



INSTALLATION INSTRUCTIONS

Boiler and Engine Exhaust Chimney Systems Grease Duct Systems (CIX only)

Double Wall Construction Positive Pressure Chimney Systems

P/N 506065-03 REV. N 02/2015

MODELS CIX / CAX

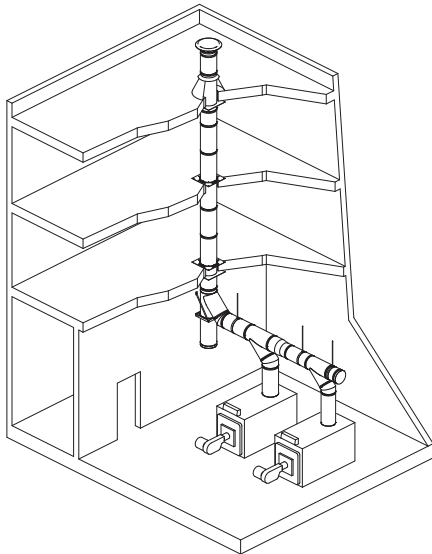
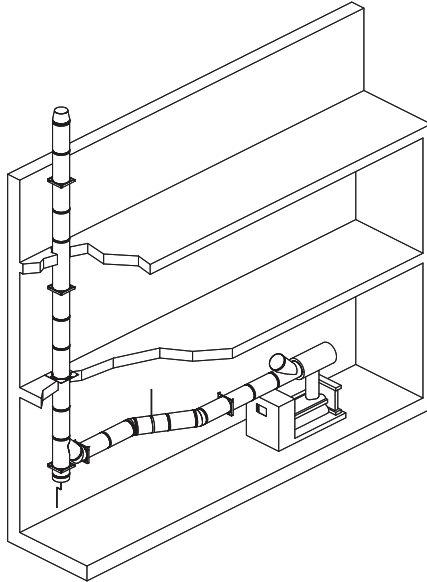
CIX: INSULATED

CAX: UNINSULATED

This installation manual will enable you to obtain a safe, efficient and dependable installation of this positive pressure chimney system. Please read and understand these instructions before beginning your installation.

Do not alter or modify the components of this chimney system under any circumstances. Any modification or alteration of the chimney system or approved accessories, including but not limited to the appliance it is connected to, may void the warranty, listings and approvals of this system and could result in an unsafe and potentially dangerous installation.

SUITABLE FOR POSITIVE PRESSURE VENTING APPLICATIONS WITH MAXIMUM 60" WATER COLUMN INTERNAL STATIC PRESSURE AT 1000 DEGREES F.



**SAVE THESE INSTRUCTIONS
FOR FUTURE REFERENCE**

! WARNINGS

FAILURE TO FOLLOW THESE INSTALLATION INSTRUCTIONS COULD CAUSE FIRE, CARBON MONOXIDE POISONING, OR DEATH. IF YOU ARE UNSURE OF INSTALLATION REQUIREMENTS, CALL THE PHONE NUMBER LISTED ON THE BACK OF THESE INSTRUCTIONS.

A MAJOR CAUSE OF CHIMNEY RELATED FIRE IS FAILURE TO MAINTAIN REQUIRED CLEARANCES (AIR SPACES) TO COMBUSTIBLE MATERIALS. IT IS OF UTMOST IMPORTANCE THAT THIS CHIMNEY BE INSTALLED ONLY IN ACCORDANCE WITH THESE INSTRUCTIONS.



Listed to standards:
UL 103 and ULC S604
UL-1978 (CIX only)
ULC/ORD-C959 540°C and 760°C
Report # 3162834

PICIX REV. 13 11/2017

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

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INTRODUCTION

Security™ Model CIX or CAX Chimney are cylindrical, prefabricated, modular venting systems incorporating a unique extended inner flange designed for both quick assembly and pressure sealing capability. Model CIX incorporates a 2" of mineral fiber insulation while CAX is air insulated. The circular cross section and high quality stainless steel inner flue construction provide for a system with high strength-to-weight ratio and low friction losses.

TESTING / LISTING INFORMATION

Security Chimney International, Ltd. model CIX and CAX venting systems are listed with Intertek Testing Services (ETL) to UL/ULC standards:

U.S.A.

- UL-103
 - 60 in. Positive Pressure Chimney
 - Building Heating Appliance Chimney
 - 1400°F Chimney
- UL-1978 Grease Duct (**CIX only**)

CANADA

- ULC/ORD C959
 - 540°C (1000°F)
 - 760°C (1400°F)
- ULC S604



Models CIX and CAX are code compliant when installed as per the Installation Instructions with : NFPA211; NFPA31; NFPA37; NFPA96 and CSA-B149

When installed in accordance with it's installation, Models CIX and CAX comply with the following codes :

- NFPA (National Fire Protection Association)
- SBCCI (Southern Building Code Congress International)
- ICBO (International Conference of Building Officials)
- BOCA (Building Officials and Code Administrators)
- ICC (International Code Congress)

SECTION A - GENERAL INFORMATION

These instructions comprise both general guidelines and special requirements for all parts in the product line. Before specifying a design or beginning an installation please carefully review these instructions.

Maintenance Notes:

Chimney Cleaning: This applies to cleaning other than standard natural gas chimney applications where minimal maintenance is necessary. Keep your chimney clean. Access should be provided for the inspection and cleaning of all sections of the chimney. Have your chimney cleaned by qualified chimney sweep. It is recommended to use a nylon chimney brush of the correct size. Do not use a brush that will scratch the stainless steel interior of the chimney.

FEATURES

Models CIX and CAX are prefabricated modular venting systems design for industrial and commercial applications. It has a unique extended inner flange for both quick assembly and pressure sealing capability. It is a double wall construction with 2" of mineral fiber insulation for CIX and 2" air space for model CAX. The inner flue is made of high quality stainless steel plasma welded.

APPLICATION

UL 103 Building Heating Appliance Chimney Listing:

Under this category, models CIX and CAX have been determined suitable for venting flue gases at temperatures not exceeding 538°C (1000°F) under continuous operating conditions from gas, liquid, oil or solid fuel fired appliances. Also complies with operation (less than one hour) at temperatures not exceeding 740°C (1400°F) and brief operation (maximum 10 minutes) at temperatures not exceeding 906°C (1700°F).

Building Heating Appliance Chimneys are suitable for use with Building Heating Appliances and Low Heat Appliances as described in the Chimney Selection Chart of National Fire Protection Association (NFPA) Standard NO. 211.

UL 103 1400°F Chimney Listing:

Under this category, models CIX and CAX have been determined suitable for venting flue gases at temperatures not exceeding 760°C (1400°F) under continuous operating conditions from gas, liquid, oil or solid fuel fired appliances. Also complies with brief operation (maximum 10 minutes) at temperatures not exceeding 906°C (1700°F). As such, it is suitable for use with ovens and furnaces as described in the Chimney Selection Chart of NFPA No. 211, in addition to other applications.

UL 103 Positive Pressure Listing:

Under this category, models CIX and CAX have been determined suitable for use at a maximum of 60 inch water column internal pressure.

ULC-C959 540°C and 760°C Industrial Chimneys Listing:

Under this category, models CIX and CAX have been determined suitable for venting flue gases at temperatures not exceeding 760°C (1400°F) under continuous operating conditions from gas, liquid, oil or solid fuel fired appliances. Also complies with brief operation (maximum 10 minutes) at temperatures not exceeding 980°C (1800°F).

UL 1978 Grease Ducts Listing (CIX only):

Security™ model CIX chimney is tested in accordance with UL 1978 Standard and approved for Grease Duct applications when installed in accordance with these installation instructions and National Fire Protection Association standard “NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations”.

SURROUNDINGS / ENCLOSURE

Boiler and Engine Exhaust

Security™ models CIX and CAX chimney are primarily intended to be used in fire resistive noncombustible surroundings or installed unenclosed. They are not intended for use in one or two family residences. **(CAUTION: Do not enclose this chimney in a chase or passageway of ordinary wood or other combustible material).**

Where the chimney extends through any zone of a building (outside that in which the heating appliance connected to it is located), it shall be provided with an enclosure having a fire resistance rating equal to or greater than that of the floor, wall or roof assemblies through which it passes.

Security™ models CIX and CIX chimney may penetrate a combustible floor, wall or roof using the appropriate parts and openings sizes. See section D “Roof & Wall Penetration” for more details.

Where, according to local code, no chase enclosure is necessary, models CIX and CAX chimney may be placed adjacent to walls of combustible construction at the clearance specified on each chimney section and in the individual listing; see “CLEARANCES”. Contact local building or fire officials about restrictions and installation inspection requirements in your area.

Grease Ducts (CIX Only)

1. Model CIX grease ducts are primarily intended for installation in noncombustible surroundings or in unenclosed installations.
2. Where model CIX grease ducts are installed in an open room and an enclosure is not required, the minimum clearance to adjacent combustible walls shall be as shown in this section (see “CLEARANCES”). The ducting may be located in a corner formed by two walls of combustible construction, if the conditions above are met.
3. Other interior installations in all buildings should be as follows:
 - a) Where a grease duct penetrates a wall or ceiling rated for fire resistance, it should be enclosed with a continuous non-combustible enclosure extending from the lowest fire-rated ceiling or floor above the hood, through any concealed space, to or through the roof so as to maintain the integrity of the fire separations required by the applicable building code provisions. The enclosure shall be sealed around the duct at the point of penetration of the lowest fire-rated ceiling or floor above the hood, in order to maintain the fire resistance rating of the enclosure and shall be extended to the exterior of the building through weather-protected openings.
 - b) A grease duct penetrating a ceiling, floor or wall which does not have a fire resistance rating does not require to be enclosed, if the clearances to combustibles are at the correct minimum for unenclosed installations.
 - c) Where model CIX grease ducts extend through any story of a building above the floor on which the connected appliances are located, they shall be enclosed in the upper stories with walls having a fire resistance rating of not less than one hour for buildings of two or three stories. If the building is four stories or more, the enclosure wall shall have a fire resistance rating of not less than two hours.
4. Combustible roofs or roof-ceiling assemblies may be penetrated as described in Section D – Roof and wall penetrations.

NOTE: Do not enclose with combustible materials. Refer to NFPA 96, “Standard For Ventilation Control And Fire Protection Of Commercial Cooking Operations”, for installation and clearances of fire-rated enclosures and definitions.

SYSTEM SIZING

Complete system sizing and capacity information maybe obtained from the “Chimney, Gas Vent, and Fireplace Systems” chapter of the ASHRAE Handbook (go to www.ashrae.org for more information). In spite of these general sizing guidelines, it is most important that the heating appliance, engine or turbine manufacturer’s installation instructions are followed. Not following the equipment manufacturer’s instructions may result in inadequate chimney performance and/or a violation of the equipment manufacturer’s installation requirements.

PART NUMBERS

These instructions identify major model CIX / CAX parts by name and part number.

Example:

CIX 36" length with inside diameter 14" made of ss316 inner flue and ss304 outer casing.

CIX 14 L36 BC
Model Dia. Part Material

CAX 30° elbow with inside diameter 22" made of ss304 inner flue and galvalume outer casing.

CAX 22 E30 CE
Model Dia. Part Material

CIX wall support for 8" diameter chimney made of galvalume.

CIX 8 WS E
Model Dia. Part Material

Use only factory-supplied components. Failure to do so will void the certification and the warranty of the chimney system.

EFFECTIVE LENGTH

CIX / CAX

When assembling two parts together, the joint will overlap 5/8". So effective length is nominal length minus 5/8"

Example:

		Effective length
L36	↕	35-3/8"
L24	↕	23-3/8"
L18	↕	17-3/8"
L12	↕	11-3/8"

CLEARANCES

CIX

Minimum air space clearance to combustible construction to model CIX Chimney is 1".

For non-combustible construction, maintain clearances as required for installation, access for inspection or per local code.

Inside diameter	B.H.A Chimney	1400°F Chimney	Grease Duct
Ø5" to Ø36"	1"	1"	2"

Table 1 - Minimum air space clearance to combustible construction model CIX

CAX

Minimum air space clearance to combustible construction to CAX chimney is 4".

Inside diameter	B.H.A Chimney	1400°F Chimney
Ø5" to Ø36"	4"	4"

Table 2

OPENING THROUGH COMBUSTIBLE CONSTRUCTION

The following table serves to identify the minimum opening required when installing a chimney through a floor, wall or roof made of combustible material. See **table 3** and **figure 1**.

CIX

Inside diameter (A)	Roof / Floor (C)	Wall (C)
Ø5" to Ø10"	Inside Ø + 8"	Inside Ø + 8"
Ø12" to Ø36"	Inside Ø + 8"	Not Listed

Table 3 - Minimum openings

CAX

Inside diameter (A)	Roof / Floor (C)	1400°F Chimney (C)
Ø5" to Ø10"	Inside Ø + 12"	Inside Ø + 12"
Ø12" to Ø36"	Inside Ø + 12"	Not listed

Table 4 - Minimum openings

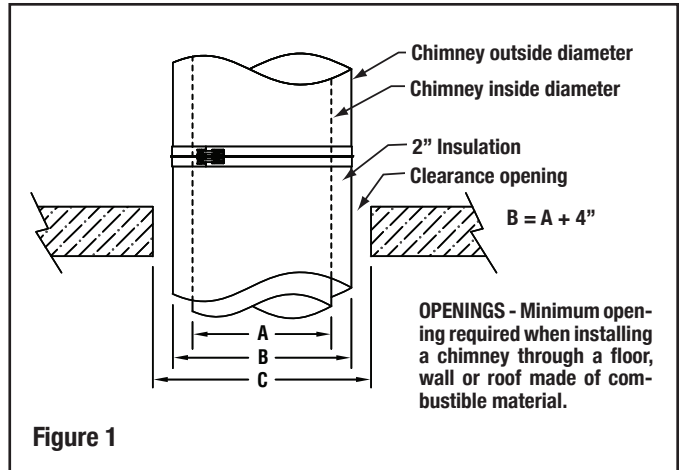


Figure 1



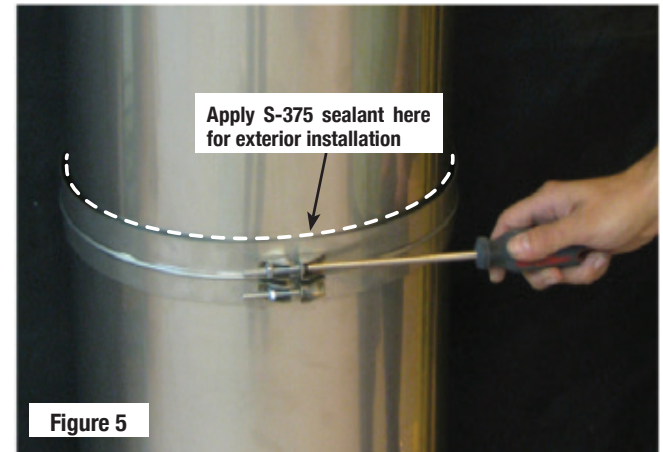
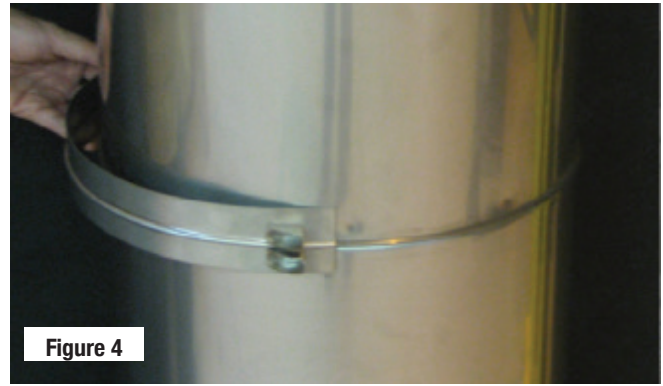
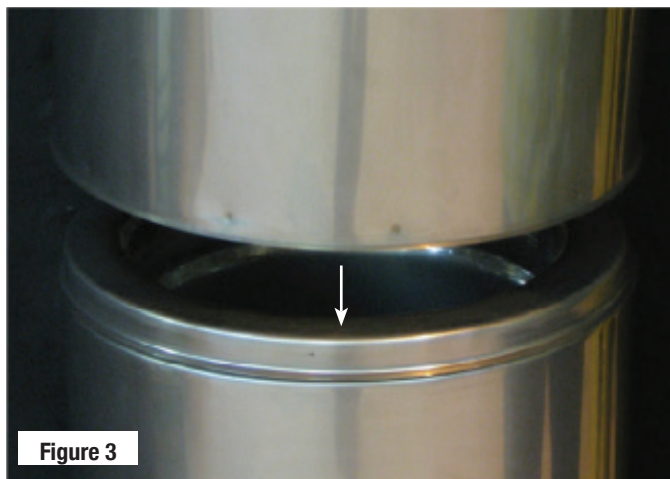
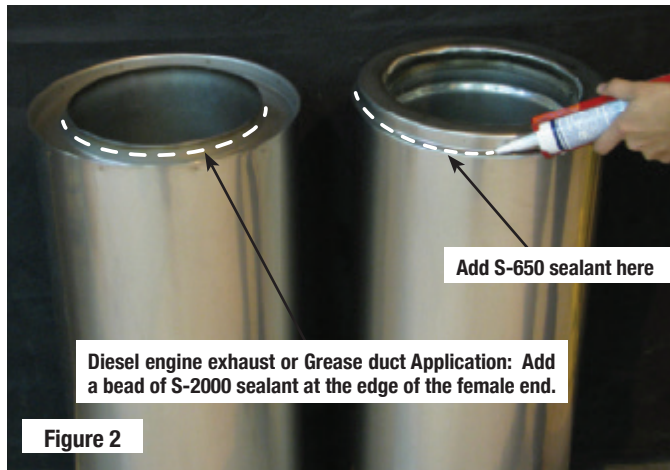
WARNINGS

DO NOT INSTALL ANY TYPE OF INSULATION IN THE REQUIRED CLEARANCE SPACES SURROUNDING THE CHIMNEY.

