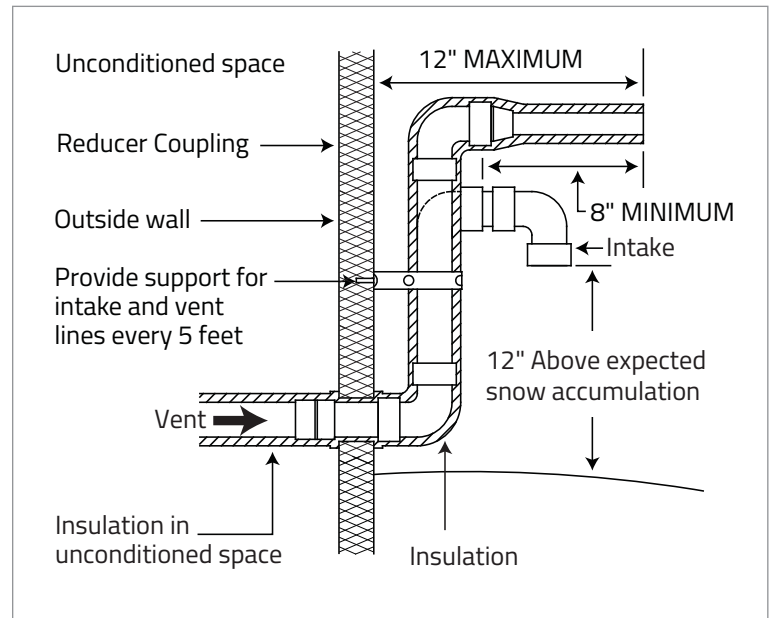


Figure 4
Side View: Typical Wall Snorkel Termination



Low Profile and Concentric Termination:

- (a) The use of the low profile or concentric vent termination kit must be specified for use as a termination option in the appliance manufacturer's installation manual.
- (e) Reference the Low Profile Side Wall and Concentric Vent Termination Kit section of this guide for full installation instructions of these termination options.

Low Profile Termination

- (a) Ensure the termination is properly oriented as shown in Figure 5.
- (b) Maintain minimum clearance requirements as shown in Figure 6.

Concentric Vent Termination

- (a) Maintain minimum clearance requirements as shown in Figure 7.

Figure 5: Low Profile Termination
- Approved Installation Orientation

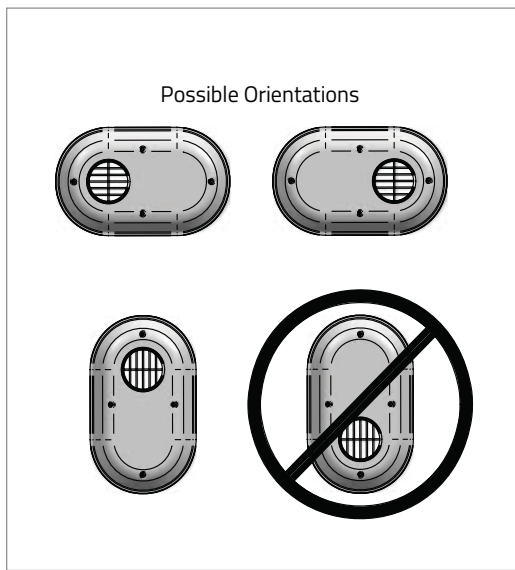


Figure 6: Typical Low Profile Termination

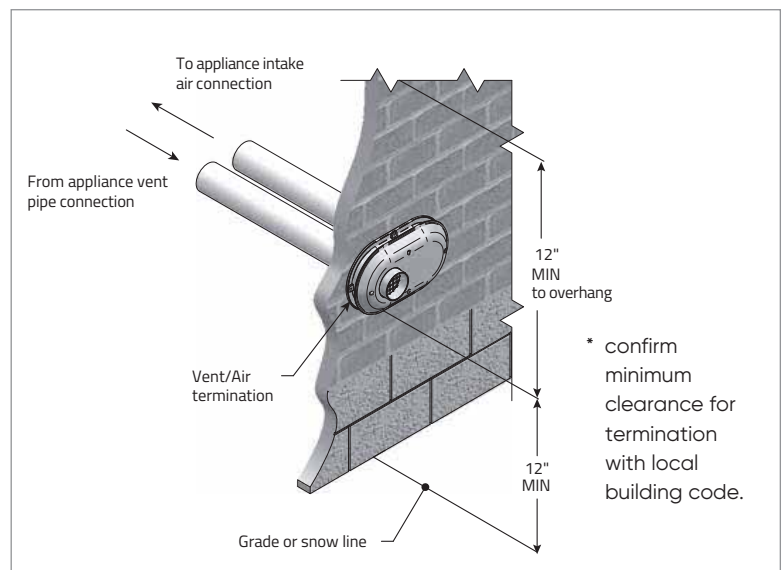
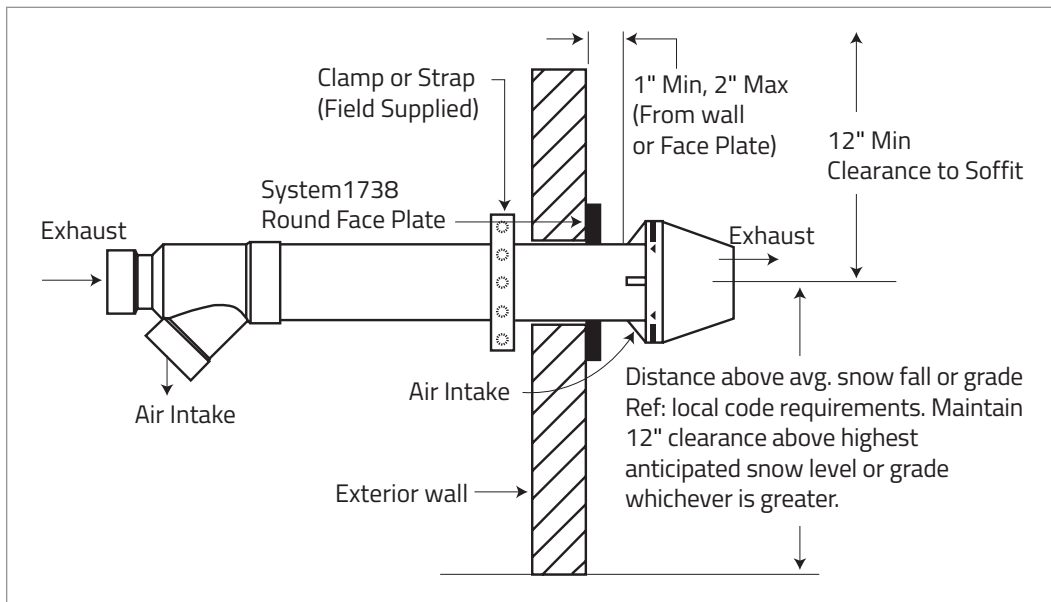


Figure 7: Typical Concentric Vent Side Wall Termination



Pitched Roof Terminations

Snorkel and concentric termination:

- (a) In accordance with the requirements of the 2018 edition of the NFPA 54/ANSI Z223.1 National Fuel Gas Code, gas vents that are 12 inches or less in size and located not less than 8 ft from a vertical wall or similar obstruction shall terminate above the roof in accordance with Figure 9 and Table 1.
- (b) Snorkel and Concentric Vent Roof termination clearances shall be installed in accordance with the requirements in Figures 8 & 9.
- (c) To avoid recirculation of exhaust gas on roof snorkel terminations, the end of the vent pipe must be higher than the intake pipe. The minimum vertical separation between the end of the vent pipe and the end of the intake pipe is 8 inches (see Figure 8).
- (d) The run of intake and vent pipes for a snorkel termination in general should be installed as close together as possible. Roof penetration shall maintain a 3" maximum separation (see Figure 8)
- (e) Terminate the vent piping of a snorkel termination straight up when through a chimney or fortified penetrations (see Figure 8).
- (f) Intake piping of a snorkel termination through the roof must be directed straight down through the use of two 90° elbows (see Figure 8).
- (g) Reference the Concentric Vent Termination Kit section of this guide for full installation instructions of this termination option.

