



INSTALLATION INSTRUCTIONS

GREASE DUCT



637N



7N71

MODEL IPIC SERIES 4G GREASE DUCT

IT IS OF THE UTMOST IMPORTANCE THAT THIS DUCT BE INSTALLED ONLY IN ACCORDANCE WITH THESE INSTRUCTIONS.

IMPORTANT: DO NOT INSTALL GREASE DUCT WITHOUT FIRST READING THESE INSTRUCTIONS VERY CAREFULLY.

COMBUSTIBLE MATERIAL: Material made of or surfaced with wood, compressed paper, plant fibers, plastic or other material that will ignite and burn, whether flame proofed or not, or whether plastered or unplastered.

Metal-Fab's series 4G Grease Duct System has been fully tested, listed and classified by Underwriters Laboratories, Inc. and Underwriters Laboratories of Canada.

Metal-Fab's Series 4G Grease Duct Systems have been evaluated and accepted by BOCA, SBCCI, and ICBO as an alternative to a two hour fire rated shaft enclosure when installed in accordance with these installation instructions.

Grease Duct installed in accordance with these Installation Instructions meet the requirements of NFPA96.

These instructions contain complete information on details concerning dimensions, installation, clearance to combustibles, use of noncombustible enclosures, and Firestops. For any additional information, refer to the parts catalog.

GENERAL INFORMATION

LISTINGS:

Metal-Fab IPIC Series 4G Grease Duct Systems (6" thru 36" diameter) are classified by Underwriters Laboratories, Inc. (UL File No. R15388) in accordance with SBCCI acceptance criteria for Grease Duct Enclosure Systems (January 1, 1998). The IPIC Series 4G Grease Ducts for use in Grease Duct Assembly No. G-1 is Classified as an alternate to 3 hr. fire resistive rated shaft enclosure system with a minimum zero clearance to combustibles.

Metal-Fab IPIC Series 4G Grease Duct Systems (6" thru 36" diameter) are classified by Underwriters Laboratories, Inc. (UL File No. R15388) in accordance with UL Standard 2221 "Tests of Fire Resistive Grease Duct Enclosure Assemblies". The IPIC Series 4G Grease Ducts for use in Grease Duct Assembly No. G-1 is Classified as an alternate to a 2-hr. fire resistive rated shaft enclosure system with a minimum zero clearance to combustibles.

Metal-Fab IPIC Series 4G Grease Duct Systems are listed by Underwriters Laboratories, Inc. (UL File No. MH8251, MH25506) and tested in accordance to UL Standard 1978 "Grease Ducts" with a minimum zero clearance to combustibles. IPIC Series 4G Grease Duct Systems are intended to be assembled in accordance with the following installation instructions and installed to meet the requirements of the National Fire Protection Association NFPA 96, "Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations".

Metal-Fab IPIC Series 4G Grease Duct Systems have been evaluated by SBCCI, PST & ESI Report No. 9666, ICBO-ES Report No. 5301 and BOCA-ES Report No. 96-37.1 for use as an alternative to a 2 hr. fire rated shaft enclosure when installed in accordance with these installation instructions and National Fire Protection Association NFPA 96, "Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations".

Metal-Fab IPIC Series 4G Grease Duct Systems are compliant with BOCA National Building Code, International Mechanical Code, Standard Building Code, Standard Mechanical Code, ICBO Uniform Mechanical Code and International Mechanical Code. Construction details are per UL File MH8251 and Through Penetrating Firestop UL File R15388.

Metal-Fab IPIC Series 4G Grease Duct Systems are accepted for use in the city of New York Department of Buildings, MEA-57-95-S.2

APPLICATION:

Grease Ducts are suitable for use in commercial installations using exhaust system components for the removal of smoke and grease-laden vapors. System installation specifications are as described in the National Fire Protection Association No. 96. Grease duct systems must be installed to conform to these installation instructions. Grease Duct systems are not to be interconnected with any other building ventilation or exhaust system.

Model IPIC Series 4G Grease Ducts may be installed without requiring a fire-rated enclosure when installed in accordance with a Through-Penetration Firestop, CAJ7006, described in UL's Fire Resistance Directory through 36" diameter.

GREASE DUCT INSTALLATIONS REQUIRE PROVISIONS FOR CLEANING THE INTERIOR OF THE DUCT. NFPA 96 CLEANOUT REQUIREMENTS ARE AS FOLLOWS:

1. A cleanout 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" (508) diameter, openings large enough to permit cleaning at intervals of no more than 12' (3.66m) are required.
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 OD of the duct. For Model IPIC Series 4G Grease Duct, this is accomplished by the use of the Grease Manifold Tee (IPICGMT) and the Cleanout Cap (IPICTCN)
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.

System size and capacity information can be obtained from: (1) Chapter 31, ASHRAE Handbook "Fundamentals Vol.," or (2) Chapter 3, "Air Pollution Engineering manual of the U.S. Environmental Protection Agency." 1973.

GREASE DUCT ENVIRONMENT:

Model IPIC Series 4G Grease Ducts are intended for use in either noncombustible or combustible surroundings. This Grease Duct System is not to be fully enclosed with combustible material.

The duct installation shall be per NFPA96 Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, or other local codes.

Duct systems serving a Type I hood shall be constructed and installed so that grease cannot collect in any portion thereof. The duct system shall slope no less than 3" vertical in 100ft. horizontal toward the hood or toward an approved grease reservoir.

When a duct 36 inches or smaller penetrates a fire-rated ceiling, wall or floor, they shall be protected with a Through-Penetration Firestop Protection System equivalent to the fire-resistance rating of the assembly being penetrated (Model PIC PPK). For ducts 6" through 36" diameter, as specified in listing section above, additional enclosure may not be required. Consult local code authority.

This duct Through-Penetration Firestop protection System shall be installed in accordance with the conditions of the classification and the manufacturer's instructions, and shall be acceptable to the authority having jurisdiction (See FIG. 45).

CLEARANCES:

Metal-Fab, IPIC Series 4G Grease Duct Systems have been tested, classified and listed by Underwriters Laboratories, Inc. for zero clearance to combustibles. Testing is in accordance with SBCCI Acceptance Criteria for Grease Duct Enclosure Systems (January 1, 1998) as an alternative to 3 hr. fire resistive rated shaft enclosure, UL Standard 1978, "Grease Ducts" and UL Standard 2221, "Grease Duct Enclosure Assemblies".