CHIMNEY AND FITTING JOINT ASSEMBLY

All components have a male and female end. The installation orientation is indicated on the labeling of each chimney section with an arrow. The arrow indicates the direction of the flow. Clean all inner and outer surfaces of the male and female ends with an appropriate organic solvent, such as acetone, Mekk, or other commercial degreaser.

1. Apply a bead of S-650 sealant about 1/8" thick around the male end of chimney and for Diesel engine exhaust or Grease duct application, add a bead of S-2000 sealant at the edge of the female chimney (see **figure 2**). See **table 5** for approved sealants.
2. Insert the female end, of another section of chimney, over male end with sealant (see **figure 3**).
3. Insert the assembly band (see **figure 4**) around the joint of the two sections assembled in step 2. A small bead of S-650 can be applied on the inner groove of the band prior to installation for better leak tightness.
4. Using a phillips screwdriver, connect the two ends of the band as shown in **figure 5**.
5. Where the chimney is installed outside, an exterior sealant S-375 must be applied at the upper joint of the band and the outer casing, see **figure 5**.



SEALANT USAGE				
Interior Installation				
Sealant Application	Supplier	Model	Color	Max. Temp.
Joints	CSIL	S-650	red	650°F
Inner Flue	CSIL	S-2000	White	2000°F
Exterior Installation				
Sealant Application	Supplier	Model	Color	Max. Temp.
Joints	CSIL	S-650	red	650°F
Outer Band	CSIL	S-375	gray	375°F

Table 5

CAUTIONS

- DO NOT ALLOW SCREWS TO PENETRATE THE INNER FLUE. THIS CAN CAUSE CORROSION, GAS LEAKAGE OR EXPANSION FAILURE.**
- NEVER USE SCREWS THROUGH THE OUTER CASING OF AN ADJUSTABLE LENGTH OR EXPANSION JOINT.**
- OBSERVE ADEQUATE SAFETY MEASURES WHEN USING A DEGREASER.**

SUPPORT METHODS AND HEIGHT LIMITS

1. Several support and guiding methods are used to anchor a chimney against upward, downward and angular displacement.
2. These supports and guides used with thermal expansion devices, prevent bending stresses on the chimney elbows and joints.
3. Supports and guiding methods and installation are described in Section C. Certain limitations apply for proper installation of supports and guides. See **tables 6 and 7**.

MAXIMUM CHIMNEY HEIGHTS AND SUPPORT METHOD FOR MODEL CIX AND CAX							
Inside Diameter (in)	Anchor Plate (AP)	Anchor Plate with Length (APL)		Ventilated Anchor Plate (APV)	Wall Support (WS)		Tee (T)
	Metal Frame Only			Metal Frame OR Wood Frame	Metal Frame	Wood Frame	
	CIX/CAX	CIX	CAX	CIX/CAX	CIX/CAX	CIX/CAX	
5	147	200	200	133	147	61	105
6	128	200	200	116	128	53	92
8	103	200	200	93	106	43	74
10	86	177	200	78	86	35	61
12	73	152	194	66	73	30	53
14	64	133	175	58	64	27	46
16	57	118	146	52	57	24	41
18	53	106	135	48	53	22	38
20	48	97	125	43	48	20	34
22	44	89	117	40	44	18	31
24	37	76	92	34	37	15	27
26	35	71	88	32	35	14	25
28	33	66	83	30	33	13	23
30	31	63	76	28	31	13	22
32	29	59	73	26	29	12	21
34	27	56	70	25	27	11	20
36	26	53	65	23	26	11	18

Table 6 - Dimensions are in feet

SUPPORT AND GUIDE SPACING FOR MODEL CIX AND CAX				
Inside Diameter (in)	MVS*		H**	MHS***
	Interior	Exterior		
5	10	8	10	12
6	10	8	10	12
8	10	8	10	12
10	10	8	10	12
12	10	8	10	12
14	10	8	10	12
16	10	8	10	12
18	10	8	10	12
20	10	8	10	12
22	10	8	10	12
24	10	8	10	12
26	10	8	10	12
28	10	8	10	12
30	10	8	10	12
32	10	8	10	12
34	10	8	10	12
36	10	8	10	12

Table 7 - Dimensions are in feet

* MVS = Maximum Vertical Spacing between two guides or a support and a guide in a vertical position.
 ** H = Maximum freestanding Height above the roof.
 *** MHS = Maximum Horizontal Spacing between two guides or a support and a guide is 12 feet.

THERMAL EXPANSION

Good installation practice requires that any length of exhaust system between two fixed points subject to more than 1/4 inch expansion must have an Adjustable Length (LA) or Bellows Joint (LB) to compensate for expansion. Models CIX and CAX will expand approximately 1 inch for every 100°F temperature rise per 100 feet of chimney. To accommodate chimney movements, any wall guide or floor guide must be located away from the locking band.

It is essential that these parts be properly installed and provided with adequate support and guidance to prevent binding or excessive bending forces. (See detailed installation information contained on **page 19, Thermal Expansion**).

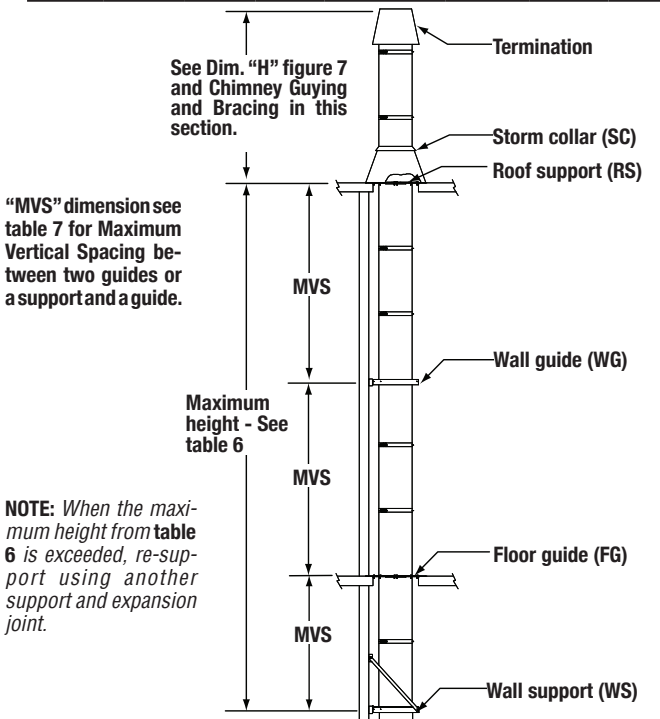


Figure 6 - Maximum chimney heights and support

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

CHIMNEY WEIGHT

Chimney weight is given in pounds per foot of chimney for each diameter. It is important to know the weight of the chimney section for chimney support or guiding. Chimney weight (**table 8**) along with maximum chimney height (**table 6**) are necessary to calculate the proper anchor strength needed with wall supports (WS), Anchor Plate (AP) supports and Suspension Bands (SB).

CHIMNEY WEIGHT IN LB/FT		
Inside diameter	Model CIX	Model CAX
5	7	4
6	8	5
8	10	6
10	12	8
12	14	9
14	16	10
16	18	12
18	20	13
20	22	14
22	24	15
24	28	19
26	30	20
28	32	21
30	34	23
32	36	24
34	38	25
36	40	27

Table 8

Example: Model CIX, 6" diameter section of 25 feet in length from table 8, weight in lb/ft = 8. Total weight 8 x 25 = 200 lbs

CHIMNEY GUYING AND BRACING

1. Proper guying and bracing is essential for part of the chimney that extends above the roof or parapet wall. The chimney at this point is subject to wind conditions and needs special attention for proper stabilization.
2. If the stack above the roof does not exceed dimension H, no special guying or bracing is required. However, to protect the flashing from lateral movement, a guide must be installed at the roof level. See **figure 7**).
3. For stack height above the roof that needs guying or bracing, a support, a small length and a expansion length must be installed near the roof level to absorb the thermal expansion and minimise this effect on the guy wires or brace.
4. When using guy wire, the cable must be slightly slack or loose to allow thermal expansion.
5. When using rigid bracing, the maximum vertical height between supports must be reduced to 5' to compensate thermal expansion.

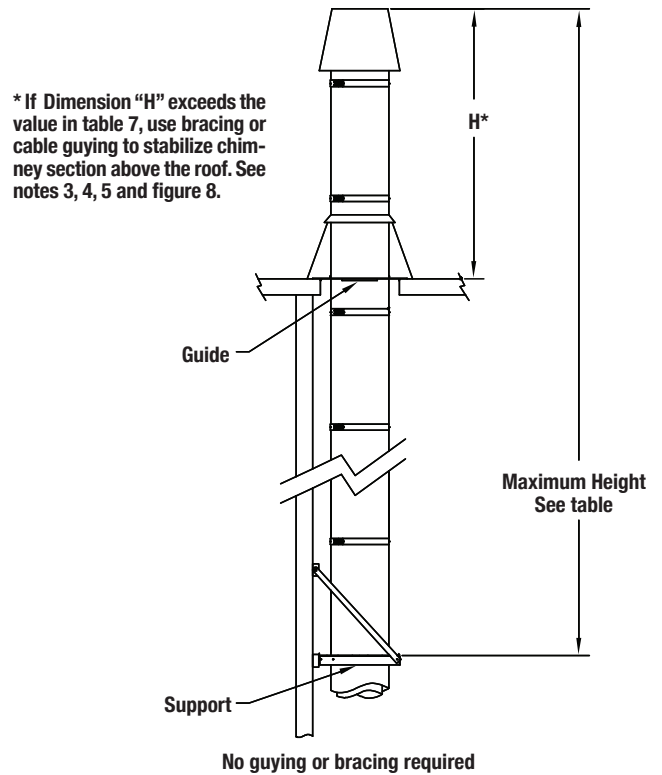


Figure 7 - Maximum freestanding chimney height

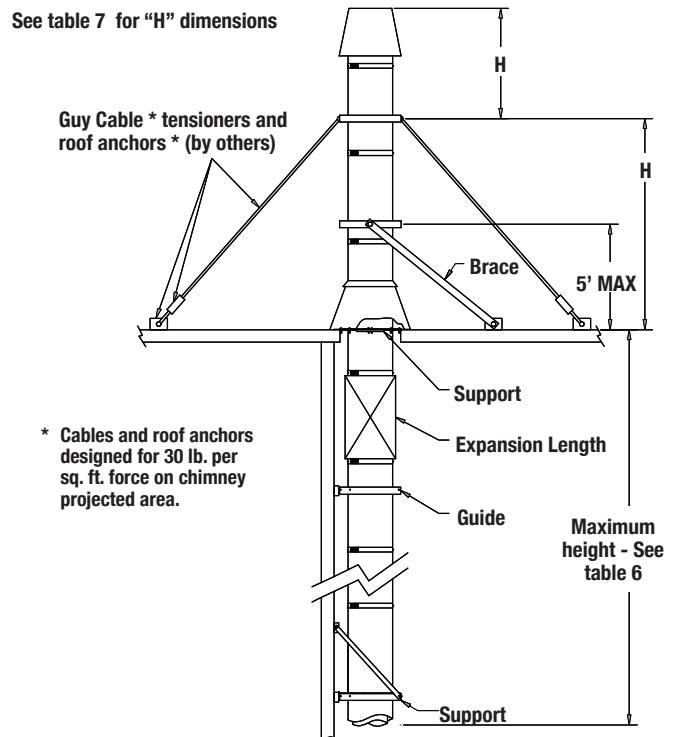


Figure 8 - Chimney height with rigid bracing or guying option

TERMINATION HEIGHT

Chimneys and vents shall terminate above the roof level in accordance with the following requirements:

1. Five feet above the roof level or any adjacent flat roof, wall parapet or air intakes, and/or in accordance with the following NFPA 211 requirements.
2. Where chimney terminates at less than 10 feet from any adjacent ridge, wall or parapet, the chimney shall terminate at minimum of 3 feet above the ridge, wall, or parapet.
3. Where chimney terminates at more than 10 feet from ridge, wall, or parapet, a minimum height of 2 feet shall be required above the ridge wall or parapet.

MULTI-ENGINE EXHAUST SYSTEMS

A common exhaust system for multiple engine or turbine installations is generally not recommended. A separate exhaust system should be provided for each engine or turbine.

Check with your engine or turbine manufacturer prior to common exhaust system design. Exhaust gas from operating units tends to flow to non-operating units where condensation may form. **WATER IN ENGINE OR TURBINES AT START-UP MAY CAUSE DAMAGE. IN GENERAL, A SEPARATE EXHAUST SYSTEM SHOULD BE PROVIDED FOR EACH ENGINE OR TURBINE.**

SECTION B - TEES, ELBOWS, INCREASERS

90° TEE (T90)

1. Generally used to connect the horizontal length from the appliance to the vertical length when clean-outs access or drain is required.
2. 90° should not be used for changing flow direction in diesel or turbine exhaust.
3. For supporting the tee, the preferred location is above the tee (see **figure 9**).
4. If it is not possible to suspend the tee, it may be supported from the base (see **figure 10**). When this is necessary, a short length should be installed between the tee and the tee cap or Drain-Tee Cap for a good clean-out or inspection access.

IMPORTANT NOTE:

If more than 1/4" of thermal expansion is expected between a stationary point and the tee, the use of an expansion length and a two axis support is recommended to minimize bending moments on the tee (see **figure 11** and **table 9**).

Gas Temperature Rise	Maximum Length	Expansion
200°F	12'0"	0.25"
300°F	8'0"	0.25"
400°F	6'0"	0.25"
500°F	5'0"	0.25"
600°F	4'0"	0.25"
700°F	3'6"	0.25"
800°F	3'0"	0.25"
900°F	2'6"	0.25"
1000°F	2'0"	0.25"

Note: 60°F - 70°F ambient T°

Table 9 - Maximum allowable length between two fixed points without expansion length

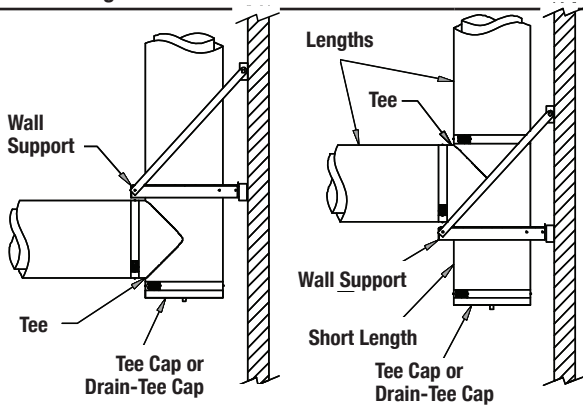


Figure 9 - Suspended Tee

Figure 10 - Base Supported Tee

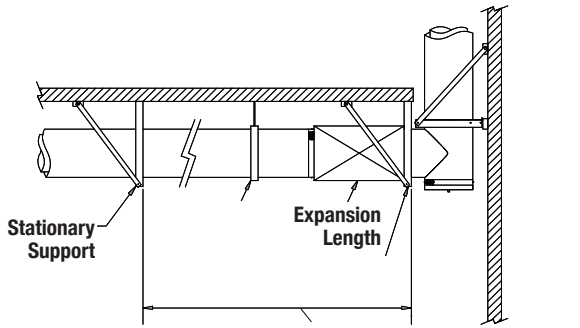


Figure 11 - Two Axis Support

More than 1/4" of expected thermal expansion between two stationary points

45° TEE (T45)

1. For systems where flow resistance must be minimized like engine or turbine exhaust. The use of a 45° tee is suggested. It can be combined with a 45° elbow to make a smooth 90° turn (see **figure 12**). To support this tee, use similar method as a 90° tee.
2. When using 45° tee to connect multiple appliances together, thermal expansion must be considered. Thus prepared to prevent bending moments on the tee, an expansion length must be installed between the tees (see **figure 13**).