Figure 8:
Typical Pitched Roof Snorkel Termination

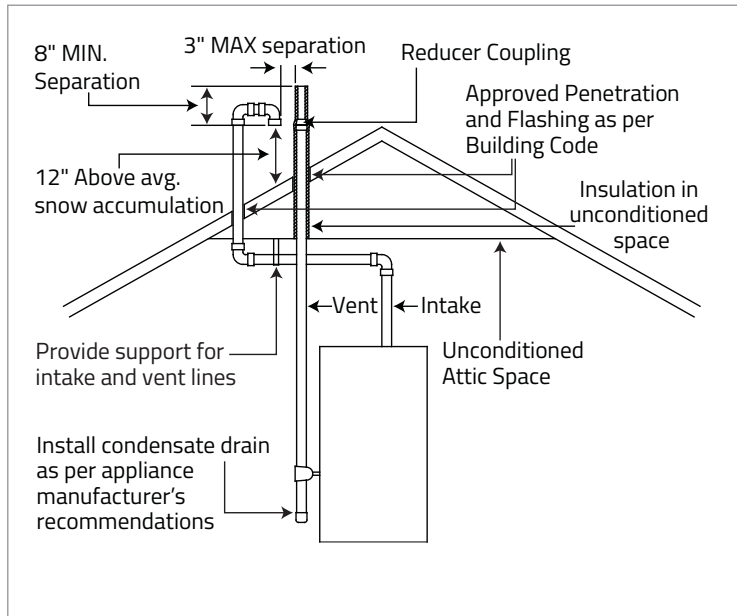


Figure 9:
Typical Pitched Roof Concentric Vent Termination

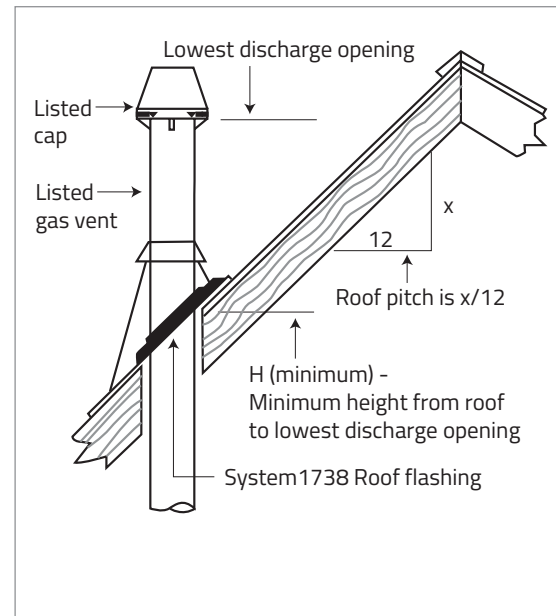


TABLE 1

Roof Slope	H (minimum) ft	Roof Slope	H (minimum) ft	Roof Slope	H (minimum) ft
Flat to 6/12	1.0	Over 9/12 to 10/12	2.5	Over 14/12 to 16/12	6.0
Over 6/12 to 7/12	1.25	Over 10/12 to 11/12	3.25	Over 16/12 to 18/12	7.0
Over 7/12 to 8/12	1.5	Over 11/12 to 12/12	4.0	Over 18/12 to 20/12	7.5
Over 8/12 to 9/12	2.0	Over 12/12 to 14/12	5.0	Over 20/12 to 21/12	8.0

Flat Roof Terminations

- (i) **Snorkel termination:** On flat roof installations the air intake and the exhaust vent terminations must be a minimum of 24 inches above any parapet, vertical wall or structure within 10 feet horizontally. (see Figure 10)
- (ii) **Concentric Vent Kit termination:** When installing a concentric termination vertically through a flat roof, the termination's vent cap must be a minimum of 10 feet away from any parapet, vertical wall or structure. (see Figure 11)

These minimum code requirements are not appliance specific. Appliance manufacturers may supply clearance requirements specific to each appliance. In this case, the appliance manufacturers' requirements if more stringent shall supersede these described herein.

The information above is in accordance with the requirements of the 2018 edition of the NFPA 54 / ANSI Z223.1 National Fuel Gas Code. These requirements shall always be superseded by requirements in latest edition of the code.

Figure 10: Flat Roof Snorkel Termination

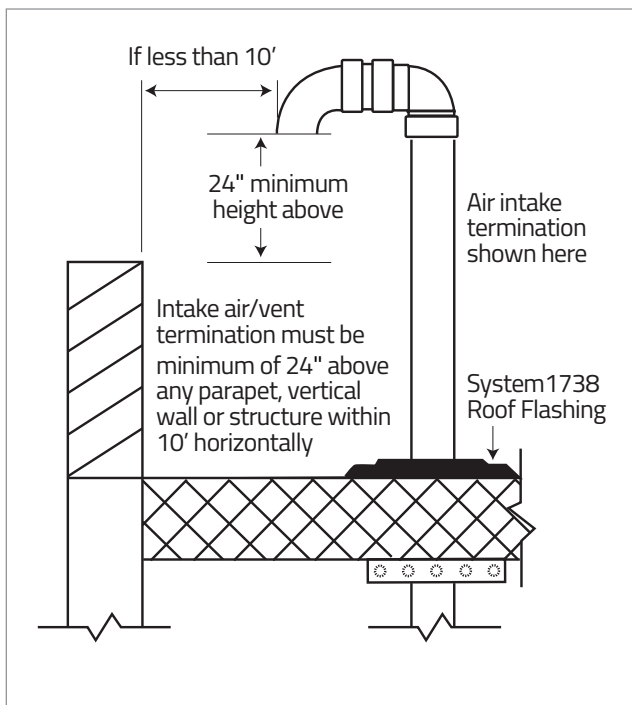
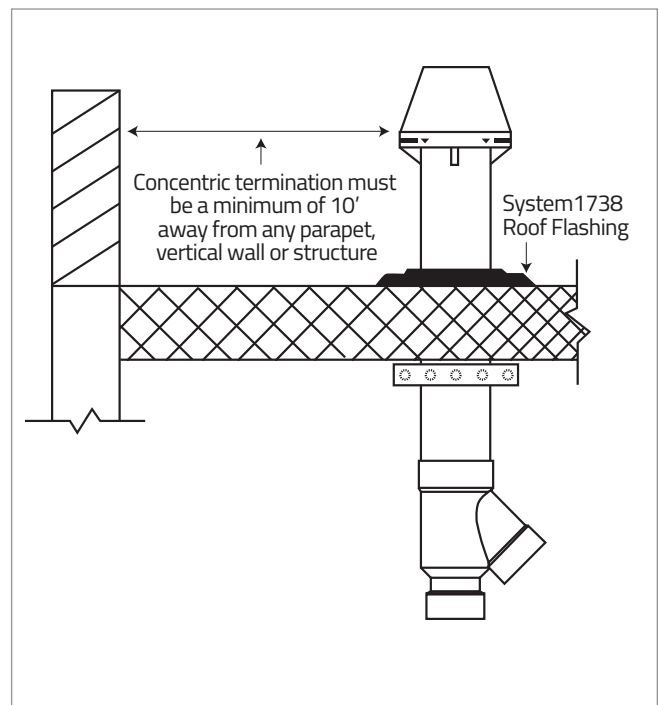


Figure 11: Concentric Vent Flat Roof Snorkel Termination

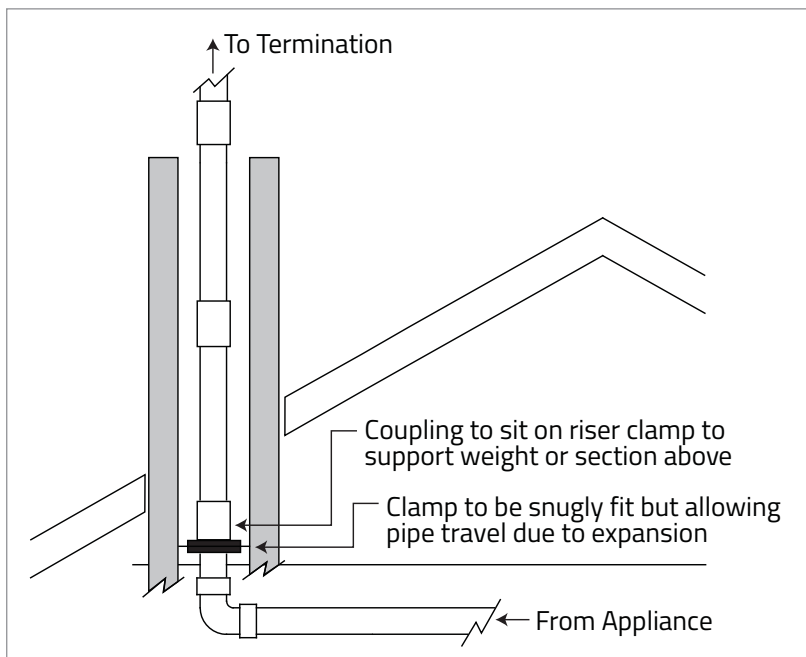


Chimney Terminations

If System1738 piping is installed through an existing unused chimney space, installers shall adhere to the following guidelines when doing such installations:

- (a) Vent pipe sizing to be as per appliance manufacturers' instructions or appliance manufacturer's technical manual.
- (b) NO existing non-certified vent piping shall be used or re-used for venting. They shall all be replaced with System1738 as required.
- (c) The chimney space shall be cleaned prior to installation to remove any debris, creosote, or other material.
- (d) All recommended practices for solvent welding must be observed in the same manner as regular System1738 installations. Refer to solvent welding basic principles and installation steps within this guide.
- (e) Multiple vent pipes are permitted in one chimney space as limited by the interior available cross-sectional area. Zero clearance is permitted between multiples runs of System1738 piping or other combustibles. (see Figure 12).
- (f) Fresh air intakes may also be installed within existing unused chimney spaces providing acceptable spacing and clearance is obtained at the termination as per appliance manufacturer requirements.
- (g) Vertical piping through the chimney space or any other vertical spaces exceeding 20 feet is to be structurally supported by use of a pipe coupling installed immediately above and sitting upon a snugly fit pipe clamp. One of these pipe coupling and pipe clamp combinations is to be installed at the entrance of the chimney space to support the pipe weight. The clamp at the entrance of the chimney is to be rigidly fixed against the wall or floor (see Figure 12). Should the pipe run exceed 60 feet inside the chimney space, please contact IPEX for further requirements.
- (h) It is recommended to install an air-tight seal as required at the chimney exit to prevent entry of water, snow, moisture or cold air.