Metal-Fab, IPIC Series 4G Grease Duct Systems have been evaluated for use as a 2 hr. fire rated, zero clearance grease duct system per the following evaluation services: SBCCI, PST & ESI Report No. 9666, BOCA-ES Report No. 96-37.1 and ICBO-ES Report No. 5301. This Grease Duct System is not to be fully enclosed with combustible material. The installation of the Grease Duct System must comply with the installation requirements of the NFPA 96, "Standard of Ventilation Control and Fire Protection of Commercial Cooking Operations".

NOTE: Dimensions in these instructions are in American Standard (feet and inches), with metric (mm) in parenthesis unless stated otherwise.

USE AND INSTALLATION OF INDIVIDUAL PARTS

These instructions comprise both general and specific requirements for all parts in the Grease Duct product line. Before specifying a design or beginning an installation, these instructions should be carefully reviewed.

PIPE WEIGHT

The average weight of the chimney per lineal foot can be calculated using the following formula:

$$\text{IPIC-4G} \quad 1.65 \times \text{Diameter} = \text{lbs. per foot}$$

Example: 8IPIC-4G $1.65 \times 8 = 13.2$ lbs. per foot

Duct design should make sure that the Grease Duct is adequately supported to ensure parts are not overloaded.

PART NUMBERS

These instructions identify Model IPIC parts by name of part number in the text and illustrations. Actual parts also carry a flue diameter prefix and a three digit "CTO" suffix which defines the materials of construction, such as 24IPIC30-4AG for a 24-inch diameter double wall pipe section 30 inches long with Type 304 stainless steel inner wall, Type Aluminized steel outerwall and a 4", 8 lb. density insulation. (See Table 1 for further explanations of CTO codes).

TABLE 1

1st DIGIT (INNER WALL)	2nd DIGIT (OUTER WALL)	3rd DIGIT (INSULATION)
4 = 304 S/S 6 = 316 S/S	A = ALUMINIZED STEEL 4 = 304 S/S 6 = 316 S/S	G = 4", 8lb. DENSITY INSULATION

U.S. Patent Nos. 4,720,125 and 4,781,402

PIPE AND FITTING ASSEMBLY

The Model IPIC Series 4G Grease Duct joint sealing system is designed for quick and easy installation (See FIG. 1&2). All Grease Duct joints must be liquid tight according to NFPA96. To insure that all joints meet that requirement, follow these six steps.

1. Apply a continuous bead of P080 sealant to one of the flanges to be joined.

NOTE: Sealant is supplied by Metal-Fab and individual tubes are marked P080.

CAUTION: The use of any other sealant on the flange surface will negate all listings of the product and impair the sealing effectiveness.

2. Join the two flanged ends of the pipe section together.
3. Fill the channel of the flange band with P080 sealant.
4. Install the flange band around the flanges.

NOTE: Light tapping with a hammer all around the band while tightening the end clamp bolt helps to align and pull the flanges together.

5. Install insulation strips (furnished) on sections to ensure that all air gaps are filled. Be sure that insulation completely fills the void.
6. Secure the outer casing with closure band. The pieces are then secure and air tight.

FIG. 1 - JOINT ASSEMBLY

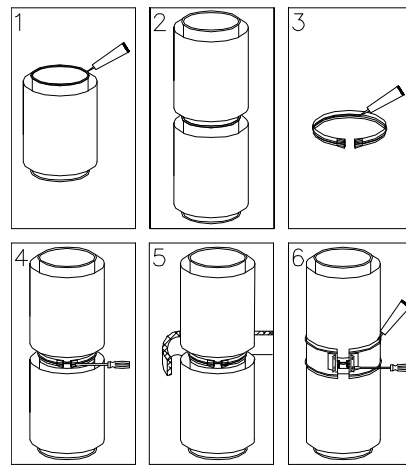
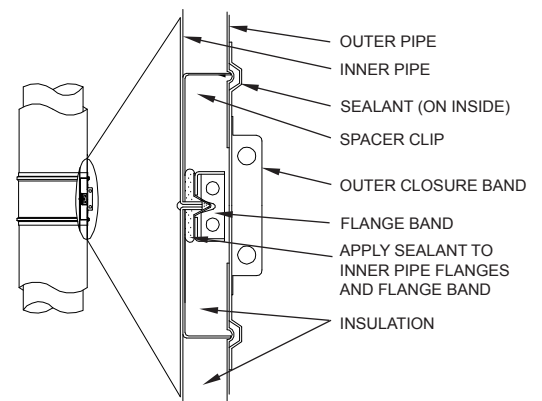


FIG. 2 - ASSEMBLED MODEL PIC JOINT



SUPPORT LIMITS: SUPPORT SPACING

Table 2 provides the maximum vertical distances between Supports for various support types.

TABLE 2

SUPPORT METHOD	Maximum Supported Length	
Wall Support	19'	
Pier or Appliance Outlet	49'	
Plate Support Assembly	49'	
Roof Support Assembly	15'	
Fan Adapter Plate	6"-16" dia.	20' (6m)
	18"-22" dia.	15' (4.5)
	24"-36" dia.	10' (3m)

GUIDE SPACING

Table 3 provides the maximum distances between Guides for Grease Duct installed inside of building (For exterior installations, See Table 5, FIG. 32, 33, & 34)

TABLE 3

SUPPORT METHOD	Maximum Supported Length
Maximum Unsupported Horizontal Spacing	9'
Maximum Unsupported Vertical Spacing Below Roof Line	18'*

*13' per ICBO ER-5301.