45° TEE Y (TY)

1. This kind of tee is useful where the stack is located between two application or with a double exhaust system. Use the same support method and thermal expansion considerations from the other tees (see **figure 14**).

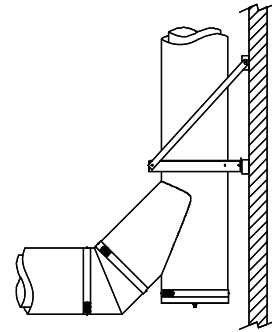


Figure 12 - Smooth 90° Turn

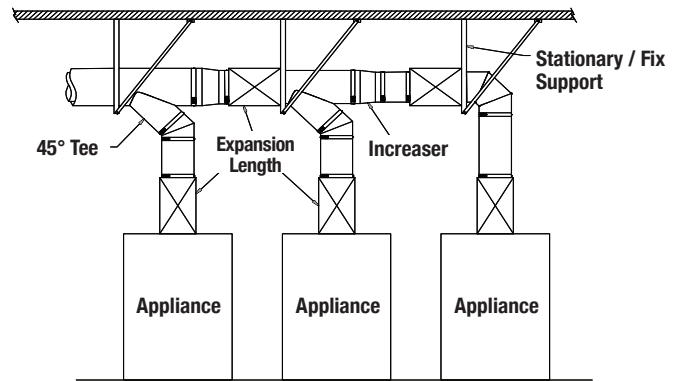


Figure 13 - Multiple appliance connection with 45° tees

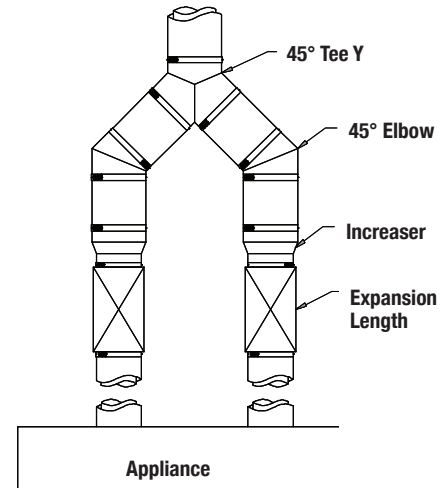


Figure 14 - 45° Tee Y

TEE CAP (TC)

1. Use to block one of the openings of horizontal or vertical tee.
2. Removable, it facilitates access for inspection and maintenance of the chimney.
3. The installation is the same as for lengths.
4. When removed, the old silicone must be cleaned out and a new bed of sealant must be applied.

DRAIN-TEE CAP (DTC)

1. Use as a drain for vertical stack.
2. Connect to a suitable drain fitting to allow rain entering the chimney to wash down, dilute and remove any corrosive residue.
3. Same installation as a tee cap.

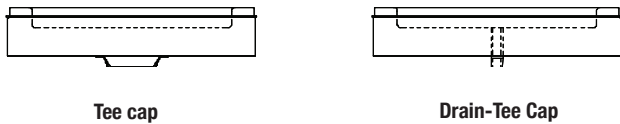
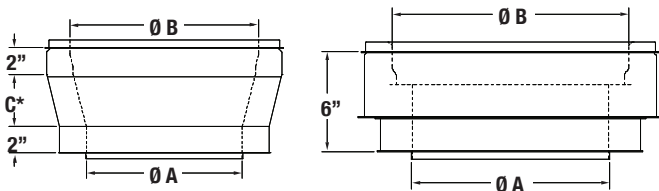


Figure 15 - Tee cap and Drain-Tee Cap

INCREASER, STEP OR TAPERED

1. Use to increase the diameter of the chimney flue.
2. The tapered increaser induce less pressure drop than the step increaser, but requires more space. It has a 15° side angle and provides increases of one, two or three size. The height of the fitting varies depending on the diameters to be increased (see figure 17).
3. The tapered increaser have the same load strength as a standard length, but the step increaser is a non-structural part and must be protected from axial and lateral load.



* See table 10

Figure 16 - Increaser height

STEP	1 Diameter	2 Diameters	3 Diameters
C	4"	8"	12"

Table 10 - Tapered increaser height

ELBOWS

1. Elbows are used for changes in direction in horizontal or vertical portions of a chimney system.
2. All elbows feature the standard joint assembly as described in Section A - Chimney and Fitting Assembly.
3. Elbows are used in combination to make different angles ranging from 3° to 90° in horizontal and vertical breechings of the chimney system.
4. Elbows are not designed to take bending loads and must be structurally supported (see figure 17). Structural parts such as posts or beams may also be needed to hold chimney supports in position.

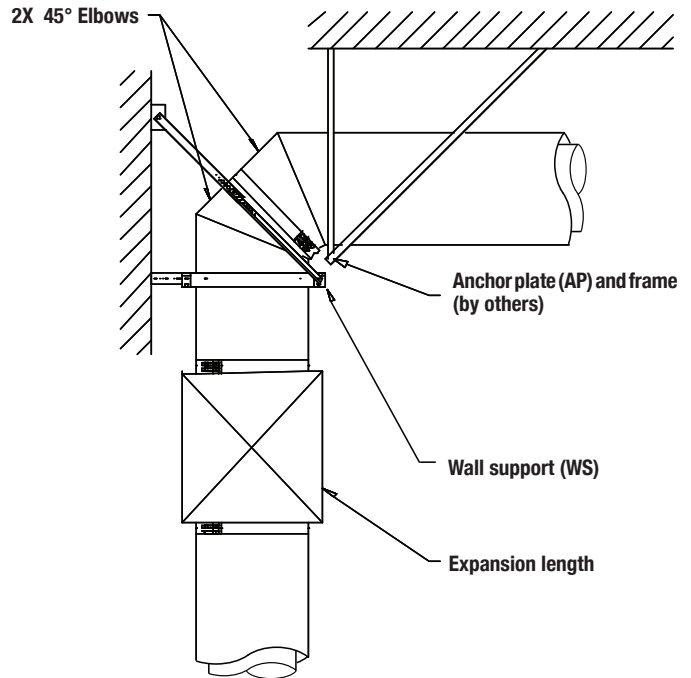


Figure 17 - Supported elbow

OFFSETS

1. Sloped or horizontal offsets in the vertical portion of a chimney above the breeching should be avoided except where absolutely necessary.
2. Sloped offsets require more expansion joints and secure bracing above and below elbows.
3. With solid fuel burning appliance, the slope must not be greater than 30° from the vertical. Appliances which are capable of burning solid fuel or are convertible to solid fuel are limited to the same 30° slope.
4. The length of the offset is determined by strength considerations. The maximum dimension between supports, given as the MHS dimension in **table 7**, is applicable to all horizontal and sloped orientations (see **figure 18**)
5. The minimum offset is accomplished with two elbows directly connected to each other (see **Figure 34** and **table 9**).
6. With frequent re-support, there is no structural or operating limit to the length of horizontal or sloped portions of model CIX chimney, providing the system meets the capacity, pressure drop of available equipment.
7. The carrying capacity of supports and their structural attachments must take into account the weight of the offset plus whatever vertical chimney is carried by that support.
8. Height limits for supports are tabulated in Section A of these instructions.
9. The ends of any sloped or horizontal offset must be anchored to prevent overstressing elbows and to assure proper operation of expansion joints.
10. The vertical sections of chimney above the offset must also be supported or anchored and guided where necessary.
11. Models CIX and CAX Roof Support (RS), Wall Support (WS), Wall Guide (WG) may be used in a variety of ways for offset support to achieve the structural stability of the chimney system. Preferred methods of using model CIX and CAX supports are shown in Section C.
12. Re-supports such as those shown in **Figure 31** must be securely anchored to walls, posts, or locally fabricated rigid framework. This framework must be designed to assure stability of attached model CIX supports, such as Anchor Plate (AP) supports and Wall Supports (WS).
13. Supports suspended by threaded rods or from small size angles or straps are usually not satisfactory to resist bending moments due to offsets.

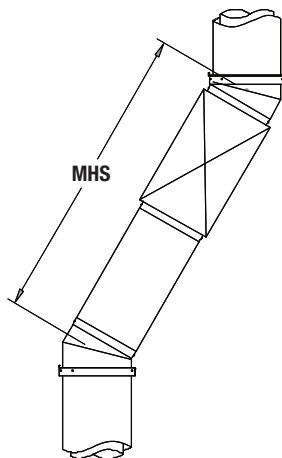
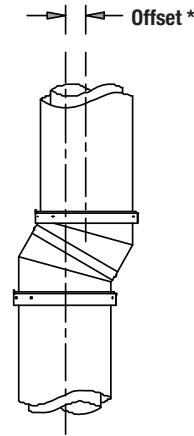


Figure 18 - Offsets MHS (refer to table 7)



* See table 11

Figure 19 - Minimum offset

Ø	3°	15°	30°	45°
5"	n/a	1-3/8"	3-5/16"	5-5/8"
6"	n/a	1-7/16"	3-7/16"	5-15/16"
8"	n/a	1-1/2"	3-3/4"	6-1/2"
10"	n/a	1-9/16"	4"	7-1/16"
12"	n/a	1-5/8"	4-1/4"	7-11/16"
14"	n/a	1-11/16"	4-1/2"	8-1/4"
16"	n/a	1-3/4"	4-13/16"	8-7/8"
18"	n/a	1-7/8"	5-1/16"	9-7/16"
20"	n/a	1-15/16"	5-5/16"	10"
22"	n/a	2"	5-5/8"	10-5/8"
24"	n/a	2-1/16"	5-7/8"	11-3/16"
26"	n/a	2-1/8"	6-1/8"	11-3/4"
28"	n/a	2-3/16"	6-3/8"	12-3/8"
30"	n/a	2-1/4"	6-11/16"	12-15/16"
32"	n/a	2-5/16"	6-15/16"	13-1/2"
34"	n/a	2-3/8"	7-3/16"	14-1/8"
36"	n/a	2-7/16"	7-1/2"	14-11/16"

Table 11 - Minimum offset

SECTION C - STRUCTURAL SUPPORT AND GUIDING

ANCHOR PLATE ASSEMBLY (AP)

1. The anchor plate support assembly is designed to provide maximal support to vertical sections and to provide fixed point support for horizontal sections.
2. The plate support must be attached to the building structure or supported with rigid structural members (see **figure 22** and **table 12** for bracing dimensions)
3. **DO NOT ATTACH THE ANCHOR PLATE TO COMBUSTIBLE CONSTRUCTION.** If unavoidable, use the Ventilated Anchor Plate support assembly.
4. The anchor plate consists of a plate and eight clamp flange. See **figure 21** for sectional details for plate support.
5. **IMPORTANT: The surfaces of the male and female couplings in contact with the plate of the anchor plate assembly must be coated with inner joint sealant.**
6. There are two ways of assembling parts on the support. You may choose your method depending on your situation.
- 6.1 The first method consists of assembling two parts and the anchor plate on the side and then installing this assembly on the support structure. This method is easier and faster to install, but requires enough clearance to insert the complete assembly through the support structure opening. If there is a tee or elbow upstream of the anchor plate, you may not have enough clearance. Also consider the weight of the assembled parts and make sure you have a safe manner of lifting the assembly.

INSTALLATION STEPS FOR FIRST METHOD (refer to figure 23)

1. Place the part that will be upstream of the support on the floor.
 2. Apply a bead of inner joint sealant on the male coupling flange.
 3. Slide the plate of the anchor plate support over the coupling.
 4. Apply a second bead of sealant on the plate around the male coupling where the flange of the female coupling of the next part will mate.
 5. Place the second part over the plate. Make sure the sealant completely fills joints between the plate and the female coupling.
 6. Use eight clamp flanges and bolts to tightly clamp the parts to the support.
 7. Insert the assembly on the support structure and fix the plate to the structure using the supplied hardware.
- 6.2 The second method is applicable when the plate of the anchor plate support needs to be installed first, as when there is a tee or elbow upstream of the support. May require at least two persons to complete the installation.

INSTALLATION STEPS FOR SECOND METHOD (refer to figure 24)

1. Fix the plate of the anchor plate support to the structure using the supplied hardware.
2. Apply a bead of inner joint sealant on the male coupling flange of the part before the support.
3. Insert the male coupling of the part in the plate opening.
4. You may hold it using two clamp flanges placed at 180° and bolted to the anchor plate.
5. Apply a bead of sealant on the plate around the male coupling.
6. Place the second part over the plate. Make sure the sealant completely fills the joint between the plate and the female coupling.
7. Fix the assembly by clamping it with four clamp flanges on the unused flange positions.
8. Remove the first two clamp flanges and finish clamping the assembly.

LENGTH ANCHOR PLATE (APL)

1. Use for same application as the anchor plate (AP).
2. It is composed of a straight section - with an effective length of 3 3/4" integrated into a support plate (see **figure 20** for the detail of the part).
3. Unlike the anchor plate (AP), the Length Anchor Plate (APL) doesn't need any clamp flange (and its hardware) for its installation, so it is easier and faster to install.
4. The APL must be attached to the building structure or supported with rigid **NON-COMBUSTIBLE** structural members (see **Figure 22** and **Table 12** for bracing dimensions).

Installation steps for the APL

1. Fix the plate of the APL to the structure using the supplied hardware.
2. Follow the steps of the «Chimney and fitting assembly» section in the **section A** on page 5 to connect the couplings of the APL with the parts downstream and upstream.

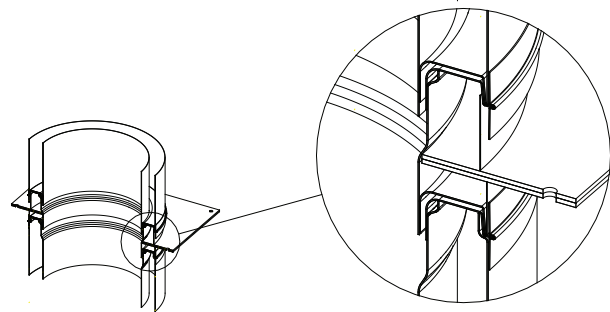


Figure 20 - Length Anchor Plate (APL)

VENTILATED ANCHOR PLATE (APV)

1. Use for same application as the anchor plate, but can be attached to combustible construction.
2. Usually uses as roof support. See section D for details on how to install at the roof level.
3. Installation is done the same manner as the anchor plate.
4. See **Figure 25** for opening dimensions through combustible construction.
5. Do not block or obstruct openings in the plate. They are intended to minimize heat accumulation.

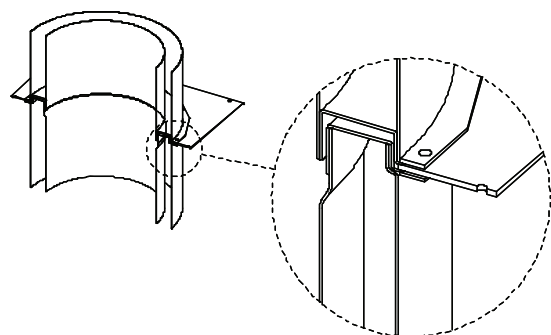


Figure 21 - Sectional detail for plate support

Height Limits - See Section A, Table 6 for maximum support height of Anchor Plate (AP).

NOTE: If bracing is used, minimum "X" angle is 30°. If there is no bracing, the framework must be attached to structural members to provide equivalent rigidity.