Figure 12: Chimney Termination



Support and Restraint Spacing

- (a) System1738 PVC systems must be supported horizontally at a maximum of every 5 feet.
- (b) Supports to be used on System1738 pipe shall be suitable for use on plastic pipe and shall not be tightly clamped onto the pipe to allow for possible expansion/contraction movement. Pipe clamps, hangers, metal strapping or equivalent shall not have sharp edges or fulcrum points which might damage the System1738 pipe over time.

Strapping shall meet the following requirements

- 1/2" strapping - 22 gauge steel
- 3/4" strapping - 28 gauge steel

Strapping or equivalent shall be fixed to supporting structure (e.g. floor joists or cross members) using typical framing nails or screws.

- (c) Changes in direction (e.g. 90° elbows) should be supported as close as practical to the fitting to avoid introducing excessive torsional stresses into the system. This is especially important for vertical 90° bends. If support is being applied to the fitting, then the fitting must be free to move during expansion and contraction of the venting system.
- (d) In order to adequately support the weight of vertical vent pipe, a pipe anchor or support shall be installed at the first floor penetration and every second floor thereafter with a System1738 coupling installed immediately above it. Securely fasten pipe anchors or supports to the building structure. Pipe anchors or supports used for this purpose shall be suitable for use with plastic pipe. These anchors or supports shall be snugly fastened to the vent in order to support the weight of the vent, but shall not be allowed to deform or damage the vent. Anchors or supports supporting the weight of the vertical vent shall be in addition to the required pipe straps referred to in (a), (b) and (c) above which are intended only to maintain the position of the vertical vent while allowing for expansion and contraction. Make certain that allowance for expansion and contraction is provided in all venting installations.

Expansion and Contraction

To accommodate expansion/contraction movement and stresses that may occur, IPEX suggests the following guidelines during installation:

1. Leave adequate clearance between any System1738 elbows and walls or the underside of floor boards or joists.
2. Use loose fitting clamps and hangers to allow free pipe movement if required.
3. For critical areas such as near the appliance outlet, two 45° elbows may be used in lieu of one 90° elbows for more structural flexibility.

TABLE 2 – PVC Linear Expansion (ΔL) in inches

Temp. change	Length of Run (ft)				
	PVC				
(°F)	10	20	30	40	50
10	0.04	0.07	0.11	0.14	0.18
20	0.07	0.14	0.22	0.29	0.36
30	0.11	0.22	0.32	0.43	0.54
40	0.14	0.29	0.43	0.58	0.72
50	0.18	0.36	0.54	0.72	0.90
60	0.22	0.43	0.65	0.86	1.08
70	0.25	0.50	0.76	1.01	1.26
80	0.29	0.58	0.86	1.15	1.44
90	0.32	0.65	0.97	1.30	1.62
100	0.36	0.72	1.08	1.44	1.80

Firestops

Should System1738 pass through a fire rated floor or wall, the penetration shall be firestopped with a device or system that provides a rating equivalent to the hour rating of the floor or wall.

Appliance Testing

Should the appliance not be equipped with an access port for flue gas testing, IPEX recommends the use of a System1738 Access Tee during installation to allow access for flue gas testing. The Access Tee has a 1/2" female thread outlet with a removable 1/2" male thread plug. Each time the plug is assembled into place, it shall have two wraps of PTFE (Teflon®) tape applied to the bare male threads. The Access Tee shall be installed as close to the appliance as possible. DO NOT drill holes in piping.

Vent Connection to the Appliance

Please refer to the appliance manual for instructions to connect System1738 to the appliance exhaust and intake collar. DO NOT use screws to join System1738 to the appliance.

Handling and Storage of System1738 Pipe and Fittings

- a) The PVC materials used in System1738 piping are strong and lightweight materials. Care shall be taken in handling and storage to prevent damage to the pipe.

System1738 pipe shall be given adequate support at all times. It should not be stacked in large piles, especially in warm temperature conditions, as bottom pipe may become distorted and joining will become difficult.

For long-term storage, pipe racks shall be used, providing continuous support along the length. If this is not possible, timber supports of at least 3 inch bearing width, at spacings not greater than 3 foot centers, shall be placed beneath the piping. If the stacks are rectangular, twice the spacing at the sides is required. Pipe shall not be stored more than seven layers high in racks. If different classes of pipe are kept in the same rack, pipe with the thickest walls shall always be at the bottom. There shall be NO sharp corners on metal racks.

For temporary storage in the field when racks are not provided, care should be taken that the ground is level and free of sharp objects (i.e. loose stones, etc.). Pipe shall be stacked to reduce movement, but shall not exceed three to four layers high.

Since the soundness of any joint depends on the condition of the pipe end, care should be taken in transit, handling and storage to avoid damage to these ends. Care should be taken when unloading and handling pipe in cold weather. Dropping pipe from a truck or forklift may cause damage. Methods and techniques normally used in warm weather may not be acceptable at the lower temperature range.

NOTICE

The impact resistance and flexibility of System1738 piping are reduced as temperatures approach 32°F (0°C) and below.

When loading pipe onto vehicles, care shall be taken to avoid contact with any sharp corners (i.e. angle irons, nail heads, etc.), as the pipe may be damaged.

While in transit, pipe shall be well secured and supported over the entire length and should never project unsecured from the back of a trailer.

- (b) Prolonged Outdoor Exposure

Prolonged exposure of System1738 pipe to the direct rays of the sun will not damage the pipe. However, some mild discoloration may take place on the exposed surfaces.

- (c) Protection – Covering

System1738 PVC pipes are packaged in crates and wrapped in protective plastic film, which protects from UV and keeps the pipe clean. Discoloration of exposed pipe can be avoided by shading it from the direct rays of the sun. This can be accomplished by covering the stockpile or the crated pipe with a light colored opaque material such as canvas. If the pipe is covered, always allow for the circulation of air through the pipe to avoid heat buildup in hot summer weather. Make sure that the pipe is not stored close to sources of heat such as boilers, steam lines, engine exhaust outlets, etc.

- (d) If painted, only latex/waterbase paint shall be used and all product markings must be either visible or accessible for visual inspection.

NOTE: Apply masking tape over product markings prior to painting. The ability to pull-back on the masking tape will allow for future inspection.

Handling and Storage of System1738 Cement and Primer

Store System1738 cement and primer in the shade between 40°F (4°C) and 110°F (43°C) or as specified on label. Keep away from heat, spark, open flame and other sources of ignition such as electronic vapor cigarettes. Secure container lid tightly when not in use to prevent escape of solvent vapors. If the unopened container is subjected to freezing, it may become extremely thick or gelled. This cement can be placed in a warm area, where after a period of time, it will return to its original, usable condition. However, it will not be the case if gelatin has taken place because of actual solvent loss - for example, if the container was left open too long during use or not properly sealed after use. Cement in this condition should not be used and should be properly disposed of per Local Jurisdiction requirements.

IPEX solvent cements are formulated to be used "as received" in original containers. Adding thinners or primers to change viscosity is strictly prohibited. If the cement is found to be jelly-like and not free flowing, it should not be used.

Solvent Welding

WARNING

DANGER: Highly flammable liquid and vapor may form explosive peroxide. Carefully follow guidelines below.

Safety Precautions

Solvent cements and primers for System1738 pipe and fittings are flammable and shall not be used or stored near heat, spark, open flames and other sources of ignition. Vapors may ignite explosively. Keep containers closed when not in use and covered as much as possible when in use.

Use in well ventilated area. Keep away from heat, sparks, open flames, hot surfaces, and other ignition sources. Take action to prevent static discharges. Use explosion proof equipment. Use non-sparking tools. **If confined or partially enclosed, use forced ventilation or NIOSH-approved respirator.** Avoid breathing vapors. If airborne concentrations exceed those limits, use of NIOSH-approved organic vapor cartridge with full face piece is recommended. The effectiveness of an air purifying respirator is limited. Use it only for a single, short term exposure. For emergency and other conditions where short-term exposure guidelines may be exceeded, use an approved positive pressure self-contained breathing apparatus. Do not smoke, eat or drink while using these products. Avoid contact with skin, eyes and clothing. Wash clothing if contaminated before re-use. May cause eye injury. Protective equipment such as gloves, goggles and an impervious apron shall be used. **KEEP OUT OF REACH OF CHILDREN.** Carefully read our instructions on the cement and primer can label, precautions and instructions in this guide, and the MSDS sheets found at system1738.com.