Detailed Parts:

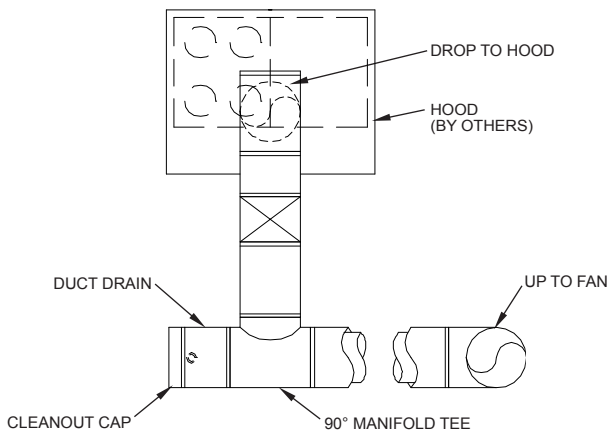
PIPE LENGTH (IPIC9, IPIC18, IPIC30, IPIC42)

Model IPIC Series 4G Grease Duct pipe is available in 4 standard lengths: 9" (229), 18" (457), 30" (762) and 42" (1067). Pipe sections are joined, using appropriate sealant, to make up desired length of run. These sections may be modified by use of nipples or couplings to accept auxiliary equipment such as fire suppression or automatic cleaning systems. Consult factory or your local representative to obtain information regarding such modifications.

DUCT DRAIN (IPICDR)

Duct drains are equipped with a 1" (25) NPT coupling, which is attached to the inner wall and extends through the outer wall to provide a path to drain grease, condensate or wash water from the duct. A dam is attached to the inside of the inner wall adjacent to the coupling to channel the effluent to the drain. The duct drain is intended for use at the end of a horizontal run where access and drainage is needed (See FIG. 3). The drain coupling must be connected to a grease trap or approved container (supplied by others).

FIG. 3 - DUCT DRAIN TYPICAL LOCATION



NOTE: This is a plan view sketch.

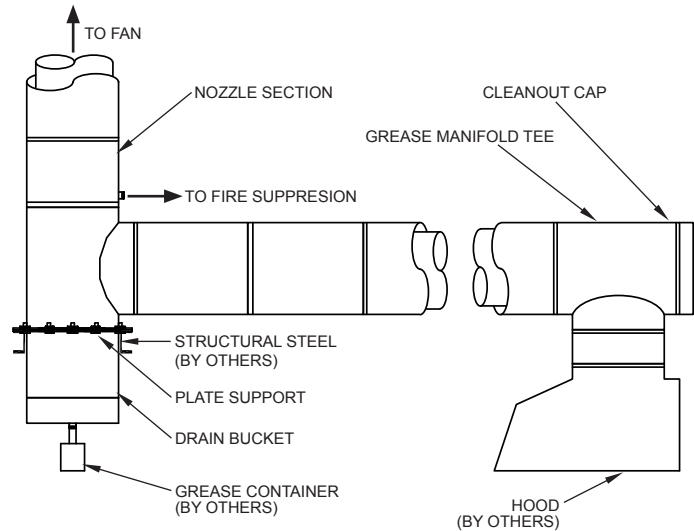
DRAIN BUCKET (IPICDB)

The drain bucket consist of a 9" (229) long pipe section with an installed tee cap. It is intended for use as a drain point and access at the base of a duct riser (See FIG. 4). The drain nipple must be attached to a grease trap or approved container (supplied by others).

NOZZLE SECTION (IPICNS)

The nozzle section is used when the duct is required to be equipped with a fire suppression system or washdown is desired. 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 wall and passing through the casing. In horizontal sections, the nozzle section must be installed so that the coupling is at or above the horizontal centerline of the pipe. When the pipe section is in vertical orientation, the nozzle may be located at the most convenient place. Local authorities should always be consulted regarding the need for fire protection or washdown systems.

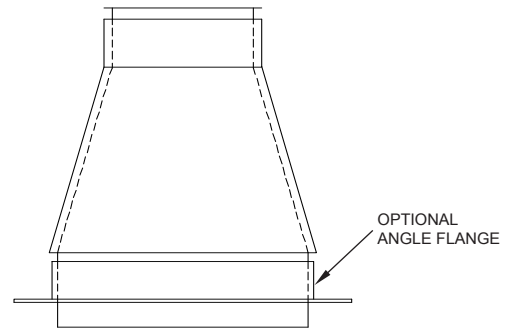
FIG. 4 - DRAIN BUCKET AND NOZZLE SECTION TYPICAL LOCATIONS



SQUARE TO ROUND ADAPTER (IPICSTR)

When the hood is equipped with a square or rectangular collar, a square to round adapter is needed to connect the round IPIC pipe to the hood (See FIG. 5). The outside dimensions of the square end are slightly smaller than the hood collar. It will fit inside the collar and be connected by means of a lap weld. Alternatively, the square end may be equipped with a flange to be used for a bolted or welded connection in accordance with NFPA 96.

FIG. 5 - SQUARE TO ROUND ADAPTER



When ordering a square to round adapter, the size of the square end, flange requirements and diameter of the round end must be specified.

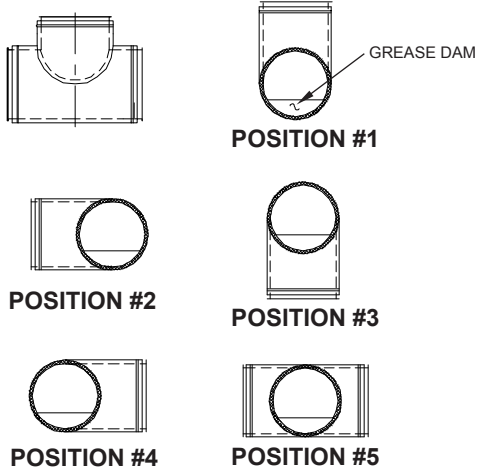
NOTE: Many hood manufacturers have the capability to build the hood with a round flanged collar, which matches the flange on Model IPIC pipe. Others can install a round flanged collar supplied to them or can provide a hood without a collar for the hole to be field cut. These alternatives may avoid the necessity of providing a square to round adapter.

GREASE MANIFOLD TEE (IPICGMT)

The grease manifold tee is used to provide access for cleanout to comply with NFPA 96 requirements. It is equipped with a 1/8" (38) high grease dam at the access port. The access port must be closed with a cleanout cap (IPICTCN) or tee cap (IPICTC).

The location of the access port in the tee is dependant on the orientation of the tee in the final installation. Access port location is coded as Position 1, 2, 3, 4 or 5 (See FIG. 6). For tool-less access for inspection and maintenance (required by some jurisdictions) refer to section **Access Panel (IPICTAP)** and FIG. 6a.

FIG. 6 - GREASE MANIFOLD TEE ACCESS PORT LOCATIONS



When a duct over 20" (508) diameter is used, a reduced tap 90° manifold tee may be used in lieu of the grease tee. Note that the tap must be at least 20" (508) in diameter.