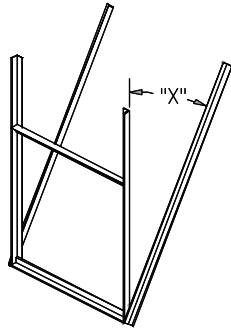
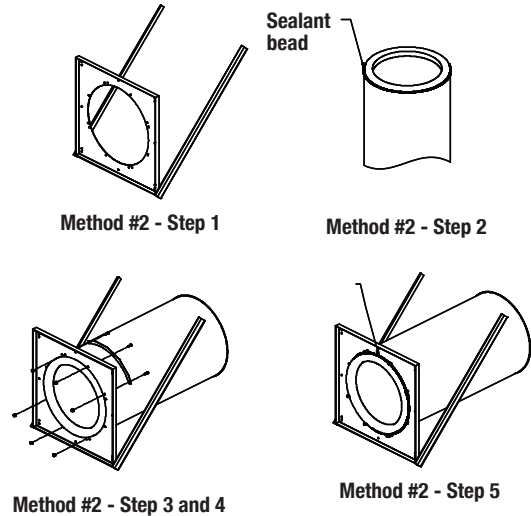
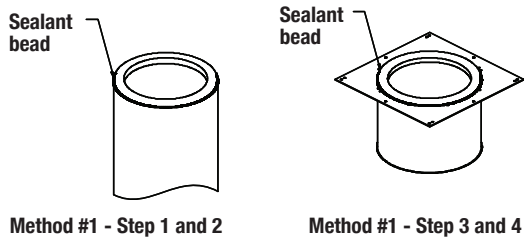


Figure 22 - Homemade brace



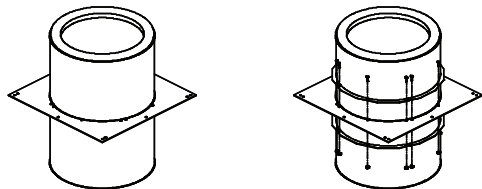
Method #2 - Step 3 and 4

Method #2 - Step 5



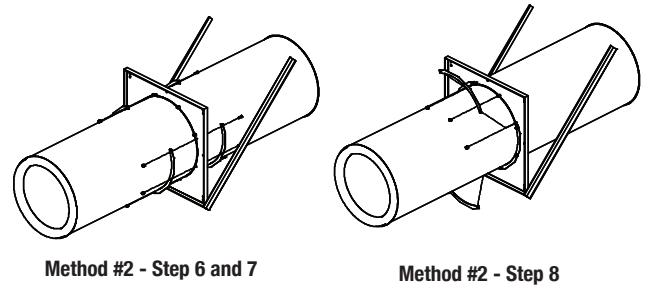
Method #1 - Step 1 and 2

Method #1 - Step 3 and 4



Method #1 - Step 5

Method #1 - Step 6



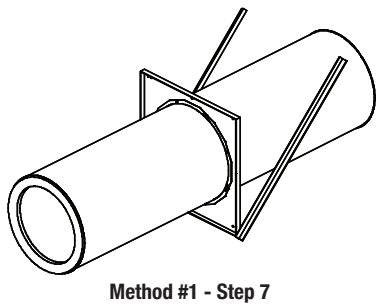
Method #2 - Step 6 and 7

Method #2 - Step 8

Figure 24 - Method #2 installation Steps

I.D.	FRAMEWORK	BRACING
5" - 20"	3" X 2" X 3/16"	2" X 2" X 1/4"
22" - 36"	4" X 2" X 1/4"	3" X 3" X 1/4"

Table 12 - Bracing CIX / CAX



Method #1 - Step 7

Figure 23 - Method #1 installation Steps

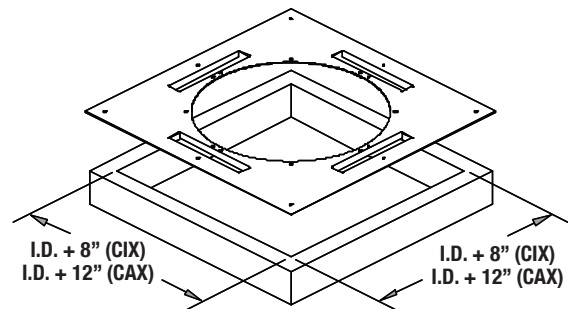


Figure 25 - Ventiladed anchor plate (APV)

WALL SUPPORT (WS)

1. The wall support consists of an Anchor Plate and a prefabricated frame with mounting brackets and angled struts for bracing.
2. Used to support the chimney in vertical runs, it maintains the chimney at an adjustable distance between 2-1/2" and 7-1/2" from the wall (see **Figure 26**).
3. The maximum weight allowable on the wall support depends if the support is attached to a metal structure or a wood structure (see **table 6** for maximum chimney height).
4. The installation begins by attaching the frame of the wall support to a rigid metal or wood structure. Adjust the braces to have a minimum of 45° angle from horizontal. Once the frame of the wall support is fixed to a rigid structure, the installation is the same as the Anchor Plate.

Height Limit - See Section A, table 6 for maximum height of Wall Support (WS)

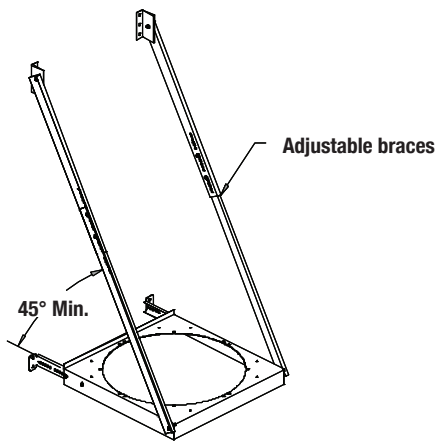


Figure 26 - Adjustable wall support (WS)

WALL GUIDE (WG)

1. The wall guide is used as a lateral guide to resist lateral or side load only, it is not designed for carrying the weight of a vertical chimney. It also ensure a minimum clearance of 1" to combustibles for model CIX and 4" for model CAX. See **Figure 27** (wall guide).
2. The proper location to install the wall guide is immediately below a locking band. The locking band must be able to move without interfering with the guide when thermal expansion occurs. See **Figure 28** (wall guide location).
3. The wall guide can be installed with a wall band extension for greater clearances up to 4-1/4" for model CIX and up to 7-1/4" for CAX. See **Figure 29** (wall guide extension).
4. Special considerations must be taken when installing on exterior wall. A wall guide must be installed between 6' and 10' below the highest wall support to stabilize the free standing portion of the chimney. Do not install a expansion length in this area due to bending forces induced by the freestanding portion. See **Figure 30** (special considerations).

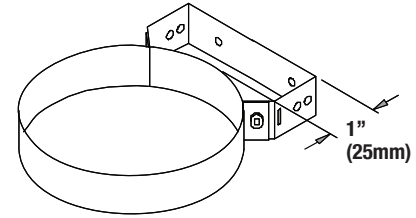


Figure 27 - Wall guide (WG)

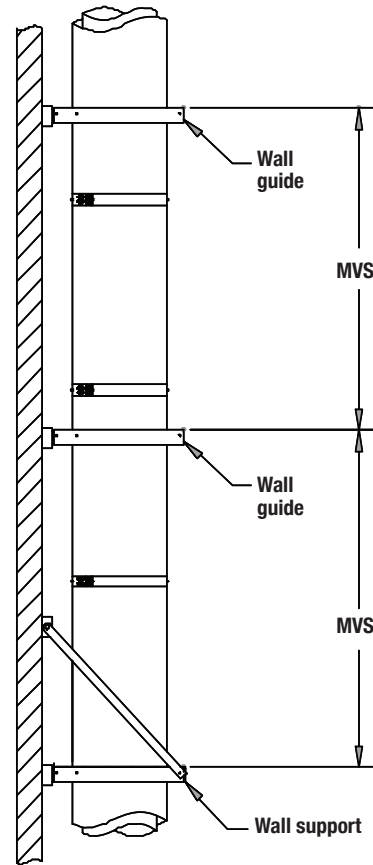


Figure 28 - Wall guide location

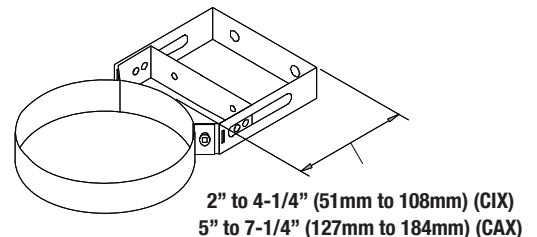


Figure 29 - Wall guide extension

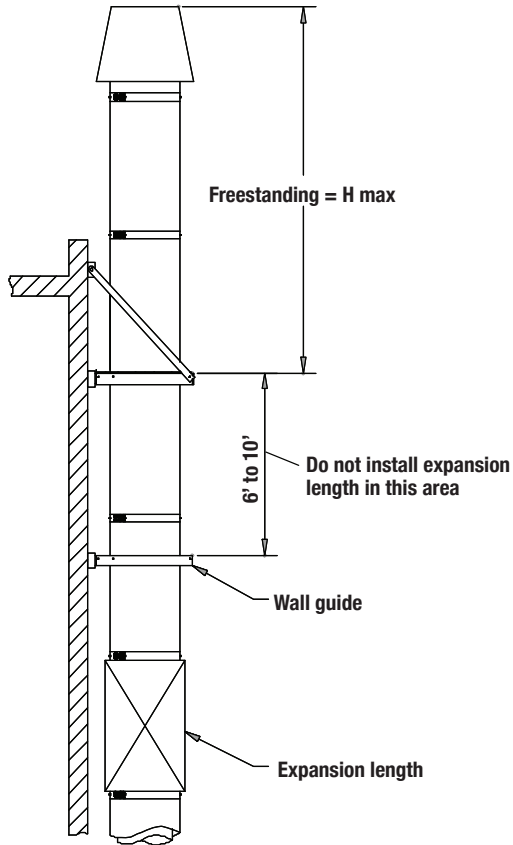


Figure 30 - Special considerations for exterior installation

FLOOR GUIDE (FG)

1. The floor guide is used the same manner as the wall guide but it is modified for use at floor penetrations. See **Figure 31** (floor guide).

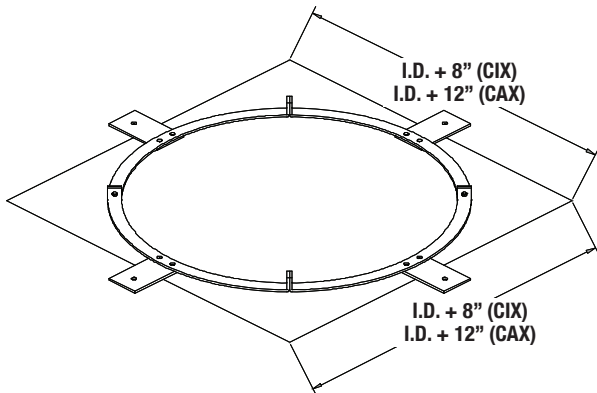


Figure 31 - Floor guide (FG)

SUSPENSION BAND (SB)

1. Suspension band is used to support and guide the chimney in horizontal runs. It consists of a band, a flexible strap (by others), a trolley and a rail.
2. The trolley and rail allow up to 4" of travel to compensate thermal expansion.
3. See section A, **Table 7** for maximum distance between two supports or guide.
4. **Important: The flexible strap must be at least 3/4" wide and 0.036" thick made of galvanized or stainless steel. YOU MUST USED TWO LAYERS OF FLEXIBLE STRAP** to attach the band to the trolley.

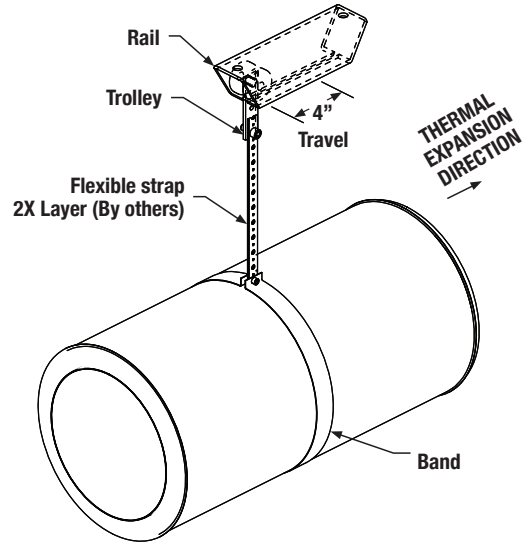


Figure 32 - Trolley

CRADLE SUPPORT (CS)

1. Cradle support is used to support and guide the chimney in horizontal runs. It consists of a cradle support and suspension rod (by others).
2. The suspension rods must attached to the structural members to provide rigidity.
3. Cradle support allows to stack two (or more) horizontal chimney runs (See **Figure 33**).
4. Cradle support does not allow movement for thermal expansion. This support should be used for low temperature application.

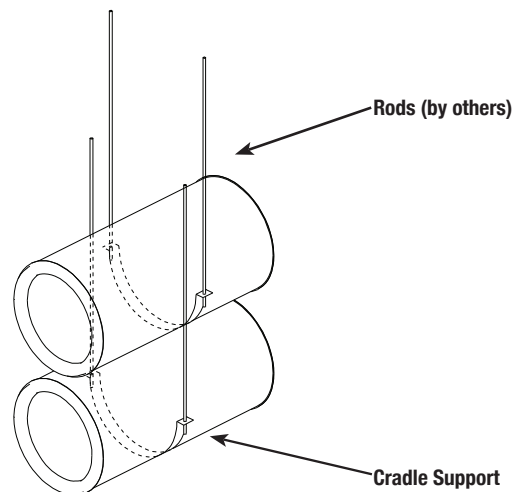


Figure 33 - Cradle Support

ROOF BRACE (RB)

1. The roof brace is used to stabilize the chimney where it extends more than 15' above the roof.
2. It consists of one band (RB) and two braces (supplied by the installer).
3. To minimize loads induced by thermal expansion on braces and support, the maximum distance between the last fixed support and the band of the roof brace must be reduced to 5'.
4. Begin by attaching the braces to the band with supplied bolts and nuts. Next, install the band on the chimney and tighten the band. Fix the braces to the roof at 120°. Make sure you have a rigid structure on the roof.

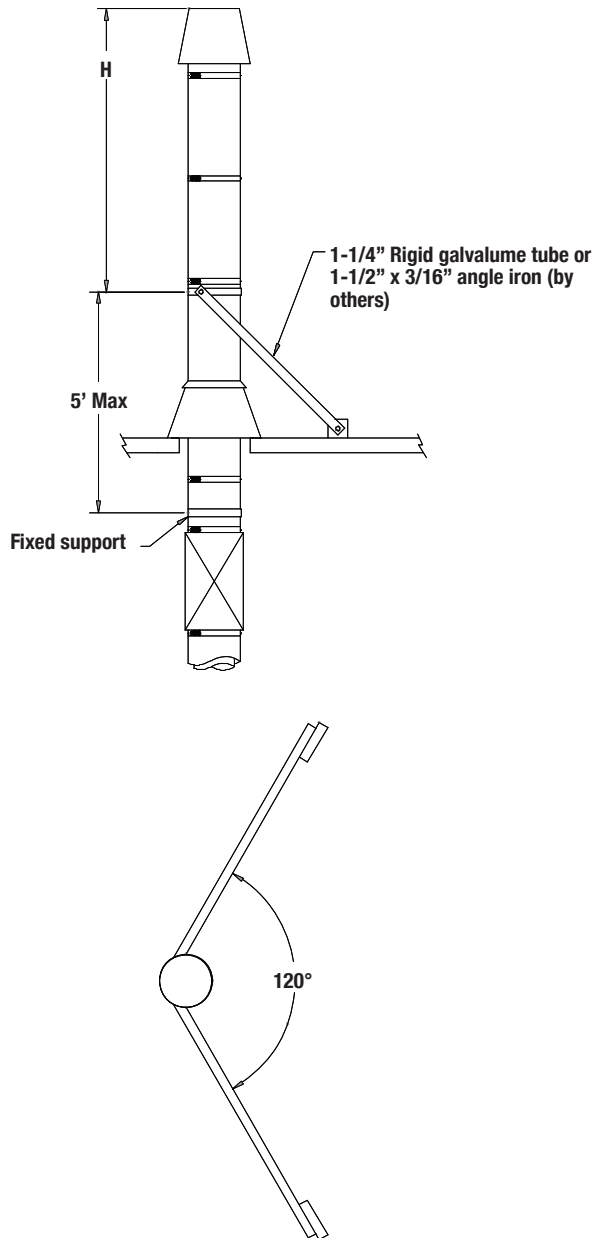


Figure 34 - Roof brace assembly

GUY WIRE (GW)

1. The guy wire is used where the chimney extends more than 10' above the roof.
2. It consists of a band designed to receive 3 guy wire (supplied by others) at 120° apart or 6 guy wire at 60° apart for diameter larger than 24". The guy wires are fixed to the roof by means of tensioner and anchor (also by others).
3. When installing guy wire, the cable must be slightly slack or loose to allow thermal expansion or be equipped with tensioning springs (by others). The tensioning springs are mandatory only when there is more than one level of guy wire needed.
4. To minimize the effect of thermal expansion, good practice implies installing a fixed support and an expansion length at the roof level (see **Figure 35** 'guy wire').