First Aid

- Inhalation:** If feeling illness from inhalation, person should be moved to a source of fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
- Eye Contact:** Remove contact lenses if present, flush eyes with plenty of water for 15 minutes and get medical attention.
- Skin Contact:** Wash skin with plenty of soap and water for at least 15 minutes. If irritation develops, get medical attention.
- Ingestion:** If swallowed, consume 1 to 2 glasses of water or milk, **DO NOT INDUCE VOMITING.** Get medical attention.

Use Caution with Welding Torches

At construction sites where System1738 is being installed or has recently been solvent welded, extreme caution should be taken when using welding torches or other equipment where sparks may be involved. Flammable vapors from welded joints sometimes linger within or around a piping system for some time.

Special care must be taken when using a welding torch around System1738 systems in areas with little or no air circulation. In all cases, solvent vapors must be removed by air circulation, purging, or other means prior to the use of welding torches, or other spark or flame generating equipment or procedures. This includes electronic sources of ignition such as electronic vapor cigarettes.

Solvent Welding Basics

⚠ WARNING

Installation of System1738 for the application of flue gas venting requires a certain degree of skill to avoid joint failures which could be life threatening. Creating optimal solvent welded connections requires attention to detail, proper preparation of components and an understanding of all instructions in this guide. On-site training is available from IPEX for proper solvent welding procedures as well as other important installation points. Contact IPEX for details.

- (a) DO NOT use solvents or cements other than what is required by this guide.
- (b) Before the use of cement and or primer, shake the can thoroughly to ensure complete mixture of container content
- (c) Dry fit all joints prior to solvent welding to confirm proper interference fit
- (d) Discard fitting joints without proper interference fit
- (e) DO NOT solvent weld joints that are too loose or too tight
- (f) DO NOT solvent weld joints without first beveling pipe ends
- (g) For assembly of System1738 PVC piping, System1738 PVC (auburn color) cement must be used.
- (h) Primer must be used for all installations performed at temperatures 32°F (0°C) or less. Where primer is required (see Basic Principles of Solvent Welding in this guide), System1738 brand primer must be used.
- (i) Assembly of pipe and fittings must be made while the surfaces are still wet and cement is still fluid
- (j) Joint strength develops as the cement dries. The tight part of the joint the surfaces will tend to fuse together; in the loose part, the cement will bond to both surfaces

NOTE: Some appliance manufacturers furnish adapter fittings which are PVC but black in color. Check with the appliance manufacturer as to whether these fittings are ABS or PVC before selecting a solvent cement.

- (k) Where transitions to ABS are necessary, only System1738 Transition Cement shall be used
- (l) FOLLOW ALL solvent welding instructions provided in this guide and on each can label of the selected solvent welding product
- (m) FOLLOW ALL System1738 installation instructions

Cement Shelf Life

Cement and primers shall be used prior to the expiration date or within 3 years of the date stated on the bottom of the can. To determine the age of System1738 cement and primer, refer to the bottom of the container where the Date of Manufacture, Expiry Date, or both will be displayed.

Estimated Quantity of Solvent Cement

Average Number of Joints/Qt. of IPEX System1738 Cement*

Pipe Diameter (inches)	2	3	4
Number of Joints	60	40	30

For the same number of joints if primer is used, one pint of primer will be required for each quart of cement used.

*These figures are estimates based on our laboratory tests. Due to the many variables in the field, these figures should be used as a general guide only.

System1738 Solvent Weld Appliance Service Time

⚠ WARNING

During the curing of the solvent welded joints, vapors may accumulate inside the piping system, especially should one end of the line be capped. Nearby sparks from welders or torches may inadvertently ignite these vapors and create a hazardous incident. Attention must be given to removing all vapors using air-blowers or water flushing prior to capping one end of an empty piping system.

Newly assembled joints require a certain amount of time to lapse prior to being placed into appliance service. "Appliance Service Time" is the time required to expire from when the joint is made to the time it is placed into service. Newly assembled joints need to be handled with care during this time. ALL VERTICAL ASSEMBLIES shall be fully supported during this period.

⚠ CAUTION

Average Appliance Service Time is for flue gas venting applications only.

** These figures are estimates based on testing done under laboratory conditions. Field working conditions can vary significantly. This chart should be used as a general reference only.

Average Appliance Service Time	
Temperature Range °F (Fahrenheit)	Joint Size 2" to 4"
60 - 105	30 min
40 - 60	2 hr
3 - 40	12 hr

Note - In damp or humid conditions above 60% relative humidity, allow at least 50% more set time.

NOTE: THE AVERAGE APPLIANCE SERVICE TIME SCHEDULE IS APPLICABLE IF THE FOLLOWING CONDITIONS HAVE BEEN MET:

1. All joints have been made per requirements of this guide
2. All joints pass the 1/2 to 2/3 interference dry fit test
3. Vertical weight loads (i.e. pipe) with freshly made joints, need to be fully supported during the Appliance Service time
4. The Appliance Service times for various ambient temperatures are to be followed (as indicated in the Average Appliance Service Time Schedule above)

Cold Weather Solvent Welding

– Below 50°F (10°C)

1. Prefabricate as much of the system as possible in a heated area
2. Store System1738 primer and solvent cement in a warm location above 40°F (4°C) when not in use and make certain cement remains fluid
3. Take special care to remove moisture including snow and ice from the surfaces being joined including pipe ends and fitting sockets
4. Ensure that the pipe, fittings and accessories are at the same temperature prior to solvent welding
5. Ensure the surfaces are softened before joining. Check for proper softening of surfaces and correct amount of cement on a sample pipe. Surfaces are sufficiently softened when scraping a blade on the treated part results in the effortless removal of a thin layer of the base material
6. Colder weather requires longer set and cure times. Refer to the System1738 Solvent Weld Cure Times section of this guide for required cure schedules before moving joints. A heating blanket may be used to speed up the cure times

Hot Weather Solvent Welding

– Above 86°F (30°C)

1. Store System1738 primer and solvent cement in a cool or shaded area prior to use
2. Store pipe and fittings in a shaded area prior to solvent welding
3. Cool surfaces to be joined with a clean, damp rag. Be sure the surface is dry prior to solvent welding
4. Consider solvent welding joints in the cooler morning hours
5. Make sure both surfaces to be joined are still wet with solvent cement when joining them together
6. Vigorously stir or shake the System1738 solvent cement before use

As the solvent dissipates, the solvent cement layer and the dissolved surfaces will dry and harden with a corresponding increase in joint strength. Completed joints must be handled with extreme care until the average appliance service time has expired. See the Average Appliance Service Time Schedule table in the System1738 Solvent Weld section for details.

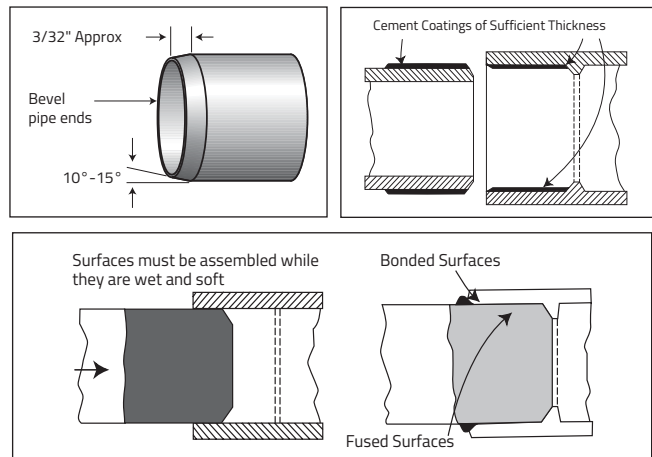
Joint strength continues to develop as the solvent cement dries.

NOTICE

DO NOT use excessive amounts of primer or solvent cement. Too much primer or solvent cement can lead to puddling in the pipe and fittings which can result in product failures and property damage. Always follow the instructions provided with each can of System1738 primer and/or solvent cement.

Surface Interaction in Solvent Welded Joint

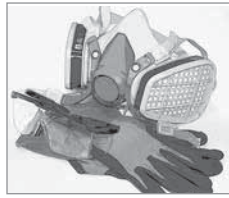
Sufficient cement must be applied to fill the gap in the loose part of the joint. Besides filling the gap, adequate solvent cement layers will penetrate the surfaces and must remain wet until the joint is assembled. If the solvent cement coatings on the pipe and fittings are wet and fluid when assembly takes place, they will tend to flow together and become one solvent cement layer. Also, if the solvent cement is wet, the surfaces beneath them will still be soft, and these dissolved surfaces in the tight part of the joint will fuse together.