TOOL-LESS ACCESS PANEL (IPICTAP)

Tool-less access panels are available in duct sizes from 6" (152) to 36" (914) diameter. The IPICTAP is offered as an alternative to the IPICTCN to allow complete access for inspection and cleaning without the use of tools and complies with the requirements of NFPA 96 for accessibility. The IPICTAP is designed to retrofit existing installations that use a clean out cap (IPICTCN). Assembly is shown (See FIG. 6a).

FIG. 6a - TOOL-LESS ACCESS PANEL ASSEMBLY

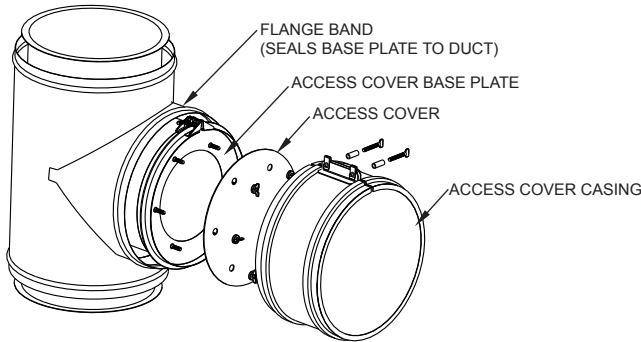
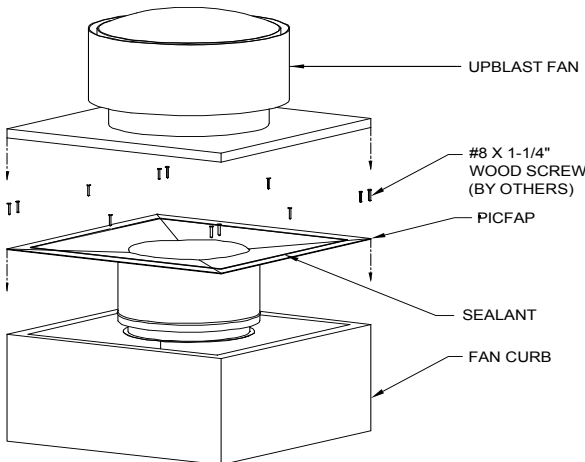


FIG. 7 FAN ADAPTER PLATE



FAN ADAPTERPLATE (IPICFAP)

The fan adapter plate is designed to connect to an upblast fan mounted on a roof curb. The plate is formed to provide a slope to allow grease deposits to flow back towards the duct.

When connected to an upblast fan (See Fig. 7), the plate mounts on top of the fan curb which supports the fan housing. The plate may be positioned off center within the curb provided that minimum clearance to combustibles is maintained. In the event that the plate is positioned off center, trim off excess plate material to allow fan placement. Secure the plate to the curb a minimum of three (3) places per side with minimum #8 x 1-1/4" wood screws. The fan housing is set on top of the plate and sealed using P080 sealant or an approved gasket supplied by the fan manufacturer. Specify the pipe diameter and outside curb dimensions when ordering the fan adapter plate.

The fan adapter plate can be used as a vertical support. The maximum height of grease duct supported by the fan adaptor plate is shown in TABLE 2 .

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

STANDARD 90° TEE (IPIC90MT)

Similar to the 90° Grease Tee except it does not have a dam. This Tee is used to connect, vertical grease duct to horizontal grease duct and requires a tee cap for draining, clean-out and inspection. The 90° Tee may also be used as a clean-out access point in a vertical run of pipe (See FIG. 8).

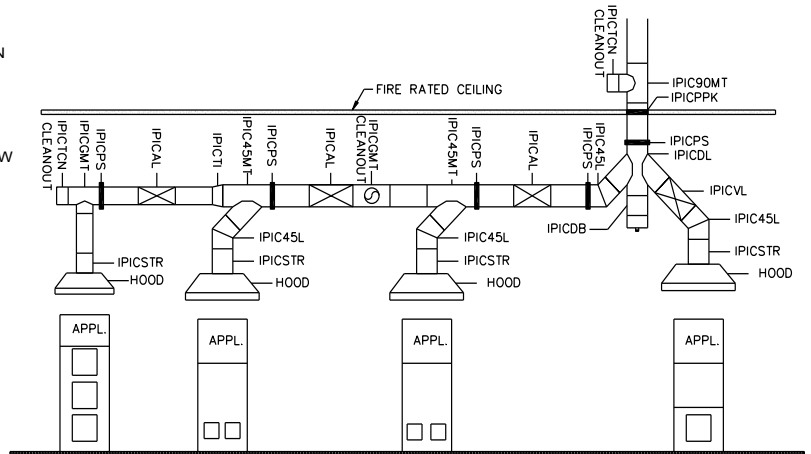
45° LATERAL TEE (IPIC45MT)

The 45° Lateral Tee is used for a 45° entry to the Grease Duct. This part necessitates an additional 45° elbow. The 45° Lateral Tee may be installed with a clean-out tee cap and supported exactly the same as the 90° Tee (See FIG. 8).

45° DOUBLE LATERAL TEE (IPICDL)

The 45° Double Lateral Tee is used for connecting two Grease Duct Connectors to one main duct run. It should be supported the same as the 90MT or 45MT (See FIG. 8)

FIG. 8 - TYPICAL MULTIPLE HOOD DUCTING SYSTEM



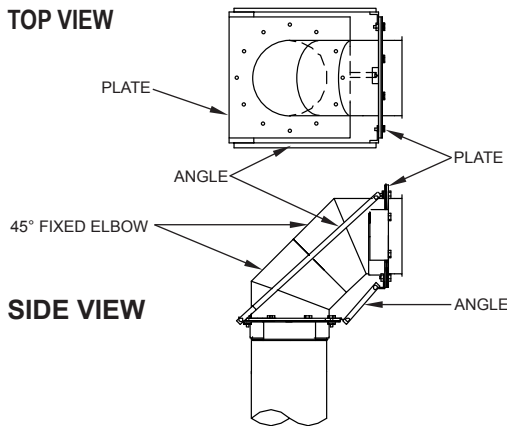
90° WYE (IPIC90Y)

The 90° is used where the Grease Duct must be accessed for clean-outs. It can be used in place of a 90° Tee and provides excellent access clearance for clean-outs (See FIG.14).