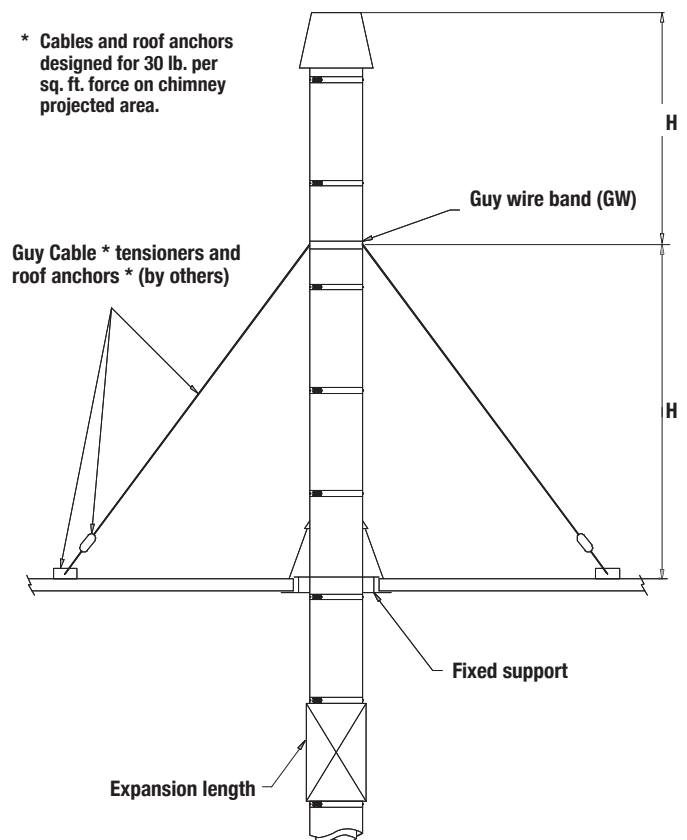


Figure 35 - Guy Wire

SECTION D - ROOF AND WALL PENETRATIONS

ROOF/FLOOR PENETRATION

1. The roof/floor penetration consist of a firestop radiant shield (FS), a flashing (F) with a storm collar (SC) and a floor guide (FG) or ventilated anchor plate (APV) (see **Figure 36** roof/floor penetration).
2. Those components allows the chimney to penetrate a combustible roof or floor at 2 inches clearance to combustible. See **table 3** – Minimum openings for framing dimension.
3. The radiant shield of the firestop may need to be trimmed to fit the height of the roof. Nominal height is 10 inches.
4. Roof/floor penetration components are designed to be installed on a flat roof. They may be installed on a pitch roof if a curb is installed to provide a flat surface.
5. Floor guide is used to protect the flashing from lateral movement. The ventilated anchor plate is used to protect the flashing and to provide a re-support.
6. Do not install a chimney joint or a expansion length in the roof/floor space.
7. For installation on non-combustibles materials, the minimum opening can be reduced to I.D. + 6 inches. The anchor plate can also be used instead of the ventilated version.
8. Always seal, with outer joint sealant, between storm collar and outer chimney casing.
9. Installation step:
 - a. Cut opening to dimensions specify in **table 3**.
 - b. Install the Firestop under the roof/floor and attach it with screw.
 - c. Slide CIX / CAX chimney trough the firestop.
 - d. Install the floor guide or the ventilated anchor plate on top of the roof/floor.
 - e. Install flashing over the chimney and the guide/support and screw it.
 - f. The storm collar is placed around the chimney and sealed to the casing with outer joint sealant. The storm collar should not quite rest on the flashing when the chimney is cold (1/4" gap between the collar and the top of the flashing).

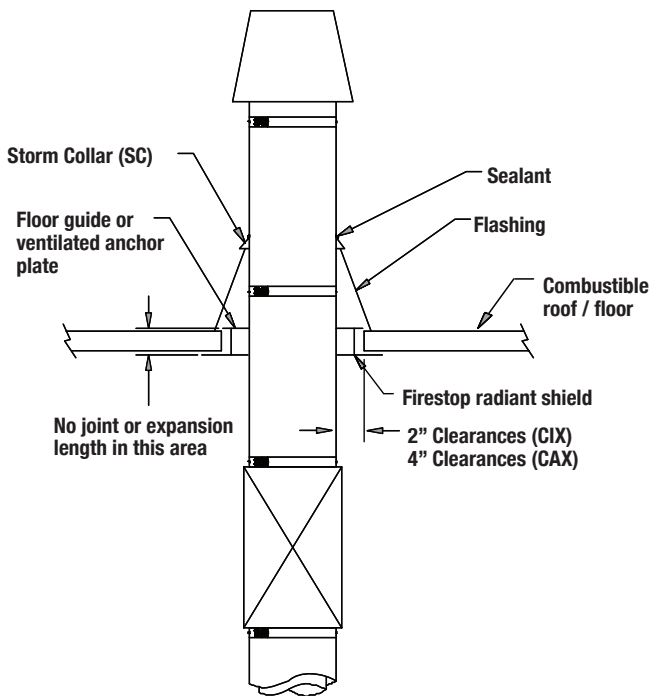


Figure 36 - Roof / floor penetration

WALL PENETRATION

1. This part is used to allow model CIX / CAX chimney to pass trough a wall made of combustible construction.

NOTE: Crossing a combustible wall is not permitted for diameters larger than 10" inside diameter.
2. The wall penetrator (FSW) consist of a firestop female half and a male half that slide in each other to adjust wall thickness from 7.8" to 12.1", see **Figure 37**.
3. Installation step:
 - a. Cut opening to dimension indicated in **table 3**.
 - b. Slide the firestop female half into the opening and fix it to the wall with screws.
 - c. On the other side of the wall, slide the male half into the opening and fix it.
 - d. Insert the chimney trough the opening of the wall firestop. Make sure there is no chimney joint or expansion length in the wall opening.
 - e. The chimney section must be well supported and guided to prevent any load on the wall firestop.

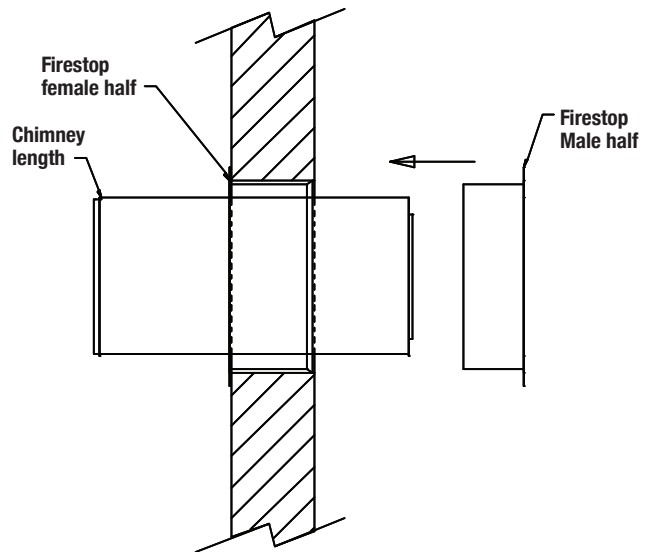


Figure 37 - Wall firestop

SECTION E - TERMINATIONS, STARTING ADAPTORS, DRAIN LENGTH AND RELIEF VALVE

STARTING ADAPTORS

Single Wall Adaptor (SWA)

1. The Single Wall Adaptor is used as an appliance connector. It is designed to be clamped with a Retaining Band and a locking band over a shank type flue gas outlet.
2. First, slide the retaining band over the appliance outlet and tighten it with supplied bolt. (See **figure 38**).
3. Add a bead of sealant about 1/8" on the flange of the retaining band and one on the flange of the adaptor (SWA) and mate those two flanges together. Be sure to fill all the gaps with S-2000 sealant. (See **figure 39 and figure 40**).
4. Tighten the Locking Band to hold and seal the adaptor in place. See **Figure 41** for typical installation.

ANSI Flange Adaptor (FA)

1. The Flange Adaptor (FA) is intended for use as a connection to a class 125 or 150 ANSI pipe flange.
2. This type of connection requires a flange gasket and bolt set provided by the installer. The gasket and bolts are typically sold by pipe, valve and fittings houses as 'NBG' set. **Figure 42** illustrates a typical installation.
3. An outer band with insulation is included to close the installation.

Flanged Adaptor (FHA)

1. The Flanged Adaptor (FHA) is used to connect the CIX / CAX chimney to flanged appliance outlets other than those with ANSI pipe flanges.
2. The adaptor is designed to sandwich an 1/2 inch flange between two half ring and the appliance flanged outlet. The Flange Adaptor comes with beam clamps to clamp the FHA to the appliance. See **Figure 43**.

CIX/CT, CT/CIX, CAX/CT, CT/CAX Adaptor

1. Used to connect model CIX / CAX chimney to model CT chimney. See **Figure 44**.

OTHER ADAPTORS

Female Single Wall Adaptor (FSWA)

1. The Female Single Wall Adaptor is used as a connector to specialised component or existing chimney connection. It is designed to be clamped with a Retaining Band and a locking band over a shank type flue gas inlet.
2. First, slide the retaining band over the system inlet and tighten it with supplied bolt. (See **figure 38a**).
3. Add a bead of sealant about 1/8" on the flange of the retaining band and one on the flange of the adaptor (SWA) and mate those two flanges together. Be sure to fill all the gaps with S-2000 sealant. (See **figure 39a and figure 40a**).
4. Tighten the Locking Band to hold and seal the adaptor in place. See **Figure 41a** for typical installation.

Female ANSI Flange Adaptor (FFA)

1. The Female Flange Adaptor (FFA) is intended for use as a connection to a class 125 or 150 ANSI pipe flange.
2. This type of connection requires a flange gasket and bolt set provided by the installer. The gasket and bolts are typically sold by pipe, valve and fittings houses as 'NBG' set. **Figure 42** illustrates a typical installation.
3. An outer band with insulation is included to close the installation.

Female Flanged Adaptor (FFHA)

1. The Flanged Adaptor (FFHA) is used to connect the CIX chimney to flanged appliance outlets other than those with ANSI pipe flanges.
2. The adaptor is designed to sandwich an 1/2 inch flange between two half ring and the appliance flanged outlet. The Flange Adaptor comes with beam clamps to clamp the FFHA to the appliance. See **Figure 42**.

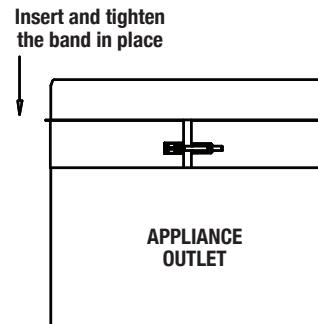


Figure 38 - Single wall adaptor

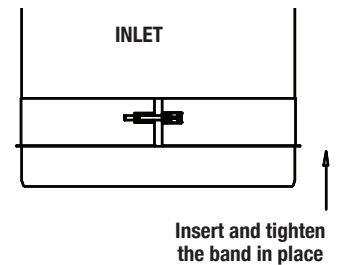


Figure 38a - Female Single wall adaptor

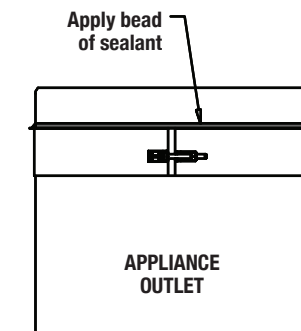


Figure 39

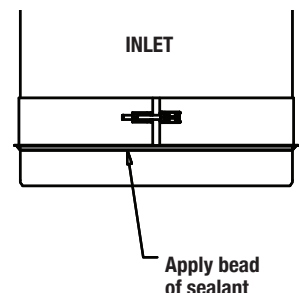


Figure 39a

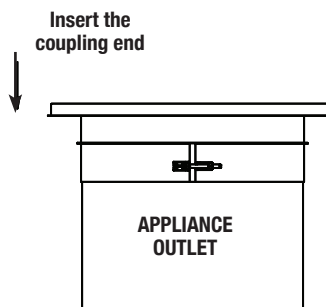


Figure 40

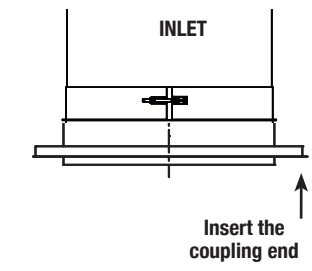


Figure 40a

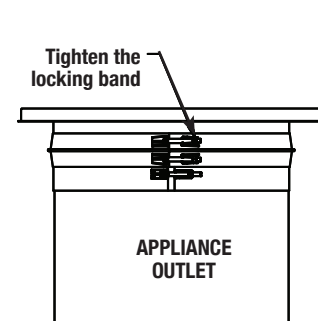


Figure 41

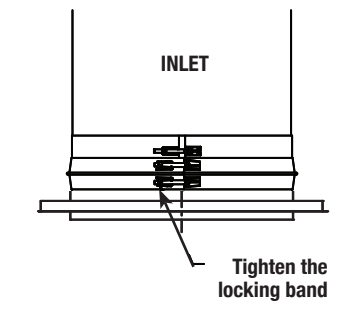


Figure 41a

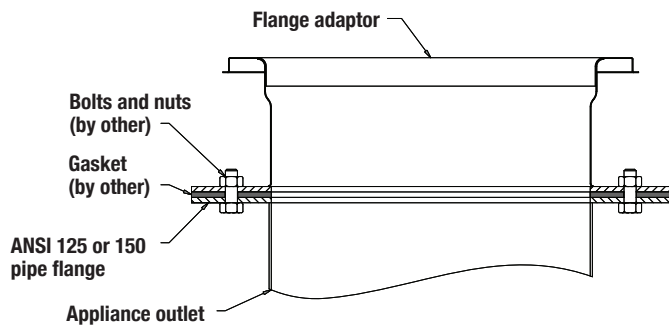


Figure 42 - ANSI flange adaptor (FA illustrated)

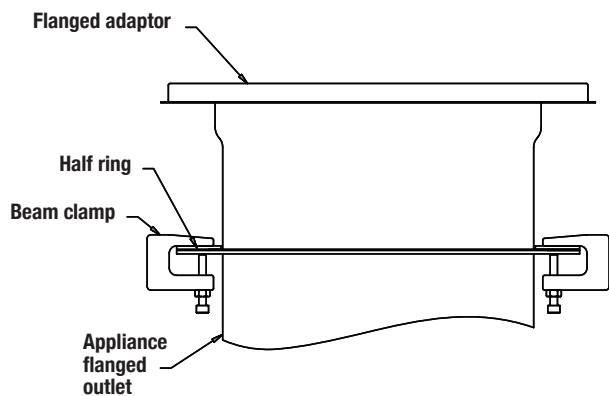


Figure 43 - Flanged adaptor (FHA illustrated)

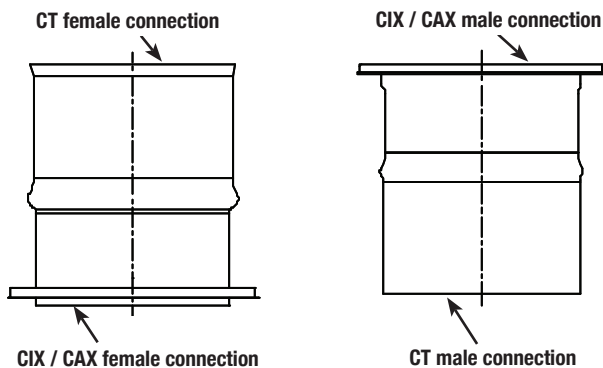


Figure 44 - CIX / CT, CT / CIX adaptor

TERMINATIONS

Note: Installation of model CIX / CAX chimney can be completed without any terminations if not necessary.

Rain Cap (RC)

1. Installed at the top of the chimney, it provides the greatest degree of rain protection.
2. Three models of rain cap are available dependently of the diameter, see **Figure 45**.
3. Do not use with turbine or engine exhaust.
4. Installation is done the same manner as a standard length except for model 3. For this model, there are 3 additional steel straps to be screwed to the chimney outer casing to ensure resistance to high wind.

Finishing Cone (FC)

1. Used to create a better draft when installed at the top of the chimney, see **Figure 46**.
2. Requires a drain at the bottom of the stack to collect rain entering the chimney.
3. Installation is done as a standard length.

Flip Top (FT) (CIX only)

1. Used in diesel or turbine exhaust, it prevents moisture and debris from entering the system. See **Figure 47**.
2. Flip top opens with internal pressure and closes when no pressure.
3. Install as a standard length.

Miter Cut (MC)

1. Used in diesel or turbine exhaust as an horizontal termination. See **Figure 48**.
2. Installation is done as a standard length.