Solvent Welding Preparation Guidelines

1) ASSEMBLE

Before beginning, assemble proper materials for the job: (System1738 cement and primer (if required), appropriate applicator for the size of pipe and fittings to be assembled, tape measure, contrasting color marker and Reed DEB4 beveling tool).



⚠ CAUTION

Use proper Personal Protective Equipment (PPE) for the job: respirator, safety glasses, gloves and protective clothing.

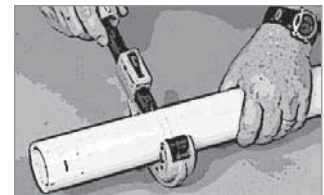
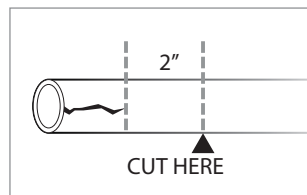
2) MARKING THE CUT

Measure the fitting socket depth and mark the outside of the pipe with this dimension followed by a second mark 1 inch further back. The first line will provide a guide for ensuring enough solvent cement is applied on the pipe. Maintaining a 1 inch distance to the second line once the pipe is inserted into the fitting socket will indicate full and proper insertion of the pipe inside the fitting socket.



3) CUTTING THE PIPE

It is important to cut the pipe squarely. A square cut provides the surface of the pipe with the maximum bonding area. Pipe can be easily cut with a wheel-type plastic tubing cutter, chop saw or fine toothed saw. Do not use reciprocating saws. Tools used to cut pipe must be designed for System1738 piping and must be in good condition in accordance with the tool manufacturer's recommendations. If there is any indication of pipe damage or evidence of pipe end cracking, cut off at least 2 inches beyond any visible crack. Use of ratchet cutters is not recommended as they may split the pipe if not properly used and maintained.

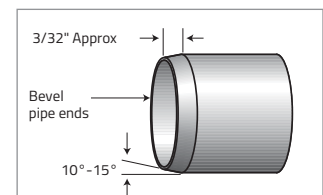
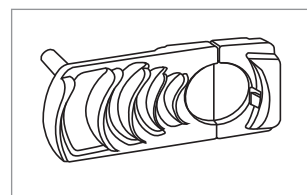


NOTICE

Chop saws will produce shavings inside the pipe which must be removed. Failure to do so may compromise the performance of the appliance and venting system.

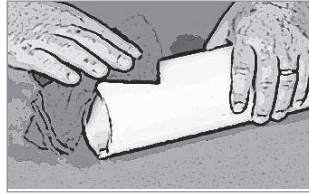
4) PREPARING PIPE ENDS

After cutting, always remove all burrs and filings from both the inside and outside of the pipe and bevel the pipe end using a Reed DEB4 beveling tool. Remove burrs and filings from the inside of the pipe using a knife edge or file. Failure to remove burrs can scrape channels into pre-softened surfaces, create obstructions inside surface walls, or inadvertently plow cement out of the joint during assembly.



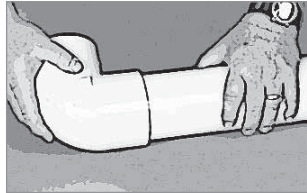
5) CLEANING

Using a clean dry cloth, wipe any dirt and moisture from the fitting socket and the pipe end. Moisture will increase cure times and dirt and grease can prevent adhesion.



6) DRY FITTING

Before applying primer or solvent cement, test all connections (pipe, fittings and accessories) to confirm a proper interference fit exists. Dry-fit contact between properly beveled pipe and fitting sockets is essential in making a good joint. The beveled pipe should easily enter the fitting socket and make contact with the inner fitting socket wall before bottoming out in a dry fit. A proper interference fit is present when the beveled pipe can only be inserted 1/3 to 2/3 of the way into the fitting socket.

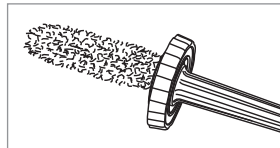


⚠ CAUTION

DO NOT SOLVENT WELD PIPE, FITTINGS OR ACCESSORIES THAT FIT LOOSELY TOGETHER OR WHERE PIPE BOTTOMS OUT IN A DRY FIT. Proper joint strength cannot be developed. Do not solvent weld pipe, fittings or accessories if a beveled pipe cannot easily be inserted at least 1/3 of the way into the fitting socket. This may cause excessive stresses during assembly leading to joint failure.

7) APPLICATOR SIZE

Use the proper size cement and primer applicator for the size of pipe or fittings being joined. As a general guide, the cement applicator size should be approximately 1/2 of the pipe diameter. It is important that a satisfactory size applicator be used to help ensure that sufficient layers of cement are applied.



Priming Guidelines

NOTICE

System 1738 primer is mandatory for installation temperatures at or below 32°F (0°C).

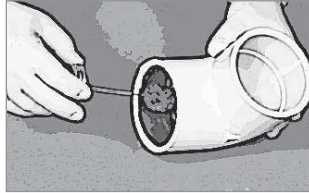
- 8)** Using the correct applicator (as outlined in step #8), aggressively work the primer into fitting socket, keeping the surface and applicator wet until the surface has been softened.
- 9)** Aggressively work the primer on to the end of the pipe to a point 1/2" beyond the depth of the fitting socket.
- 10)** A second application of primer in the fitting socket is required.
- 11)** Immediately and while the surfaces are still wet, apply the appropriate System1738 cement using the solvent welding guidelines that follow.

Solvent Welding Guidelines

12) Vigorously shake the System1738 cement can before using. If the cement is jelled, replace with a new can.

13) Using the proper size applicator for the pipe size as outlined in #7, aggressively work a full even layer of cement on to the pipe end equal to the depth of the fitting socket - do not brush it out to a thin paint type layer, as it will dry too quickly.

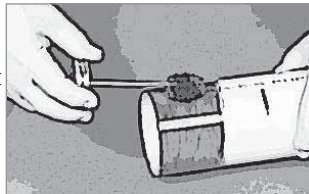
14) Aggressively work a medium layer of cement into the fitting socket. Avoid puddling cement in the socket by holding the fitting on an angle.



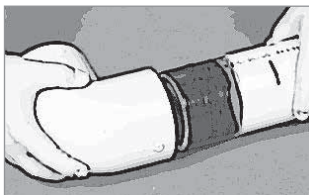
NOTICE

Excessive cement may cause the fitting to weaken due to softening by the trapped solvents.

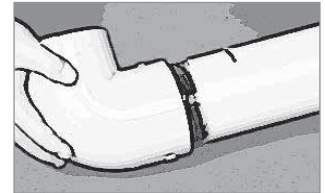
15) Apply a second full, even layer of cement on the pipe. Apply enough solvent cement to completely fill all the gaps between the pipe and fitting at socket entrance.



16) Without delay, while the solvent cement is still wet, assemble the pipe and fitting.



17) Hold the pipe and fitting together for approximately 30 seconds to resist pushout due to tapered sockets. Higher potential for pushout exists in colder weather installations. If pushout does occur, the joint will need to be replaced.



18) A bead of solvent cement must be formed around the entire socket fitting entrance. With a clean, dry cloth, remove the excess solvent cement from the pipe and fitting socket entrance. This will allow the solvent to evaporate from within the joint and prevent weakening of the pipe.



19) Gently handle newly assembled joints carefully until the appliance service time has expired. Follow System1738 Appliance Service Time Schedule outlined in this guide.

CAUTION

The average joint hold time when solvent welding is 30 seconds but can vary depending on installation temperatures and humidity as indicated in the Average Appliance Service Time Schedule in this guide. Reference Step #2 of the Solvent Welding Preparation Guidelines and Step #17 of the Solvent Welding Guidelines. For directions on determining how to mark the pipe, the proper amount of hold time and evaluating pushout.

System Repair

Inspect pipe for any damage such as cracking and deep gouges. Locate the end of any pipe cracks and be sure to cut at least 2" beyond the crack line to ensure it is removed.

Carefully inspect any fittings for damage and remove and replace them accordingly.

Repairs can be made by solvent welding new sections of pipe and fittings. Follow all the solvent welding instruction within this guide. However, installation conditions during a repair vary greatly when compared to a new installation. Repairs or cut-ins to an existing system are typically done in confined spaces, on closed end piping systems, and often have more humidity present. All of these factors can inhibit the evaporation of the solvent leading to increased set and cure times. As such, IPEX recommends that the standard set and cure times be increased by 50% for repairs or cut-ins. Refer to set and cure tables in this guide.

CAUTION

When modifying or repairing aged PVC pipe, use only wheel cutters or fine tooth saws that are new and sharp. DO NOT use ratchet style cutters.

Maintenance

IPEX recommends that the System1738 Flue Gas Venting system be checked at least once per year by a licensed Plumbing or HVAC service technician. This can be done during any regular maintenance activities as required for the heating appliance or any other time.

Vent Replacement

IPEX recommends the vent piping system be replaced each time the heating appliance is replaced.

Warranty

A 10-year warranty is provided with System 1738 Flue Gas Venting System when installed in accordance with the guidelines herein. Please reference our website at system1738.com.