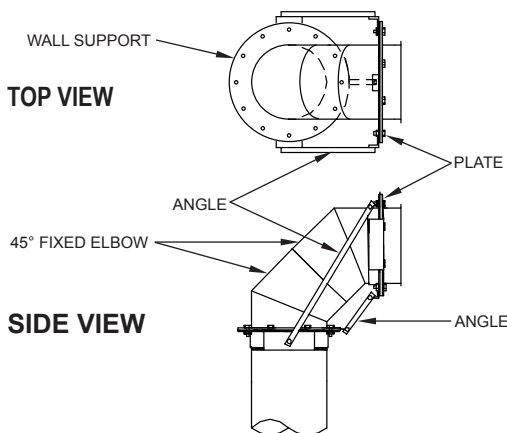
ELBOWS 30°, 45°, OR 90° FIXED (IPIC30L, IPIC45L, OR IPIC90L)

The combination of (2) 30L or a 30L and a 45L will allow for offsets of 60° or 75°. The 90L is used to transition from horizontal to vertical and requires a clean-out at the change in direction. Elbows are not designed for resisting bending loads, therefore they must be protected from these conditions. (See figure 9 for structural recommendations to protect the elbows).

FIG. 9 - METHODS OF STRUCTURAL REINFORCEMENT



2 each 45° ELBOWS REINFORCED WITH PLATE SUPPORTS



2 each 45° ELBOWS REINFORCED WITH WALL SUPPORTS

OFFSETS

Offsets should be avoided except when there is no other way to route the Grease Duct. When an offset must be used, good design indicates that the angle used should be in the minimum possible (See FIG. 10 & 11).

FIG. 10 MINIMUM ELBOW OFFSETS (REFER TO TABLE 4)

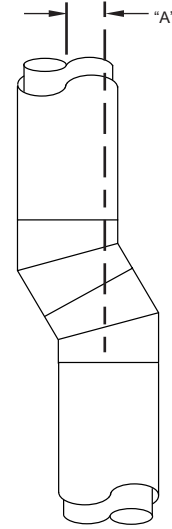
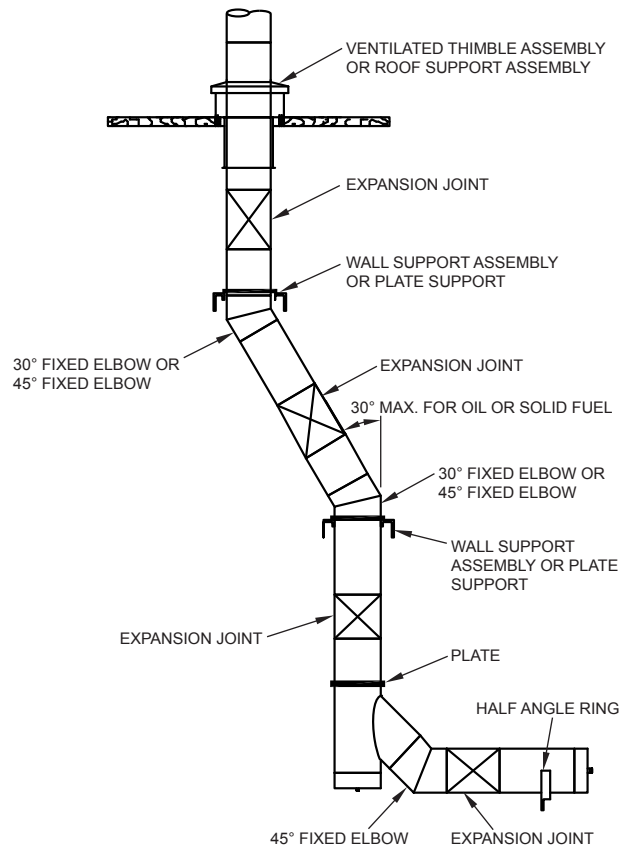


Table 4 indicates minimum center to center offset for two elbows connected directly to each other.

FIG. 11 SUPPORT FOR OFFSETS



Bracing, above and below the elbows, is needed to avoid subjecting them to bending moments. In order for bracing to be effective, it must be rigidly attached to building members or foundation. The design of the structure used to attach supports must include the weight of the sloped section and whatever additional pipe is carried by the support. Additionally, an expansion joint is needed between the elbows to relieve thermal expansion stresses.

TABLE 4 (MODEL IPIC SERIES 4G)

(SEE FIG. 10)

MINIMUM ELBOW OFFSETS		
PIPE SIZE	"A" - 30° ELBOW	"A" - 45° ELBOW
6"	6" (152)	9 7/8" (251)
8"	7 3/4" (197)	14 1/8" (359)
10"	7 3/4" (197)	14 1/2" (368)
12"	7 3/4" (197)	14 1/2" (368)
14"	7 3/4" (197)	14 1/2" (368)
16"	7 3/4" (197)	14 1/2" (368)
18"	7 3/4" (197)	14 1/2" (368)
20"	8 1/2" (216)	16 5/8" (422)
22"	8 1/2" (216)	16 5/8" (422)
24"	8 1/2" (216)	16 5/8" (422)
26"	8 1/2" (216)	16 5/8" (422)
28"	8 1/2" (216)	16 5/8" (422)
30"	8 1/2" (216)	
32"	11" (279)	
34"	11" (279)	
36"	11" (279)	

TEE CAPS (IPICTC, IPICTCN)

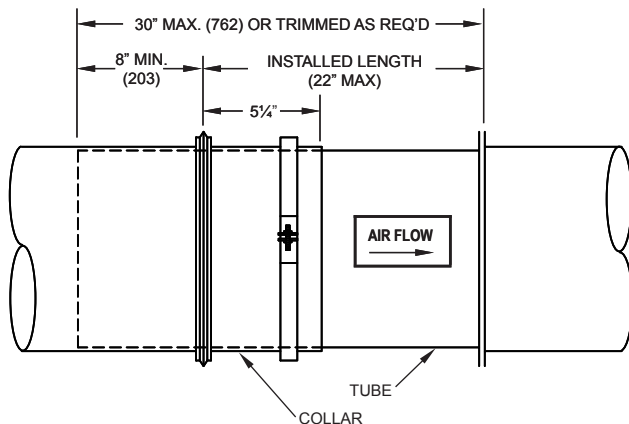
The Tee Cap provides access for cleaning and inspection into the Grease Duct. When using clean-outs, always prevent leaks and assure that the Grease Duct functions as intended. The Tee Caps can be ordered with or without a drain and are assembled in the same manner as the sections (See FIG. 1).