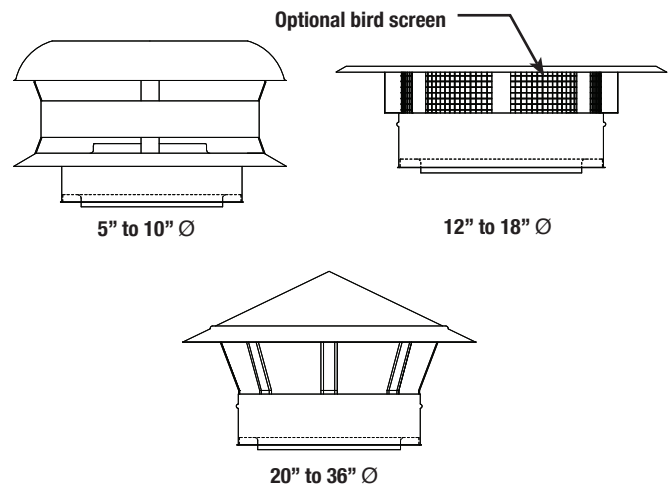


Figure 45 - Rain Cap models

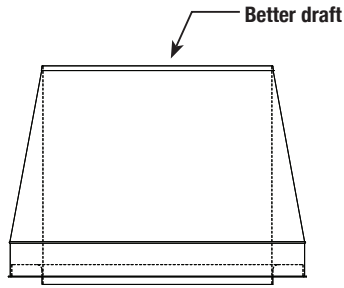


Figure 46 - Finishing Cone (FC)

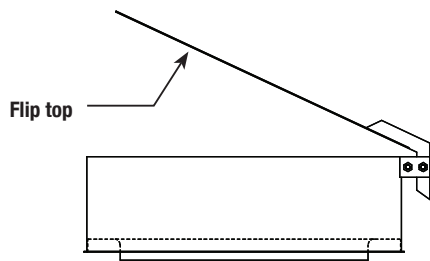


Figure 47 - Flip Top (FT)

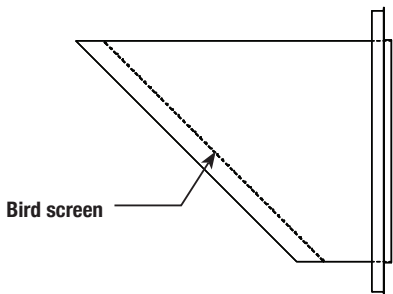


Figure 48 - Miter Cut Termination (MC)

DRAIN LENGTH

Drain Length (DL)

1. Used to drain rain or condensate from the chimney.
2. The chimney flue is equipped with an annular catch ring and a 1" NPT nipple extending through the outer casing for attachment of drain tubing.
3. The drain tubing should include a water trap of a height at least equal to the maximum expected operating pressure at the appliance outlet to avoid allowing flue gases to vent through the drain. See **Figure 49**.
4. Drain length should be installed indoors to prevent freezing.

RELIEF VALVE (CIX ONLY)

Relief Valve (RV)

1. The relief valve must be use with diesel engines to provide extra protection to the chimney in case of a delayed ignition and backfire.
2. The valve is factory calibrated to open at 27 in. wc.
3. The relief valve must be supported independently of the rest of the exhaust system. The best way to accomplish this is to locate an Anchor Plate (AP) support at the joint between the ANSI Flange adaptor and the adjacent fitting. See **Figure 50**.
4. It is crucial that the support be properly secured to building structure so that it can withstand the forces generated in case of delayed fuel ignition.

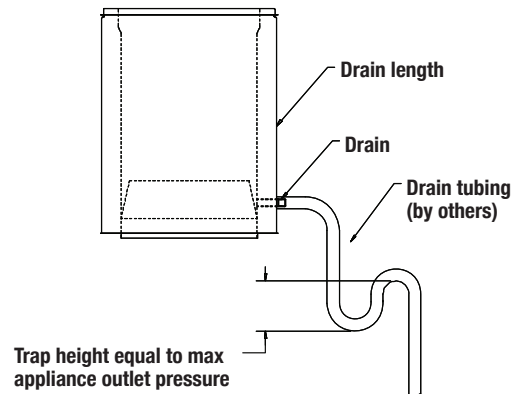


Figure 49 - Drain length

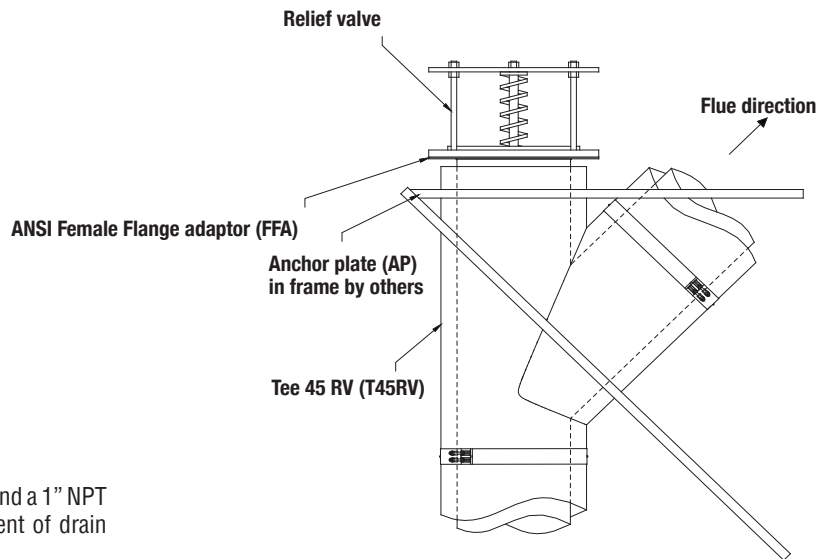


Figure 50 - Relief Valve installation Example

SECTION F - THERMAL EXPANSION

Thermal Expansion :

1. When Model CIX / CAX is in use, thermal expansion will occur on the inner flue and outer casing.
2. A good estimation for thermal expansion is approximately 1" per 100' chimney length per 100°F rise.

$$\text{Thermal expansion [inch]} = (\text{length[feet]}/100) \times (\Delta T [^\circ\text{F}]/100)$$

3. Thus, the thermal expansion is dependant on the inner flue temperature and the length of the chimney between two (2) fixed points.
4. Good installation requires that expansion greater than 1/4" must be compensated with either a bellow joint (LB) or an adjustable length (LA). Depending on the pressure of the system.
5. Tees and elbows are not designed to withstand bending moment, make sure to compensate thermal expansion before connecting to a tee or a elbow.
6. Expansion joints are not designed to withstand lateral forces so they must be accurately supported and guided.
7. Because the amount of outer casing movement is the same as the inner flue, the outer casing must slide to avoid excessive forces on tees, elbows or fixed points. To accommodate outer casing movements, wall guide, floor guide and suspension bands must allow movement of the chimney.
8. When supporting a system with considerable height and thermal expansion, adjustable lengths or bellow joints must be used just below every fixed support above the first to compensate for thermal expansion.
9. For engine or turbine exhaust system requiring pressures up to 60 inches of water column, or where the construction must be absolutely gas tight, all welded bellows length (LB) are recommended for expansion and vibration movements of the exhaust.
10. Low pressure systems, such as boilers (up to 6 inches water column), can effectively use the Adjustable Length (LA).
11. Spacing of guides and supports, when a thermal expansion part is used, should not be greater than that specified in Section A, **table 7**.
12. Proper guiding and support of expansion parts often requires closer spacing.

EXPANSION JOINTS INSTALLATION

Bellows Expansion Joint (LB) and Adjustable Length (LA) in vertical runs

1. A Bellows Expansion Joints or Adjustable Length installed vertically should be installed directly below one chimney length of the highest support, between fixed points (see **Figure 51**).
2. Always use Bellows Expansion Joints or Adjustable Lengths between fixed points when expansion is over 1/4". See **table 14 and Table 15** for maximum run between fixed points.
3. Install proper guiding between fixed points when using Bellows Expansion Joint or Adjustable Length, to allow chimney vertical movement due to expansion.

Bellows Expansion Joint and Adjustable Length in horizontal runs

1. Same guidelines apply as for vertical run with respect to expansion estimate and proper support and guiding with the use of Bellows Expansion Joint and Adjustable Length.

BELLOWS EXPANSION JOINT (LB)

1. Used in diesel or turbine exhaust installation for expansion and vibration movements.
2. Good for exhaust pressure up to 60 inches of water column, it will compensate for up to 3" max of expansion. See **table 14** for maximum run with one bellow.
3. Bellow joints comes with a liner to protect the bellow and to have a smooth flow.
4. We suggest to always install a 12" length chimney downstream and upstream the bellow to insure clearance for the liner and adding accessibility for supporting and guiding. See **Figure 51** "bellowjoint" for good positioning of the bellow expansion joint.
5. It is of the most important that the bellow joint be properly supported and guided in vertical and horizontal orientation.
6. Installation is done the same way as described in section A: Chimney and fitting joint assembly.

Operating temp. [°F]	Max distance with one bellow joint [feet]
700	42.8
800	37.5
900	33.3
1000	30.0
1100	27.3
1200	25.0
1300	23.1
1400	21.4

Table 14 - Maximum run with bellow between each fixed point

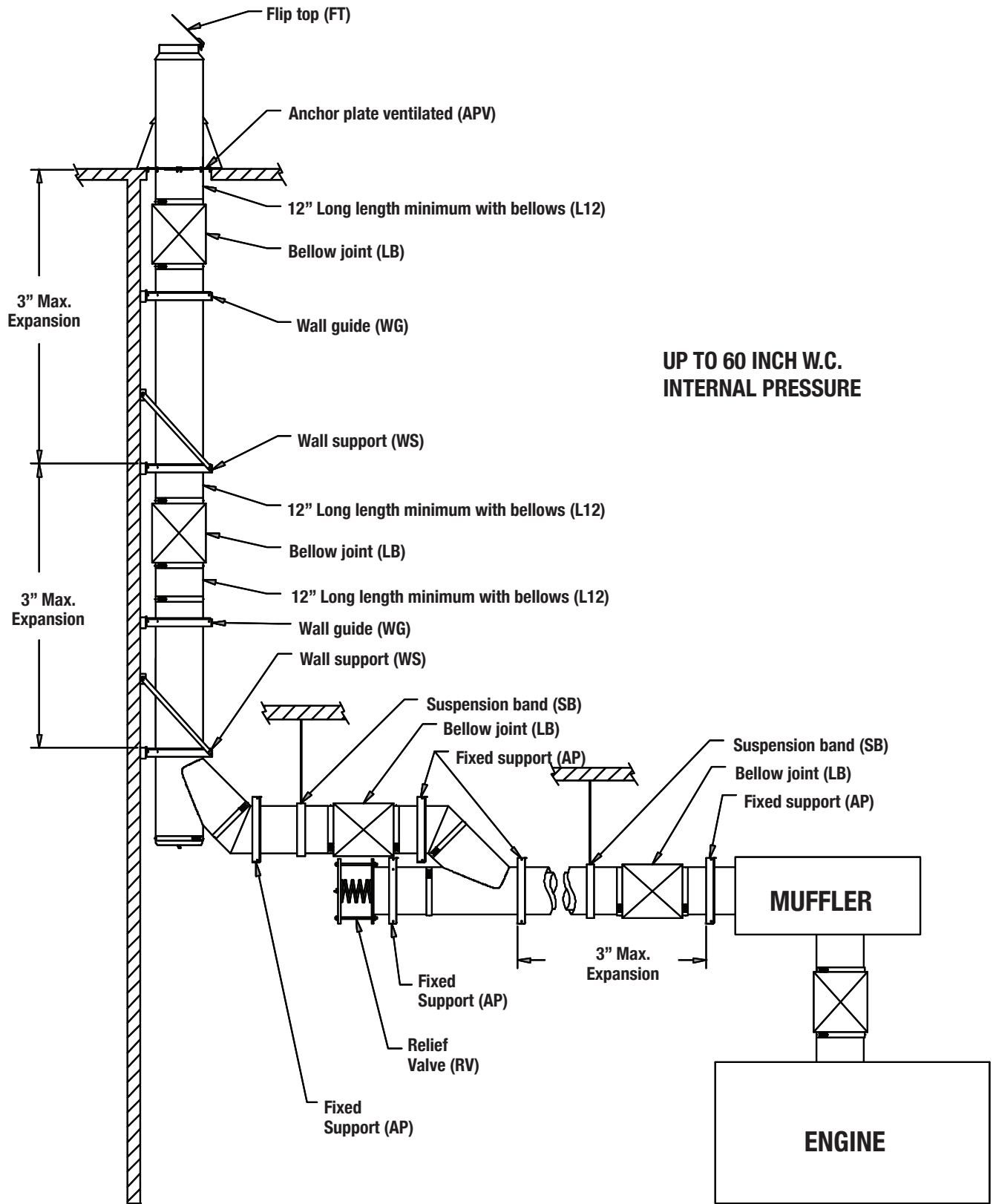


Figure 51 - Bellow Joint installation on Diesel Engine

ADJUSTABLE LENGTH

1. The adjustable length (LA) is used for two functions, one is to make odd lengths and the other to serve as an expansion joint.
2. The adjustable length may be used when internal pressure do not exceed 6" water column or in well ventilated areas. See **Figure 66** for good positioning of the adjustable length.
3. The adjustable length assembly includes a sliding inner section, two containing rings, one compression band, a graphite packing gasket, an insulation band (CIX only) and a telescopic outer casing. There is a tool supplied with this assembly. (see **Figure 67**).
4. For proper installation, the adjustable length must have adequate overlap and sufficient allowance for thermal expansion. (see **Figure 56** - Adjustable length (LA), and **table 15**).
5. **Installation steps** (see **Figure 57**):
 - a. Adjust the length of the chimney as required. If outer casing or inner flue are too long, they may be cut to length. You must keep the overlap of the outer casing to at least 1". You are only authorised to cut on the outer casing section attached to the female coupling. See **Figure 52**.
 - b. Move up the sliding section of the outer wall to access inner wall. See **Figure 53**.
 - c. Tighten the compression band so that the graphite packing is firmly registered against the inner flue. See **Figure 54**.
 - d. Tighten all the bolts of the containing ring. For each bolt, use the supplied tool as a guide between the two containing rings (see **Figure 55**).
 - e. Fill the gap between the inner flue and outer casing with the supplied insulation band. See **Figure 56** (CIX only).
 - f. Move down the sliding section of the outer wall to the flange of the female coupling and install the locking band as described in section A: Chimney and fitting joint assembly. See **Figure 57**.

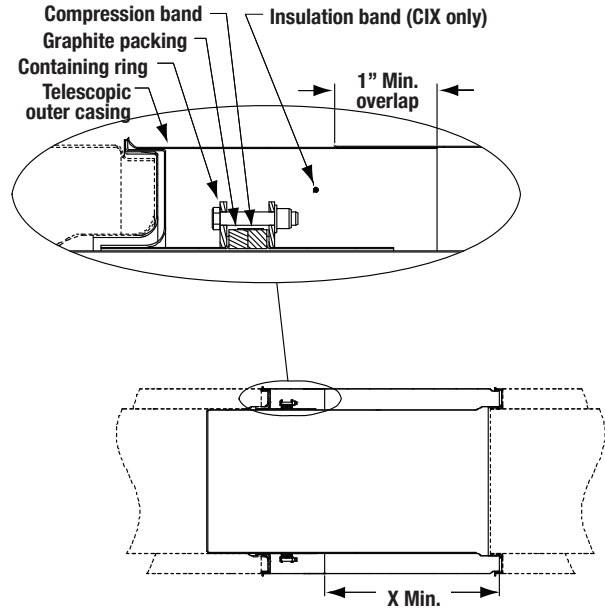


Figure 58 - Adjustable length

$X \text{ min.} = \text{EXPANSION} + 3 \text{ [inch]}$ $\text{EXPANSION} = (\text{length[feet]}/100) \times (\Delta T[^\circ\text{F}]/100)$	
Operating Temp. [°F]	Max distance with one Adjustable length [feet]
200	200
300	133
400	100
500	80
800	50
1000	40
1200	33
1400	29

Table 15 : Maximum run with Adjustable length between two fixed points

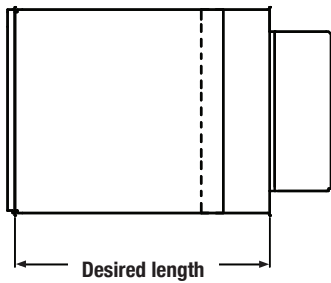


Figure 52 - Adjustable length, INSTALLATION STEP A

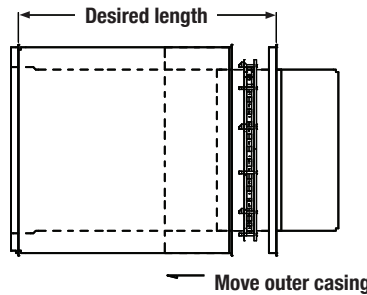


Figure 53 - Adjustable length, INSTALLATION STEP B

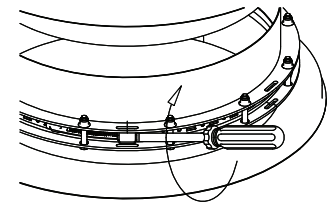


Figure 54 - Adjustable length, INSTALLATION STEP C

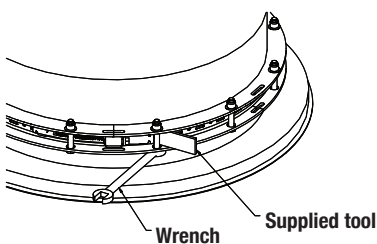


Figure 55 - Adjustable length, INSTALLATION STEP D

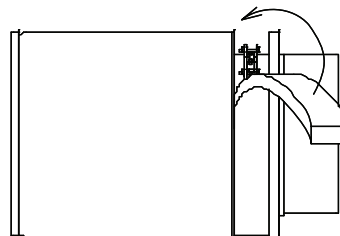


Figure 56 - Adjustable length, INSTALLATION STEP E

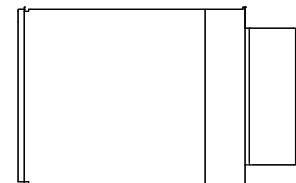


Figure 57 - Adjustable length, INSTALLATION STEP F

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

VARIABLE LENGTH

1. The variable length (LV) is used only to make odd lengths, it doesn't compensate thermal expansion. See **figure 66 for typical location**.
2. The variable length assembly includes a sliding flanged female coupling, a flanged retaining band, a locking band, an insulation band and split outer casing. Inner flue sealant S-2000 or S-650 is necessary depending on the flue gas temperature.
3. **Installation steps :**
 - a. Measure the distance required for the variable length. See **figure 59**.
 - b. Cut the inner wall at the dimension found at point 'a.' plus 1". Cut the split outer casing at dimension plus 5/8". Then cut the insulation band at dimension (CIX only). See **figure 60**.
 - c. Install the interior assembly between the two parts. Put one bead of sealant between the couplings flanges as a regular length installation. See **figure 61**.
 - d. Slide down the female coupling over the male coupling of downstream part and fill the gap between the female coupling and the inner wall with S-2000 or S-650 sealant. See **figure 62**.
 - e. Slide down the retaining band to the female coupling to mate their flanges and tighten the band. Then, install the locking band over those flanges. See **figure 63**.
 - f. Install the insulation over the inner wall (CIX only). See **figure 64**.
 - g. Install the split outer casing by inserting the crimped end under the male coupling first. Tighten the bolts and install the locking bands of downstream and upstream parts. See **figure 64**.