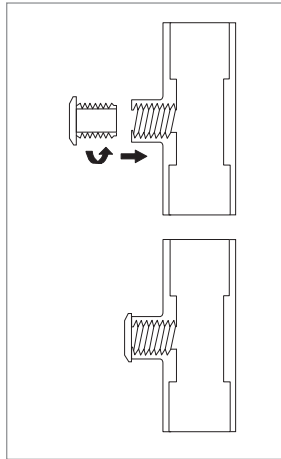
Training

IPEX recommends that installers attend formal training on System1738 every 3 years to ensure proper installation methods are utilized at all times.

Accessory Installation Instructions

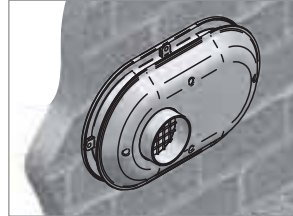
Access Tee

1. The access tee shall be installed on a vertical run of pipe to prevent the collection of condensate.
2. PVC Access Tees shall only be used on System1738 PVC venting systems. Do not mix pipe, fittings, cements, or joining methods from different Vent manufacturers. This can result in unsafe conditions and will void the certification and warranty.
3. Solvent cement the access tee into the piping system as per the Solvent Welding Guidelines instructions specified in this guide. Allow for the proper cure times referenced in this guide before proceeding to next step.
4. Apply two full turns of Teflon® Tape to the threaded portion of the 1/2" plug.
5. Hand thread and hand tighten the plug into the bushing. Take care not to cross thread the fittings.
6. Once hand tight, slowly turn the plug an additional one and a half (1.5) turns.
7. If the fittings appear to be damaged during threading, the entire assembly should be replaced. If the Teflon® Tape was unraveled during threading, the plug will need to be re-installed with new tape.
8. Repeat steps 4-7 every time the plug is removed ensuring to use new Teflon® Tape each time.



Low Profile Side Wall Termination Kit

Refer to the appliance manufacturer's installation instructions to ensure that the low profile side wall termination kit is permitted for use. The IPEX Low Profile side wall termination kit is fully certified for use with IPEX System1738 product only.



System1738 PVC Low Profile vent kits are made from a UL1738 certified PVC compound and are rated to a maximum temperature of 149°F.

The vent termination must maintain all termination clearances and be installed in accordance with local building code and NFPA 54 / ANSI Z223.1 National Fuel Gas Code. (see Figure 13)

TABLE 3 – Each Kit Contains:

Qty	Item Description
1	Base (two holes)
1	Cap (one hole)
8	Stainless Steel Screws
4	Plastic Anchors

Refer to Figure 15 for side wall termination assembly

TABLE 4 – Low Profile Termination Kits Dimensions

Item #	Flush Mount Vent Kit Size (inches)	Pipe O.D.	Hole Spacing (ctr to ctr)
397984	2	2.375"	5.6"
397985	3	3.5"	5.6"
397986	4	4.5"	5.6"

Installation Procedure

1. When locating the penetration of the vent and air pipe, ensure the termination is properly oriented as shown in Figure 14 and ensure that it maintains minimum clearance requirements as shown in Figure 13. For multiple vent terminations, ensure that a minimum clearance of 12 inches is maintained between edge of air inlet and adjacent vent outlet and that all vent pipes and air inlets terminate at the same height to avoid the recirculation of flue gases and the possibility of causing severe personal injury, death, or substantial property damage. (see Figure 16)
2. When installing the vent termination in a vertical configuration, ensure the vent piping is located above the air inlet piping. This will avoid the risk of flue gas products recirculating into the air inlet and building. (see Figure 14).

- Once the installer has determined the termination location, cut 2 holes in the wall large enough to accommodate the pipe. Pipe diameters and distance between hole centers can be found in Table 4.
- Slide both the intake and vent pipe through the holes. Solvent weld both pipes to the Base of the vent termination kit (see Figure 13) following the solvent welding procedures outlined in this guide.
- To fasten the Base to the wall, use the supplied screws and anchors. A 3/16" diameter x 1-3/16" deep hole, will need to be drilled for the anchors. Locate and mark the anchor hole using the Base as a template and then drill the required holes.
- Screw the Cap to the Base using the supplied screws.
- Once the vent termination and pipe are secured, the wall penetrations will need to be sealed from the interior using a PVC-compatible sealant material.

Figure 13: Typical Side Wall Termination

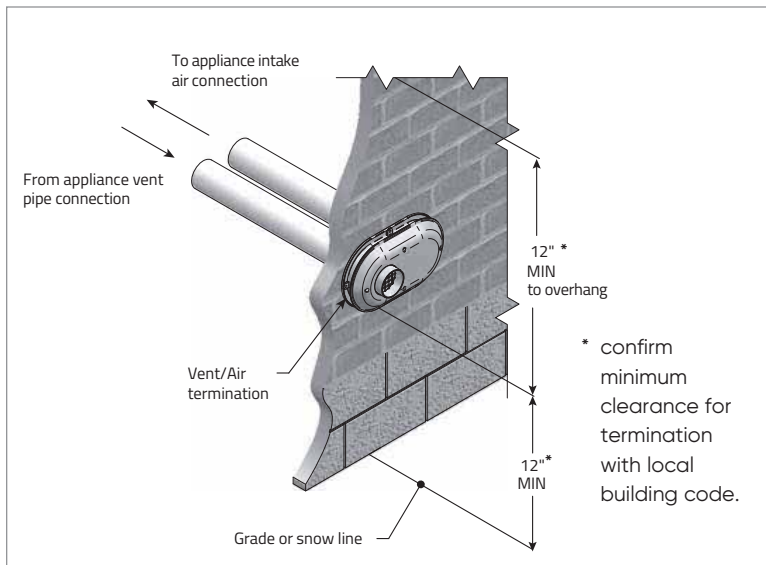


Figure 14: Approved Installation Orientation

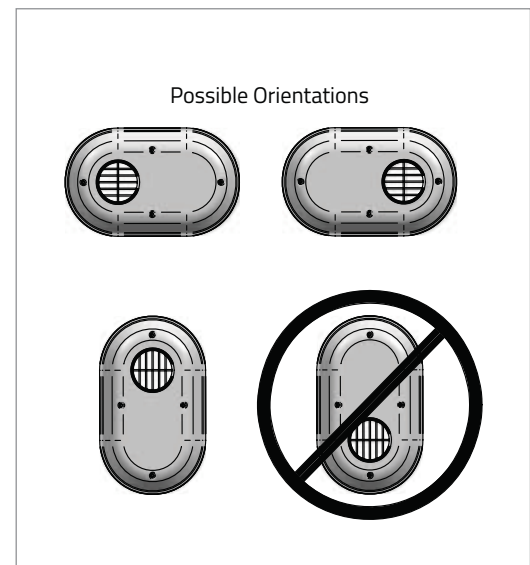


Figure 15: Sidewall Termination Assembly

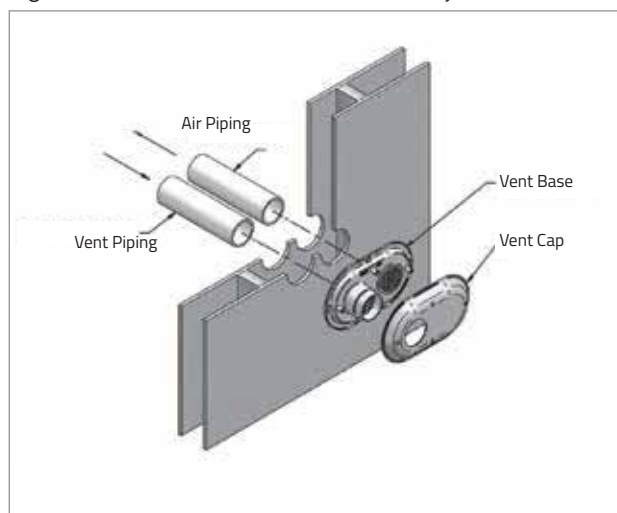
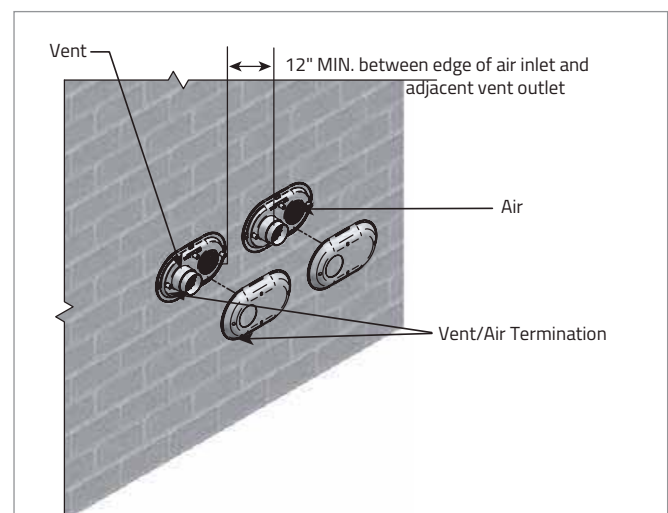


Figure 16: Minimum Clearances: Multiple Side Wall Terminations



Concentric Vent Termination Kit

⚠ WARNING

Do NOT mix pipe, fittings, cements, or joining methods from different manufacturers, this can result in unsafe conditions and will void the certification and the product warranty.