EXPANSION JOINT (IPICAL)

The expansion joint may be used to compensate for thermal expansion and to make up odd lengths. It is essential that sufficient installed length be allowed to compensate for abnormal, as well as normal, operating conditions. The expansion joint cannot be used to correct misalignment or to compensate for lateral movement or vibration.

An expansion joint is comprised of: (1) a collar that is 5 1/4" (133) long with a flange and vee band at one end and a graphite impregnated ring gasket at the other; (2) a 30" (762) long tube, flanged at one end, which fits into the 5 1/4" (133) collar; (3) an outer jacket consisting of two half jacket assemblies; and (4) loose insulation blanket to fill space between the tube and casing.

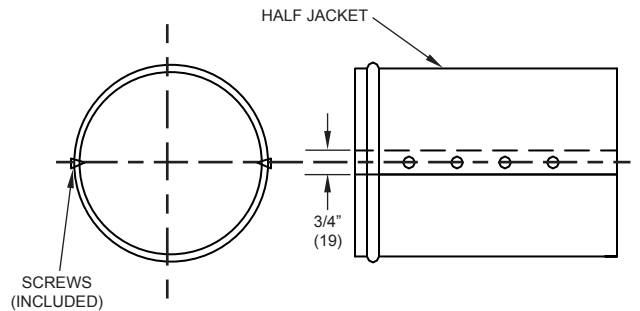
FIG. 12 - EXPANSION JOINT FLUE ASSEMBLY



INSTALLATION PROCEDURE IS AS FOLLOWS:

1. Loosen draw screw at gasket band and slide collar toward flanged end of tube. Do not remove collar from tube.
2. Slide unflanged end of tube into the upstream piece of pipe and make up joint between pipe and collar following the procedures outlined under heading PIPE AND FITTING ASSEMBLY on Page 3.
3. Pull flanged end of tube to the downstream piece of pipe and make up joint as shown (See FIG. 12).
4. Cut insulation to desired length and wrap inner pipe ensuring that it is covered completely before attaching half jackets.
5. Wrap two half jackets around joint with bead at the downstream end and punched edge overlapping plain edge by approximately 3/4" (19).
NOTE: For horizontal installations the seams must be located at the top and bottom of the pipe, coat unpunched edge of casing with P077 sealant to waterproof the casing.
6. Install self-drilling screws (supplied with jacket) at punched holes through both layers at overlap. Exercise care that half jacket edges do not align with draw screws on flange bands and that no screws are installed in portion of jacket which is over casing of adjacent pieces of pipe (See FIG. 13). The screws shipped with the expansion joint are of the correct length to avoid penetrating the inner wall (flue) of the pipe. Do not use any other screws to attach the casing.

FIG. 13 - EXPANSION JOINT CASING ASSEMBLY



NOTE: Do not screw through casing of adjacent pipe.

NOTES:

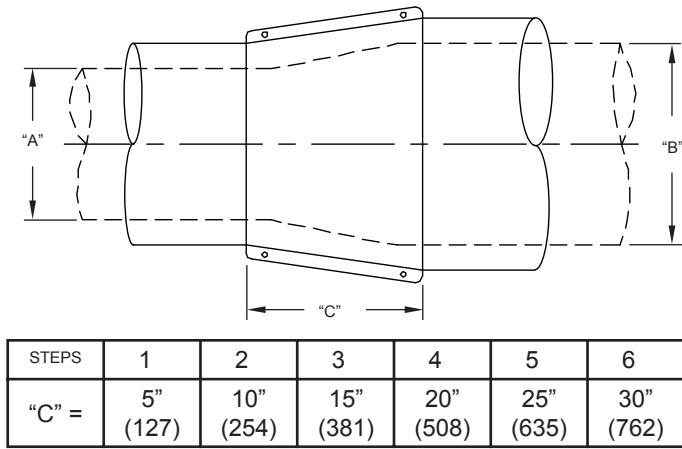
1. It is recommended that the pipe on both sides of the expansion joint is supported or guided to assure the expansion joint will not bind during operation.
2. Installation of an expansion joint adjacent to fittings, such as elbows, tees or wyes, is not recommended. However, it is not always possible to avoid these fittings. If an expansion joint must be joined to one of these fittings, the unflanged end of the tube should be away from the fitting and fitted into a pipe length in the manner described in the installation procedure above.
3. Expansion joint must be installed with a flange length of not more than 22" (558). The minimum length for installation must take into account the amount of expansion that may occur during operation. Minimum length is calculated as follows:

$$\text{Expansion} = \text{Length (feet)} / 100 \times \text{Temperature Rise (°F)} / 100$$

$$\text{Minimum Length} = \text{Expansion} + 6" (152)$$

4. It is recommended that the temperature used in the above formula be at least 300°F higher than the expected normal operating temperature.
4. If inner tube is too long, it may need to be cut to length. Tube must be a minimum of 8" (203) longer than flange-to-flange. Prior to installation of cut pipe, remove all burrs to ensure interference does not occur.
5. Check gasket to ensure that it fits snugly without binding on inner pipe.

FIG. 17 - TAPERED INCREASER (IPICTI)



Note: 1 step = 2" increase in Pipe Diameter

CASING END CLOSURE (IPICCEC)

The Casing End Closure is used to close off the annular space between the inner and outer walls when the duct is attached to a single wall component, such as a round hood collar.