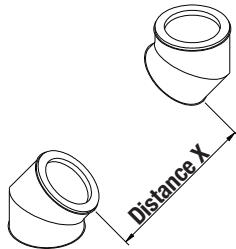


Figure 59- Variable length, Installation step A

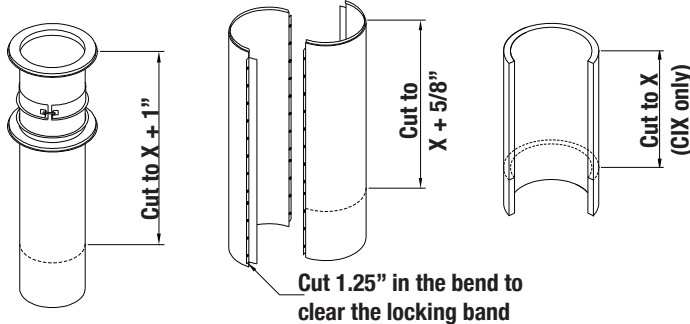


Figure 60 - Variable length, Installation step B

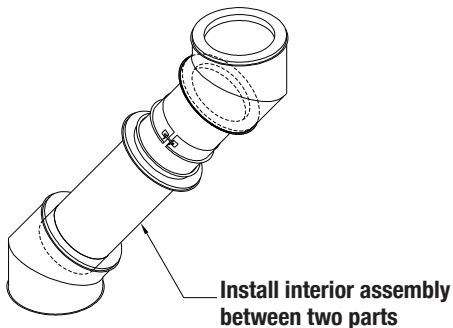


Figure 61 - Variable length, Installation step C

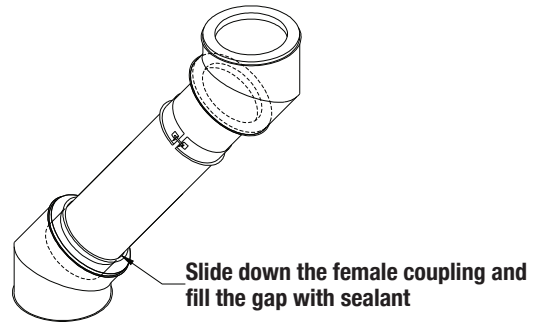


Figure 62 - Variable length, Installation step D

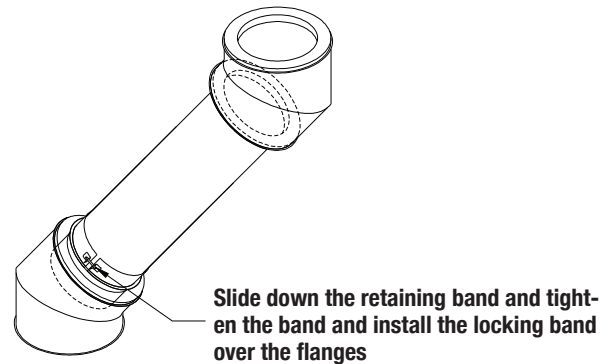


Figure 63 - Variable length, Installation step E

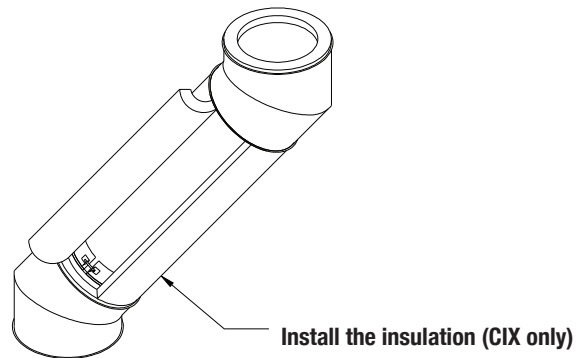


Figure 64 - Variable length, Installation step F

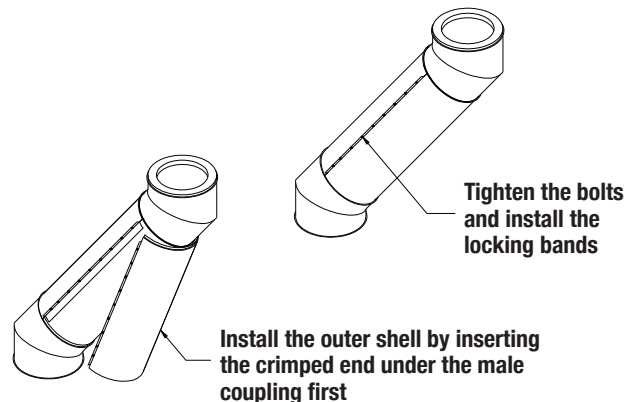


Figure 65 - Variable length, Installation step G

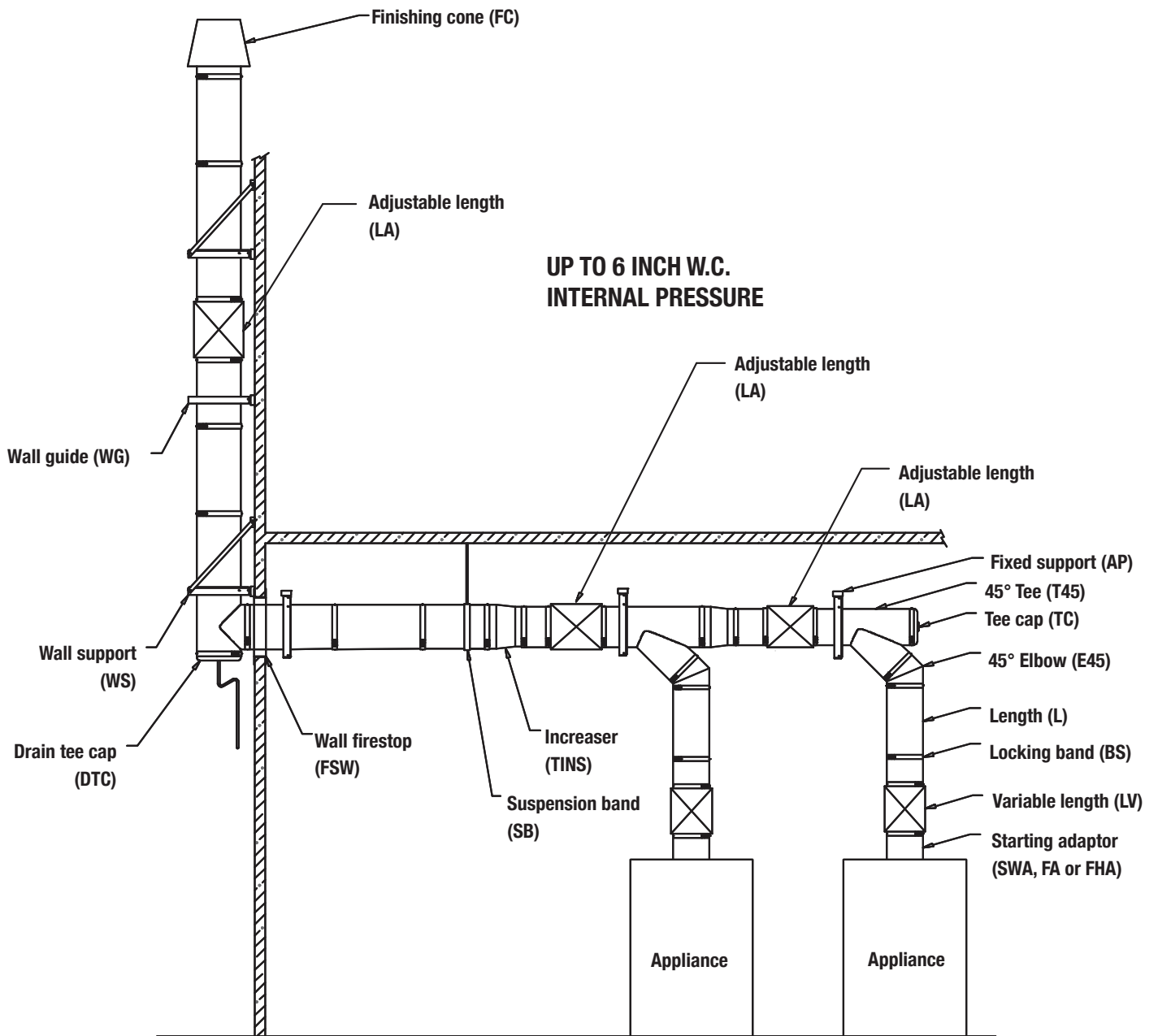


Figure 66 - Adjustable and Variable length typical location

SECTION G - GREASE DUCT APPLICATION (CIX ONLY)

ACCESS

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

1. A clean-out must be provided at each change of direction except where the entire length of the duct can be inspected and cleaned from either the hood or the discharge end.
2. On horizontal duct runs, at least one (1) 20" (508) diameter opening must be provided. Where the duct is smaller than 20" (610) diameter, openings large enough to permit cleaning must be provided at intervals of not more than 12' (3.66m).
3. Openings may be at the side or the top of the duct whichever is more accessible. When the opening is on the side of the duct, the lower edge of the opening must be at least 1-1/2" (38) above the bottom of the duct. For Model CIX Grease Duct, this is accomplished by the use of the Grease Tee (GT90) with a Tee Cap (TC).
4. On vertical duct where personnel entry is possible, access must be from the top of the riser. Where entry is not possible, access must be provided at each floor.

NOTE: ACCESS REQUIREMENTS ARE SUBJECT TO CHANGE IN ACCORDANCE WITH LOCAL CODE. LOCAL AUTHORITIES SHOULD BE CONSULTED FOR EXACT REQUIREMENTS.

USE AND INSTALLATION OF INDIVIDUAL PARTS

1. Security™ Model CIX parts numbering and parts usage are discussed under chimney applications beginning on **page 4** of these installation instructions.
2. Those parts specific to grease duct, which are not normally used in chimney applications, are discussed in the following sections.
3. Installation is the same as described for standard application on **page 5**, but a additional bead of sealant must be applied. See **figure 2**.

HORIZONTAL DRAIN LENGTH (HDL)

1. Horizontal Drain length is equipped with a 1" (25) NPT nipple, which is attached to the inner flue and extends through the outer casing to provide a path to drain grease, condensate or wash water from the duct. See **Figure 67**.
2. A dam is attached to the inside of the inner flue adjacent to the nipple to channel the effluent to the drain.
3. The duct drain is intended for use at the end of a horizontal run where access and drainage is needed (See **Figure 68**).
4. The drain coupling must be connected to a grease trap or approved container (supplied by others).

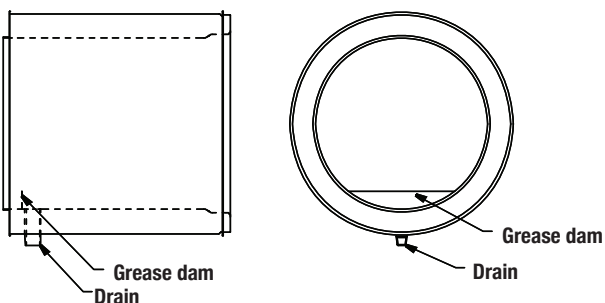


Figure 67 - Horizontal Drain length

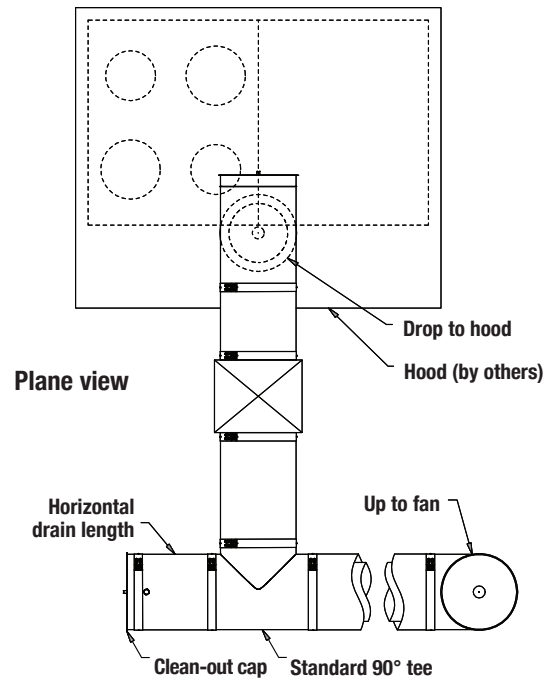


Figure 68 - Horizontal drain length typical location

NOZZLE SECTION

1. The nozzle section is used when the duct is required to be equipped with a fire suppression system or washdown is desired.
2. The nozzle section allows a spray head or nipple to be attached to the duct through a 1" (25) NPT coupling attached to the inner flue and when the chimney section is in a vertical orientation, the nozzle may be located at the most convenient place. See **Figure 69**.
3. Local authorities should always be consulted regarding the need for fire protection or washdown systems be installed so that the coupling is at or above the horizontal centerline of the chimney.

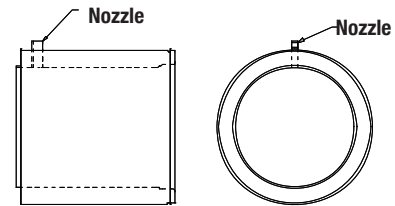


Figure 69 - Nozzle Section

SQUARE TO ROUND ADAPTOR

1. When the hood is equipped with a square or rectangular collar, a square to round adaptor is needed to connect the round CIX chimney to the hood (See **Figure 70**).
2. The outside dimensions of the square end are slightly smaller than the hood collar. It will fit inside the collar and be connected by welding the two parts.

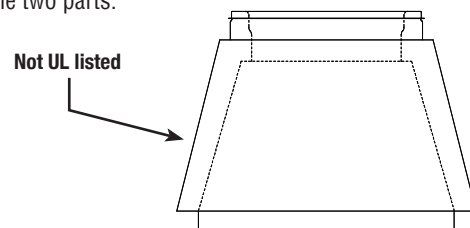


Figure 70 - Square to round adaptor

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

GREASE TEE 90° (GT90P) / TEE 90 DAM (T90D) (CIX ONLY)

The Grease Tee 90 and the standard Tee 90 with a dam are used to provide access for clean-out to comply with NFPA 96 requirements. They are equipped with a 1-1/2" (38) high grease dam at the access port. The access port must be closed with a tee cap (TC). The location of the access port in the tee is dependent on the orientation of the tee in the final installation. Access port location is coded as shown in **Figure 71**.