System1738 Pipe, Fittings, Termination Kits and Cements are certified as a system and must be installed as such.

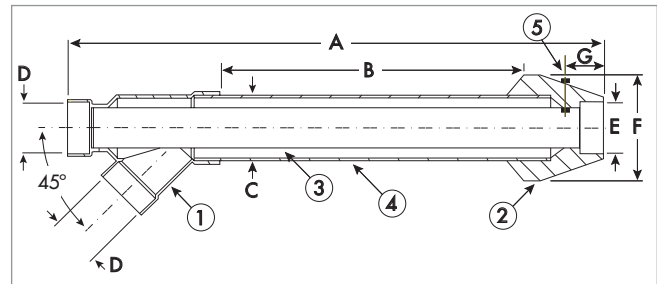
System1738 PVC concentric termination kits are made from a UL1738 certified PVC compound and are rated to a maximum temperature of 149°F.

All termination kits must be located and installed in accordance with the installation instructions found in this guide and with the local building code and NFPA 54 / ANSI Z223.1 National Fuel Gas Code.

Concentric Vent Kit Installation Considerations

1. Kits must be securely fastened to structure, to ensure clearance dimensions are maintained. Refer to Figures 17 - 20 for installation clearances in different installation scenarios.
2. Straps are field supplied. Use straps, clamps or equivalent that will not score or damage the pipe. Termination support must allow movement as a result of expansion and contraction.
3. All penetrations must be sealed according to local building codes. Caulking for side wall terminations and flashing for roof penetrations are typical. Use only PVC compatible sealing material. Contact the Sealant manufacturer for confirmation on compatibility with PVC.
4. The weight of the concentric kits must be supported by the clamps/straps and not by the vent system it connects to.

Figure 17



Each Kit Contains:

Item Description
Concentric Vent Wye
Exhaust Pipe
Intake Pipe
Rain Cap
Stainless Bolt and Locknut

5. Insulating exhaust piping in unconditioned space to prevent freezing may be required by the local building code.
6. The pipe length of the concentric vent kit can be shortened, provided that the cutting and welding procedures adhere to the System1738 guidelines outlined in this guide.

NOTE: THE PIPE LENGTH OF THE CONCENTRIC VENT KIT CANNOT BE LENGTHENED.
7. Pipe lengths and/or fittings shall NOT be solvent welded to the socket of the rain cap in order to divert or extend the exhaust gas, unless the appliance manufacture guidelines confirm that the extra length or the changing in direction will not adversely impact the flow of flue gas.

TABLE 5

Concentric Vent Termination Kits Include:			Dimension (Inches)						
Material	Concentric Kit	Item #	A	B*	C=	Nominal Pipe Size		F	G
						D	E		
PVC	2" x 16"	397005	29.0	16.5	3.5	2	2	7.38	1.75
PVC	2" x 28"	397105	41.0	28.0	3.5	2	2	7.38	1.75
PVC	2" x 40"	397125	53.0	40.0	3.5	2	2	7.38	1.75
PVC	3" x 20"	397006	36.1	20.0	4.5	3	3	8.75	2.25
PVC	3" x 32"	397106	48.1	32.0	4.5	3	3	8.75	2.25
PVC	3" x 44"	397116	60.1	44.0	4.5	3	3	8.75	2.25
PVC	4" x 36"	397021	56.0	37.3	6.62	4	4	10.00	3.50

- 1 Wye - (Concentric)
- 2 Rain Cap
- 3 Exhaust Vent Pipe (Inner)
- 4 Fresh Air Intake Pipe (Outer)
- 5 Stainless Steel Bolt & Nut

B* Dimension be may be shortened to a minimum of 12". Inner pipe (item 3) must remain "F" inches longer than the outer pipe (item 4). Cut pipe ends square and solvent weld as outlined in this guide.

C= Installation cutout should be at least 1/2" larger than dimension "C".

DO NOT LENGTHEN THE CONCENTRIC TERMINATION UNITS.

Concentric Vent Kit Assembly

1. Once the installer has determined the termination location, cut a hole in the roof or wall 1/2" larger than the "C" dimension referenced in Table 5 for the part being installed. The size of the hole can vary greatly depending on the roof pitch.
2. As per the procedures outlined in this guide, solvent weld the inner pipe to the concentric wye fitting.
3. Solvent weld the outer pipe to the concentric wye fitting.
4. Slide the assembly through the roof or wall penetration. (Install flashing if needed).
5. The outer pipe shall be only a friction fit with the cap. To permanently affix the rain cap, apply solvent cement to the inner pipe as per the procedures outlined in this guide. For installations where removal of the cap may be required for service of the termination or cleaning the cap, it can be fastened mechanically (drill location reference ⑤ in Figure 17).
6. Once the rain cap is installed, and the kit secured as outlined below in Figure 18, the kit can be connected to the venting system.