FIG. 18 - INSTALLED CASING END CLOSURE (IPICCEC)

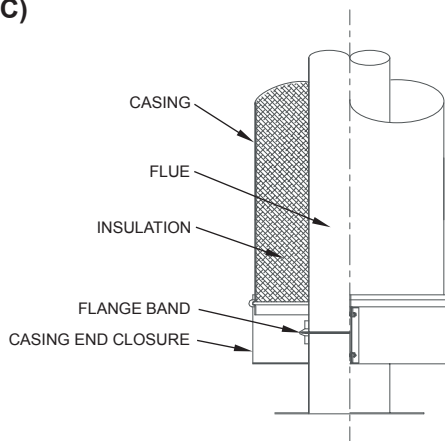
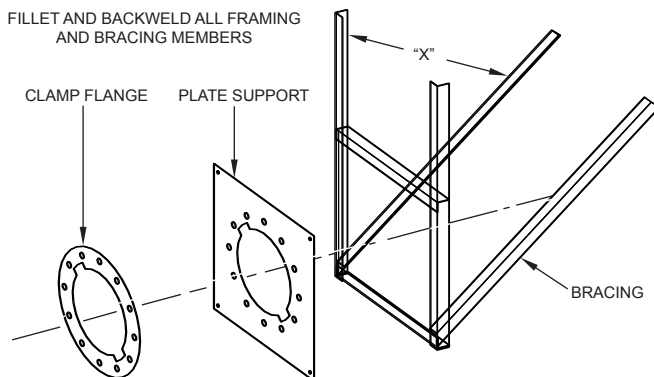


PLATE SUPPORT (IPICPS)

NOTE: See Table 2 for maximum supported height.

The plate support assembly is designed to provide maximal support to vertical sections and to provide fixed-point support for horizontal sections. The plate support must be attached to the building structure or support with rigid structural members.

FIG. 19 - PLATE SUPPORT BRACING REQUIREMENTS



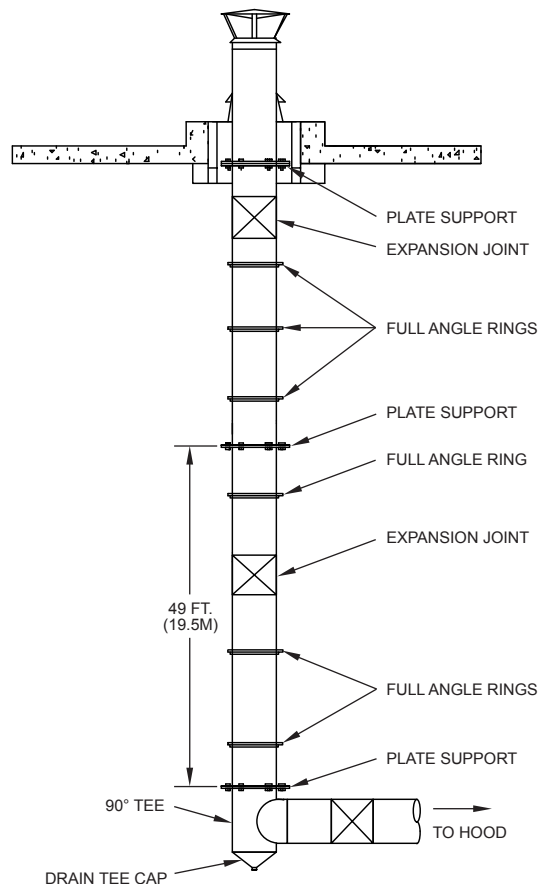
"X" is a minimum of 30" when bracing is used. A welded frame must be adequately attached to structural member for framework rigidity if bracing isn't used.

Pipe Diameter	IPICPS Plate Thickness	Bracing for IPIC Plate Support Height of Stack	
		35' (10.67m)	75' (22.86m)
6" - 20"	3/16" (5)	1 1/4"x1 1/4"x1/8" (32x32x3)	2"x2"x1/4" (51X51X3)
22" - 36"	1/4" (6)	2"x2"x1/8" (51X51X3)	3"x3"x1/4" (76X76X6)

Pipe Diameter	IPICPS Plate Thickness	Framework for IPIC Plate Support Height of Stack	
		35' (10.67m)	75' (22.86m)
6" - 20"	3/16" (5)	1 3/4"x1 3/4"x1/8" (44x44x3)	3"x2"x3/16" (76x51x5)
22" - 36"	1/4"	2"x2"x1/4" (51x51x3)	4"x3"x1/4" (102x76x3)

When the supported section is subject to thermal expansion or is in a vertical position, so that the plate support is weight bearing, the support structure must be braced with diagonal members or gussets to prevent deflection of the supported joint (See FIG.19). Plate supports are usually located adjacent to fittings, such as tees or elbows, to protect the fitting from expansion stresses. Chimneys heights in excess of a single plate support capability can be resupported with additional plate support(s). An expansion joint must be used between support points (See FIG. 20).

FIG. 20 - RESUPPORT REQUIREMENTS

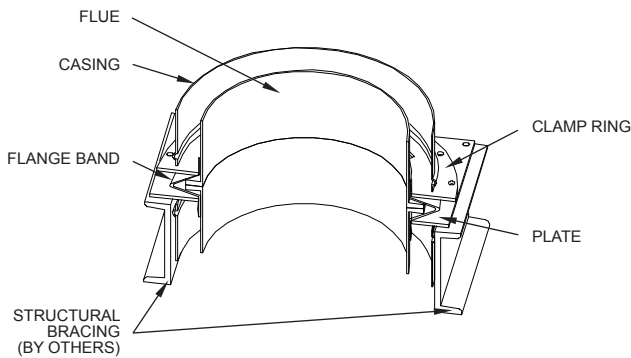


A plate support assembly is to be attached only to non-combustible construction such as block, concrete or steel with clearance that is adequate for installation and access.

DO NOT ATTACH THE PLATE SUPPORT TO COMBUSTIBLE CONSTRUCTION.

For maximum support, the entire perimeter of the plate support assembly must be attached to structural framing (See FIG. 21). Structural members are supplied by the installer.

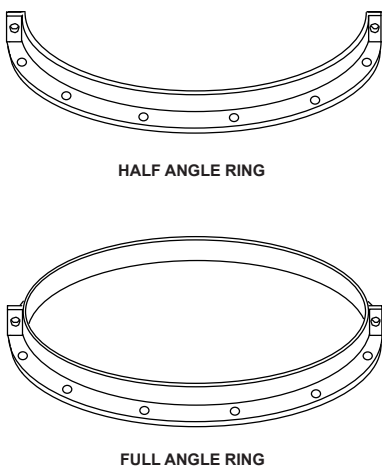
FIG. 21 - SECTIONAL DETAIL FOR PLATE SUPPORT



FULL ANGLE RING (IPICFAR) AND HALF ANGLE RING (IPICHR)

The full angle ring is used as a guide to prevent the Grease Duct from flexing due to lateral loading. The angle ring is split for ease of installation. The I.D. of angle ring is slightly larger than the outside diameter of the pipe casing to allow movement of the pipe inside the ring (See FIG. 22).