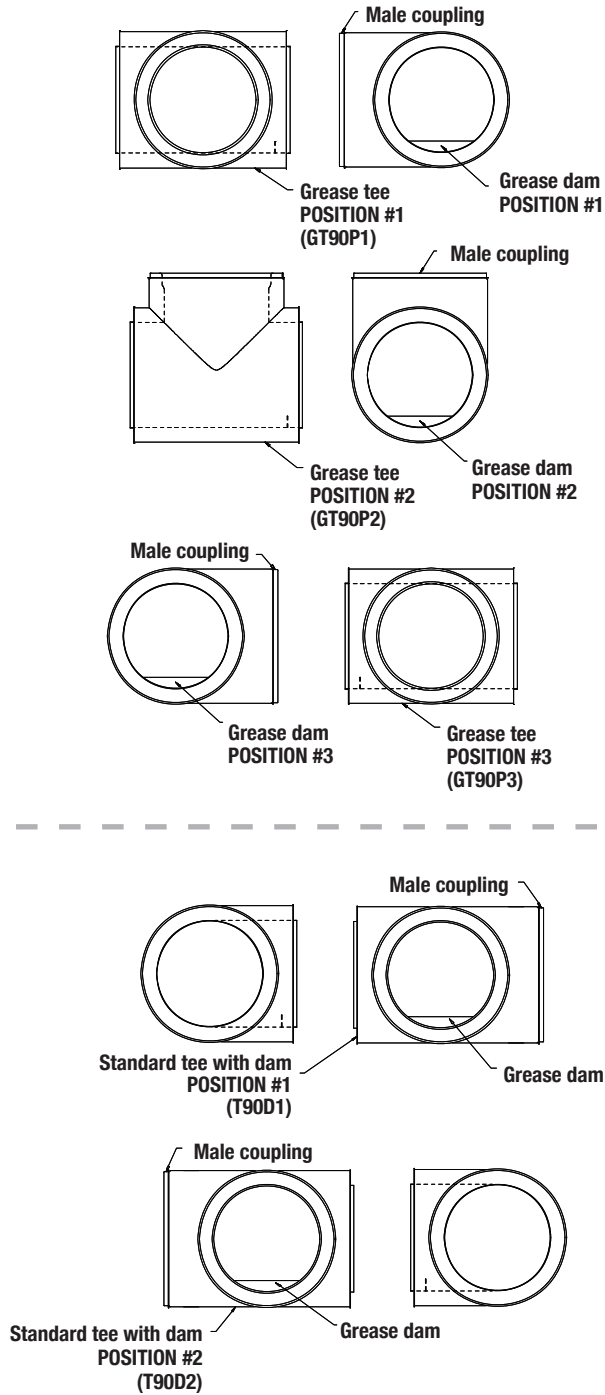


Figure 71 - Grease tees

GREASE TEE Y (CIX ONLY)

1. The Grease Tee Y (GTY) is very useful where the grease duct must be accessed for clean-out and inspection purposes. See **Figure 72**.
2. It can be used in place of the Grease Tee 90 (GT90) and provides excellent access clearance for clean-outs.
3. Clean-outs must be located at all direction changes in the grease ductwork.
4. Installation is the same as standard tee.

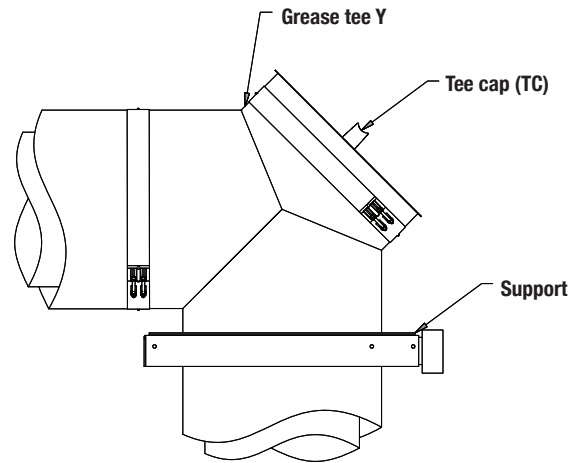


Figure 72 - Grease tee Y

NO TOOL ACCESS DOOR - REMOVAL FOR INSPECTION OR CLEANING

1. Unscrew the six (6) wing screws with your hands and set them in a safe place during the inspection (*see figure 73*).

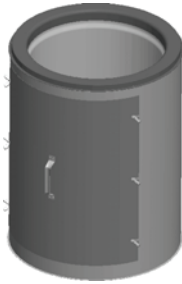


Figure 73

2. Remove the outer door from the outer wall of the duct and set it in a safe place during the inspection (*see figure 74*).
3. Remove the insulation pad and set it in a safe place during the inspection (*see figure 74*).

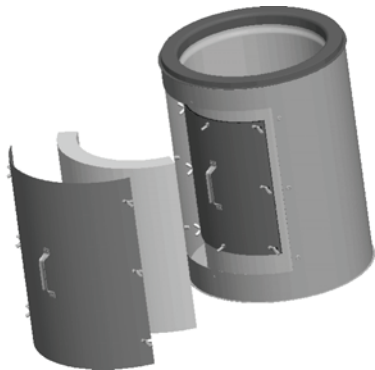


Figure 74

4. Unscrew the eight (8) wing screws and set it in a safe place (*see figure 75*).
5. Remove the Inner cover and set it in a safe place (*see figure 75*).

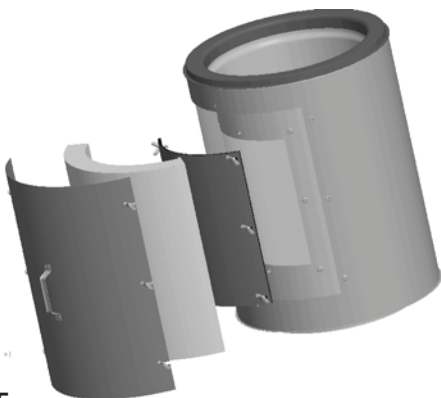


Figure 75

6. Inspect the ceramic gasket (white) and the silicone gasket (gray) attached on the inside of the Inner door for any damage (*see figure 76*). If any damages, you must order one or both gaskets.

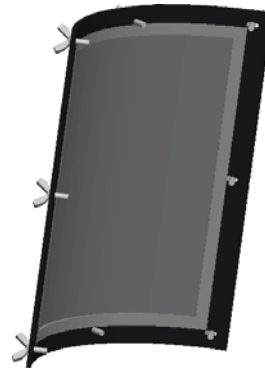


Figure 76

Replacement of the access door:

1. Replace the Inner door on the duct over the access hole.
2. To make sure the door is well placed, put back only the top and lower central wing screw and tighten both.
3. Make sure that the door is well placed.
4. Put back the other six (6) wing screws and tighten adequately.
5. Replace the INSULATION PAD over the inner door.
6. Replace the outer door.
7. Put back the six (6) wing screws and tighten them with your hands.

FAN ADAPTOR PLATE (FAN) (CIX ONLY)

1. The fan adaptor is designed to connect to an upblast fan mounted on a roof curb.
2. When connected to an upblast fan (See **Figure 77**), the plate mounts on top of the fan curb which supports the fan housing.
3. The plate may be positioned off center within the curb provided that minimum clearance to combustibles is maintained.
4. In the event that the plate is positioned off center, trim off excess plate material to allow fan placement.
5. Secure the plate to the curb a minimum of three (3) places per side with minimum #8 x 1-1/4" wood screws. You will have to drill holes in the plate.
6. The fan housing is set on top of the plate and sealed using P-650 sealant or an approved gasket supplied by the fan manufacturer.
7. Specify the chimney diameter and outside curb dimensions when ordering the fan adaptor plate.
8. The fan adaptor plate can be used as a vertical support. The maximum height of grease duct supported by the fan adaptor plate is 15' for all diameters.

WARNING: DO NOT EXCEED THE MAXIMUM LOAD LIMIT OF THE ROOF CURB OR THE ROOF.

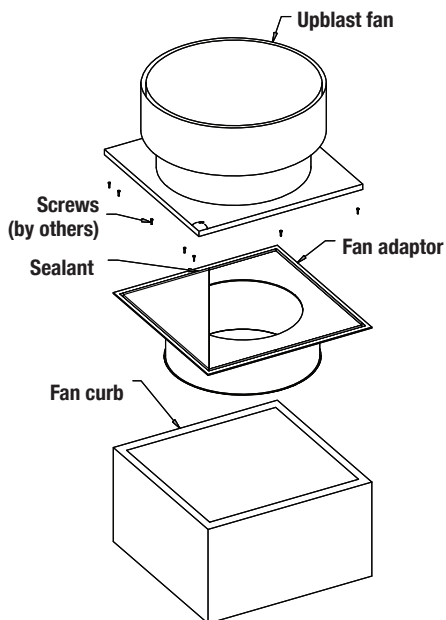


Figure 77 - Fan adaptor




MAINTENANCE

1. Grease duct is required by NFPA 96 and many local building codes to be inspected and cleaned if necessary at specific intervals.
2. Security™ Model CIX Grease Duct must be inspected and cleaned in accordance with local requirements. It requires no additional internal maintenance.
3. Security Chimneys International recommends that grease containers connected to drainage points be emptied and washed out daily or more often, if necessary. If needed, the drain nipples should be checked and cleaned whenever the containers are emptied.
4. Where the duct is installed outside the building, the galvalum steel outer casing must be primed and painted. The paint surface should be maintained regularly to prevent possible deterioration of the casing surface. The use of stainless steel outer casing negates the need for painting.

NOTE: When solid fuel fired cooking appliances are vented with Model CIX Grease Duct, creosote and grease may buildup on the inner flue. This mixture can result in an unusually severe duct fire. To minimize fire hazard, the duct should be inspected weekly and any residue removed by cleaning. Additional requirements for solid fuel fired cooking appliances are outlined in NFPA 96.

SECTION H - MARKINGS

SAFETY LISTING LABELS - CIX AND CAX

<p>UL-103 ULC-S604 ORD-C959</p>	<p>LISTED / HOMOLOGUÉ</p> <p>BUILDING HEATING APPLIANCE CHIMNEY / CHEMINÉE POUR APPAREIL DE CHAUFFAGE INDUSTRIAL 1000°F OR LESS CHIMNEY / CHEMINÉE INDUSTRIELLE 540°C OU MOINS INDUSTRIAL 1400°F OR LESS CHIMNEY / CHEMINÉE INDUSTRIELLE 760°C OU MOINS</p>	 Intertek 4002244
<p>UL-1978 GREASE DUCT / CONDUIT D'ÉVACUATION DE GRAISSE: CIX ONLY / CIX SEULEMENT</p> <p>Ø5" TO Ø36" / Ø5" À Ø36"</p> <p>FOR VENTING SOLID(US ONLY), LIQUID AND GAS-FIRED APPLIANCES / POUR ÉVACUER DES COMBUSTIBLES SOLIDES (US SEULEMENT), LIQUIDES ET GAZEUX</p>		
<p>MODEL CIX / CAX MODÈLE</p>		
<p>MINIMUM CLEARANCE (AIR SPACE) TO COMBUSTIBLE MATERIALS AND BUILDING INSULATION: 1" CIX FOR B.H.A / 1000°F / 1400°F CHIMNEY 2" CIX FOR GREASE DUCT 4" CAX FOR B.H.A. / 1000°F / 1400°F CHIMNEY</p> <p>WHEN A CHIMNEY PASSES THROUGH A COMBUSTIBLE WALL, THE SECURITY CHIMNEYS WALL FIRESTOP SHALL BE USED TO MAINTAIN A 2" CIX / 4" CAX CLEARANCES TO COMBUSTIBLE CROSSING A COMBUSTIBLE WALL IS NOT PERMITTED FOR DIAMETERS LARGER THAN 10" INSIDE DIAMETER</p> <p>CAUTION: DO NOT ENCLOSE WITH COMBUSTIBLE MATERIALS</p> <p>RATED FOR USED AT MAXIMUM 60 INCH WATER COLUMN INTERNAL PRESSURE WHEN USED IN POSITIVE PRESSURE APPLICATION</p> <p>FOR INSTALLATION AS REQUIRED FOR DOUBLE WALL METAL CHIMNEYS. ALWAYS FOLLOW INSTALLATION INSTRUCTION FROM SECURITY CHIMNEYS INTERNATIONAL LTD.</p> <p>SUITABLE FOR EXTERIOR AND INTERIOR INSTALLATION</p>		<p>ESPACE (D'AIR) MINIMAL AUX MATIÈRES COMBUSTIBLE ET AUX ISOLANTS DE LA BATISSE: 1" CIX POUR A.C.B / 540°C / 760°C CHEMINÉE 2" CIX POUR CONDUIT D'ÉVACUATION DE GRAISSE 4" CAX POUR A.C.B. / 540°C / 760°C CHEMINÉE</p> <p>QUAND UNE CHEMINÉE TRAVERSE UN MUR FAIT DE MATÉRIAUX COMBUSTIBLES, LE COUPE-FEU MURAL DE CHEMINÉES SÉCURITÉ DOIT ÊTRE UTILISÉ POUR MAINTENIR UN ESPACE D'AIR DE 2" CIX / 4" CAX AUX MATÉRIAUX COMBUSTIBLES IL N'EST PAS PERMIS DE TRAVERSER UN MUR COMBUSTIBLE POUR LES INSTALLATIONS DE PLUS DE 10" DIAMÈTRE INTERNE</p> <p>ATTENTION: NE PAS ENFERMER DANS UNE ENCEINTE COMBUSTIBLE</p> <p>CLASSÉ POUR UNE UTILISATION A PRESSION POSITIVE INTERNE MAXIMALE DE 60 POUCHES DE COLONNE D'EAU</p> <p>POUR INSTALLATION TEL QUE REQUISE POUR DES CHEMINÉES DOUBLE PAROIES MÉTALLIQUES. TOUJOURS SUIVRE LE MANUEL D'INSTALLATION FOURNIT PAR CHEMINÉES SÉCURITÉ INTERNATIONAL LTÉE.</p> <p>UTILISABLE À L'EXTÉRIEUR ET À L'INTÉRIEUR</p>
<p>CHEMINEES SÉCURITÉ INTERNATIONAL LTÉE</p>		<p>SECURITY CHIMNEYS INTERNATIONAL LTD</p> <p>LAVAL, QC CANADA NP321 REV.2</p>

<p>CIX / CAX</p>	 Intertek 4002244	<p>CIX / CAX</p>
<p>ACCESSORIES</p>		<p>ACCESSOIRES</p>
<p>LISTED</p> <p>BUILDING HEATING APPLIANCE CHIMNEY INDUSTRIAL 1000°F OR LESS CHIMNEY INDUSTRIAL 1400°F OR LESS CHIMNEY GREASE DUCT: CIX ONLY</p> <p>ALWAYS FOLLOW INSTALLATION INSTRUCTION FROM SECURITY CHIMNEYS INTERNATIONAL LTD.</p> <p>SUITABLE FOR EXTERIOR AND INTERIOR INSTALLATION</p>		<p>HOMOLOGUÉ</p> <p>CHEMINÉE POUR APPAREIL DE CHAUFFAGE CHEMINÉE INDUSTRIELLE 540°C OU MOINS CHEMINÉE INDUSTRIELLE 760°C OU MOINS CONDUIT D'ÉVACUATION DE GRAISSE: CIX SEULEMENT</p> <p>TOUJOURS SUIVRE LE MANUEL D'INSTALLATION FOURNIT PAR CHEMINÉES SÉCURITÉ INTERNATIONAL LTÉE.</p> <p>UTILISABLE À L'EXTÉRIEUR ET À L'INTÉRIEUR</p>
<p>SECURITY CHIMNEYS INTERNATIONAL LTD</p>		<p>CHEMINEES SÉCURITÉ INTERNATIONAL LTÉE</p> <p>LAVAL, QC CANADA NP322 REV.1</p>

NOTES

WARRANTY

These products have a limited warranty. Please read the warranty to be familiar with its coverage.

Retain this manual. File it with your other documents for future reference.

PRODUCT REFERENCE INFORMATION

Please contact Security Chimneys International for the phone number of your nearest Security Chimneys International dealer who will answer your questions or address your concerns.

Normally, all parts should be ordered through your Security Chimneys International distributor or dealer. Parts will be shipped at prevailing prices at time of order.

When ordering repair parts, always give the following information:

1. The model number of the chimney system.
2. The part number.
3. The description of the part.
4. The quantity required.
5. The installation date of the chimney system.

If you encounter any problems or have any questions concerning the installation or application of this system, please contact your dealer.



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800-667-3387; www.securitychimneys.com

Security Chimneys International Limited reserves the right to make changes at any time, without notice, in design, materials, specifications, prices. Consult your local distributor for chimney system code information.