Figure 18: Typical Concentric Vent Side Wall Termination

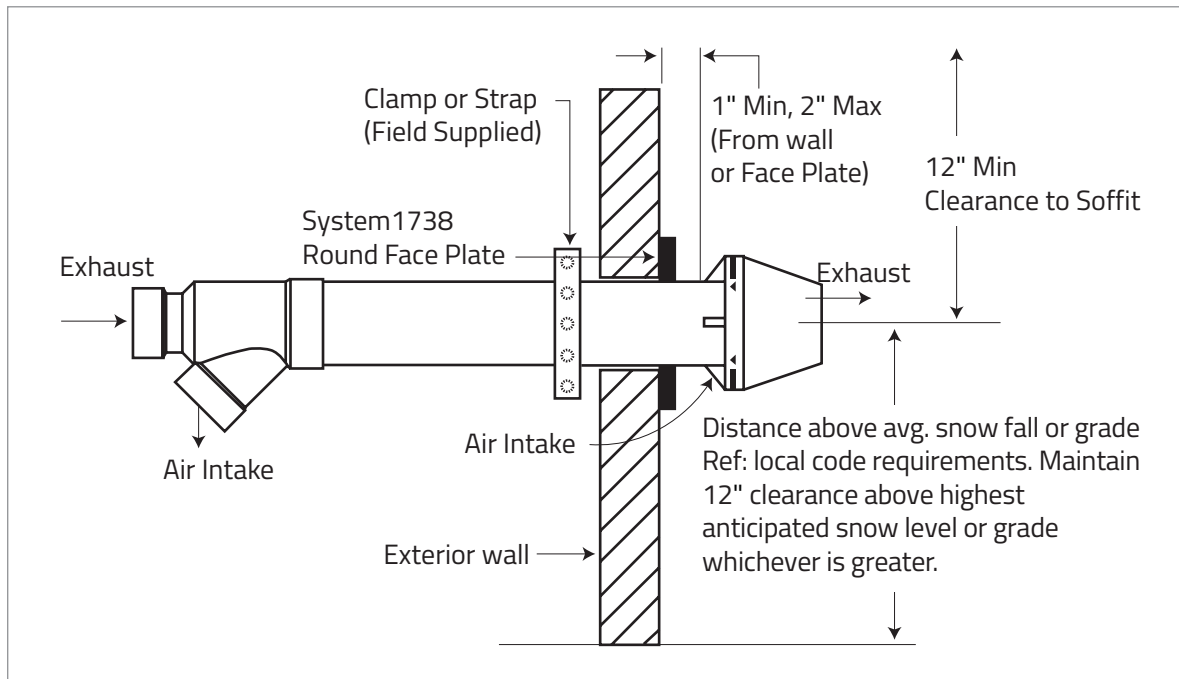


Figure 19: Typical Concentric Vent Pitched Roof Termination

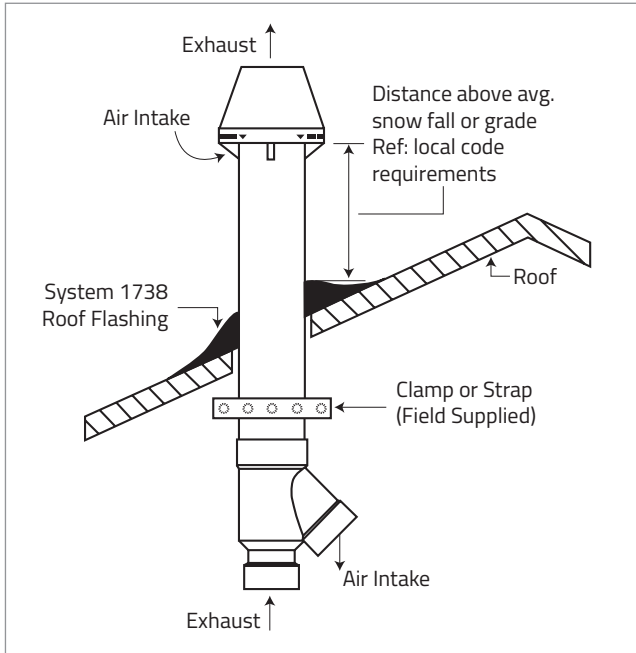
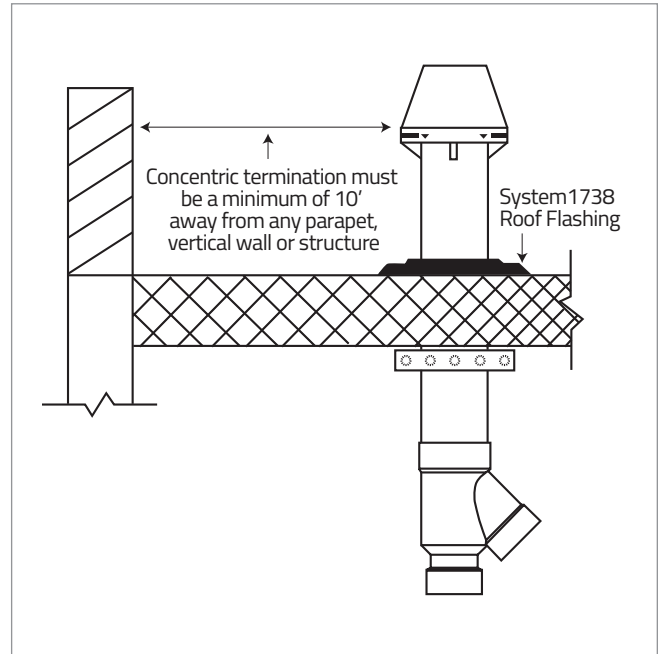


Figure 20: Typical Concentric Vent Flat Roof Termination



Multiple Concentric Vent Kit Spacing

For multiple horizontal and vertical concentric vent kit installations, retain a minimum spacing of 12" between the outside edges of each concentric vent kit as shown in Figures 21 and 22.

These guidelines are not appliance specific actions; appliance manufacturers may supply spacing dimension specific to each appliance. In this case the manufacturer's recommendations shall supersede those described herein.

Figure 21: Multiple Concentric Vent Terminations: HORIZONTAL

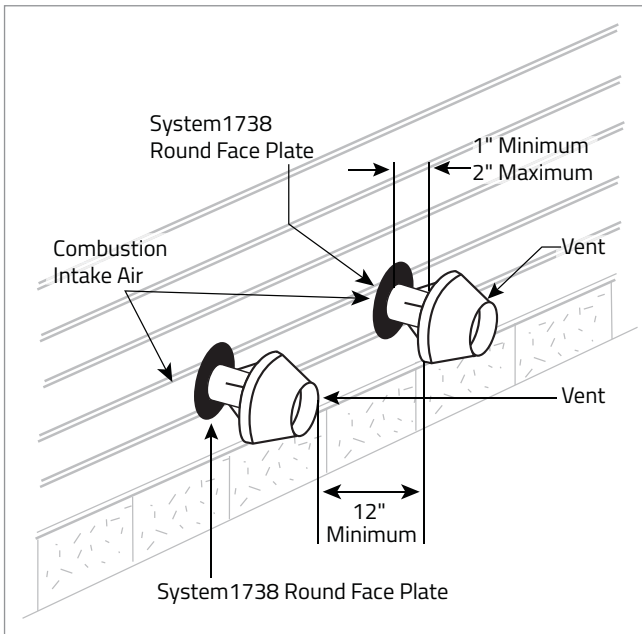
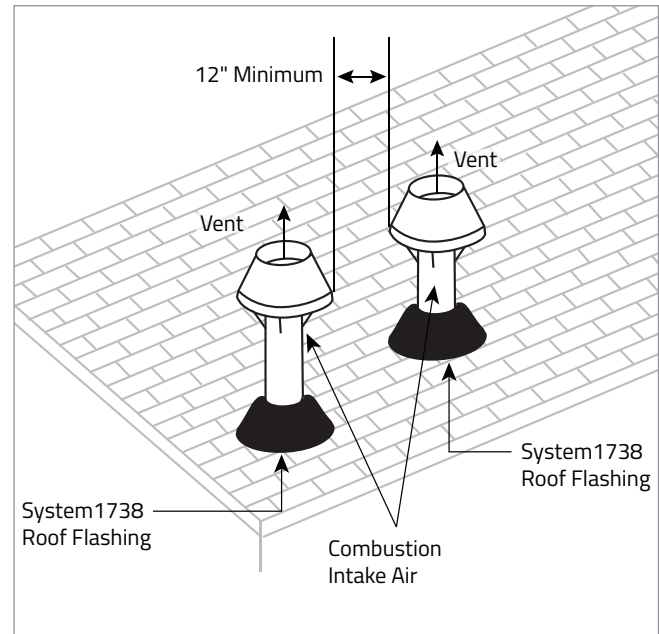


Figure 22: Multiple Concentric Vent Terminations: VERTICAL

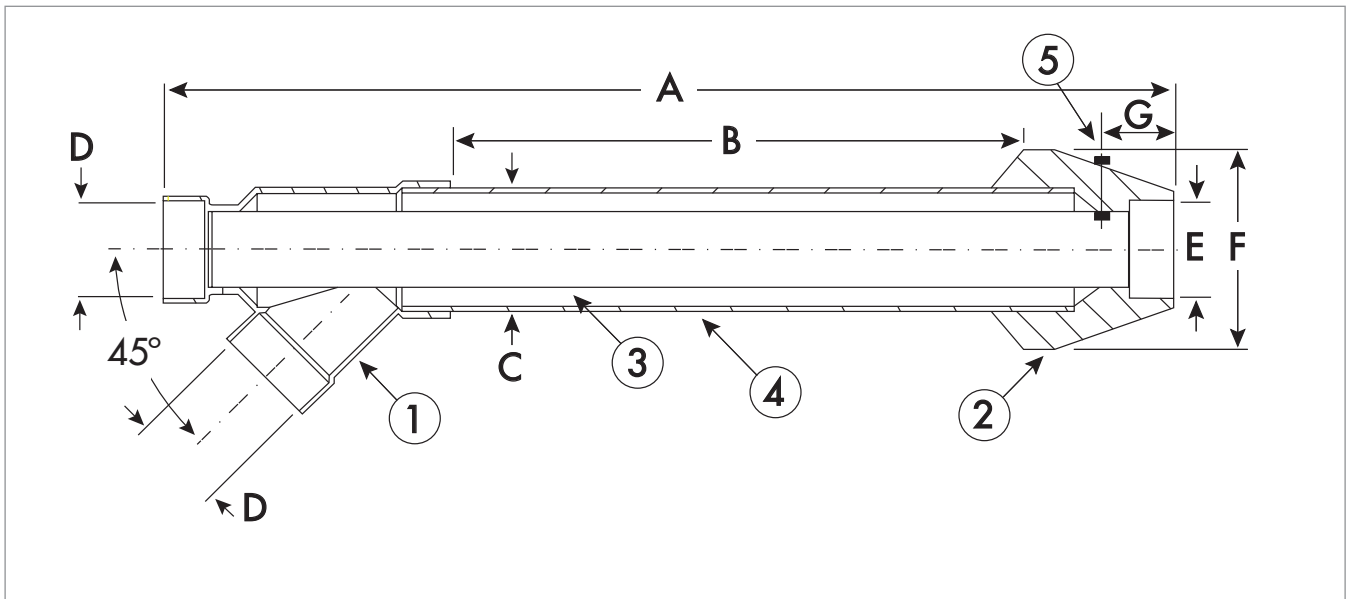


Mechanically Fastened Rain Cap

The Rain Cap must be installed with the supplied Stainless Steel bolt and lock nut, and in accordance with the following instructions and diagram (Figure 23).

1. Locate the drill location dimple on the outside of the rain cap. (drill location reference 5 in Figure 23)
2. At this location, drill through the cap and the inner pipe wall. Ensure that the path of the hole is perpendicular to the inner pipe NOT the outside of the cap. For the 2" & 3" kit, drill a 3/16" hole, for the 4" kit, a 1/4" hole.
3. Insert the bolt and tighten the lock nut supplied with the Concentric Vent Kit. Do not over tighten (do NOT use field supplied screws).

Figure 23



NOTES

System1738®

System 1738® Pipe, Fittings and Cements are certified as a system and must be installed as such. Do NOT use or mix with other IPEX products other than those specified in this guide. Different manufacturers have different materials, joining systems and adhesives. Do NOT mix pipe, fittings, or joining methods from different manufacturers, this can result in unsafe conditions.

These recommendations were issued on December 17, 2018, and are subject to periodic review. IPEX Inc. 1425 North Service Rd. E., Unit 3, Oakville, Ontario, Canada, L6H 1A7

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