FIG. 22 - FULL ANGLE RING & HALF ANGLE RING

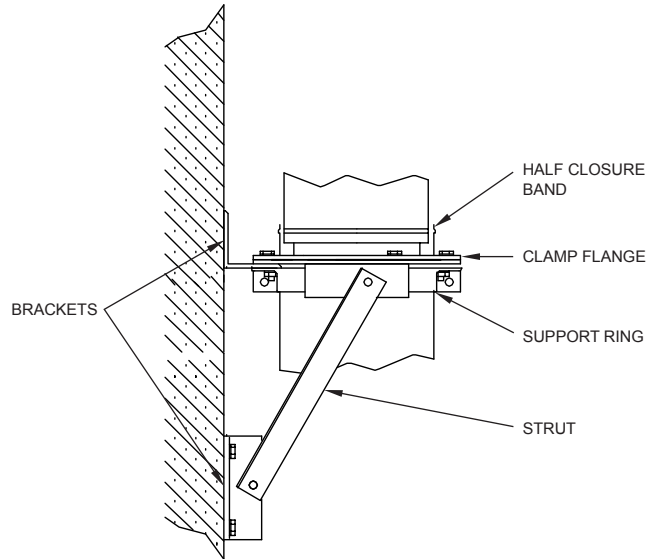


The half angle ring is used as a saddle in horizontal or sloped runs. It may be suspended either on rigid framework or soft frames, such as threaded rod. The half angle ring will not replace a plate support or other fixed support in horizontal runs. It should not be used as the sole support for the Grease Duct.

WALL SUPPORT ASSEMBLY (IPICWSA)

A wall support assembly consist of a full angle ring, two clamp rings, wall brackets and struts. The clamp rings sandwich a flange band at a pipe joint and are supported by the full angle ring (See FIG. 23 & FIG.24).

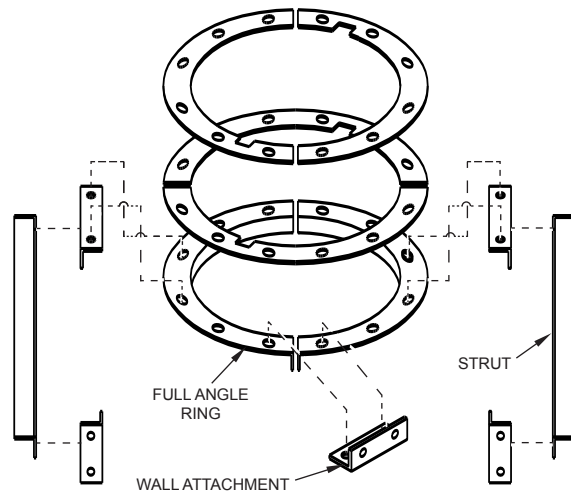
FIG. 23 - WALL SUPPORT ASSEMBLY ASSEMBLED VIEW



NOTE: Wrap pipe joint with insulation before attaching half closure bands.

The clamp rings are installed with the splits 90° apart so that they support each other. The notches in the clamp rings are aligned with the draw screws of the flange band. The clamp rings and full angle ring are then bolted together with the hardware provided to form a rigid assembly (See FIG.24).

FIG. 24 - WALL SUPPORT ASSEMBLY EXPLODED VIEW



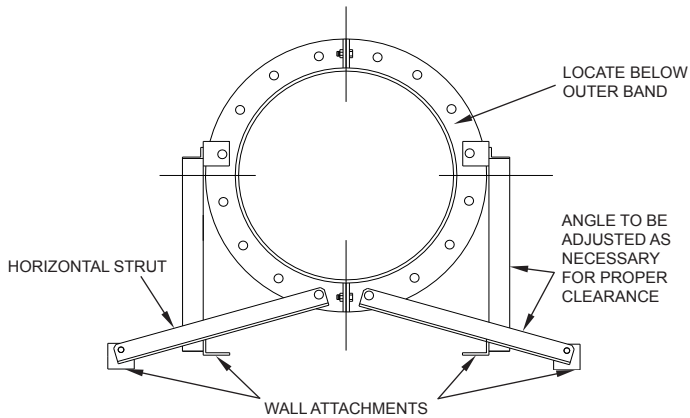
When attached to a non-combustible wall, with the brackets and struts, the wall support makes up a fixed-point in the Grease Duct. An expansion joint is required between the wall support assembly and any adjacent fixed point. Multiple wall support assemblies may be used, in conjunction with expansion joints, to support Grease Duct heights in excess of the allowable height for a single wall support assembly.

DO NOT ATTACH THE WALL SUPPORT ASSEMBLY TO COMBUSTIBLE CONSTRUCTION.

WALL GUIDE (IPICWG)

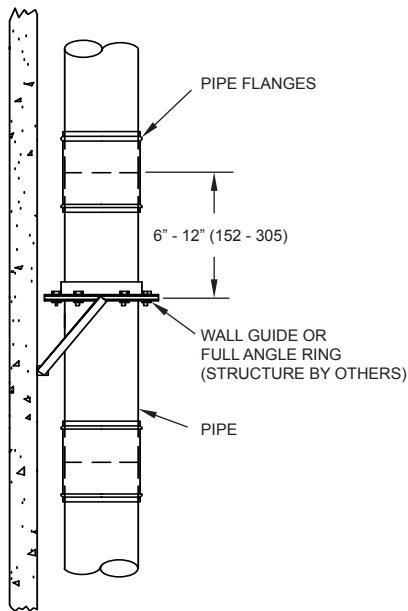
The wall guide is designed to compliment the wall support assembly. It is used as a lateral support to prevent the Grease Duct from flexing due to lateral loading. The wall guide consists of a full angle ring with wall brackets and struts (See FIG. 25).

FIG. 25 - WALL GUIDE



The proper location for a wall guide is immediately below the outer closure band near a pipe joint. The outer band must be able to move away from the wall guide when thermal expansion occurs (See FIG. 26).

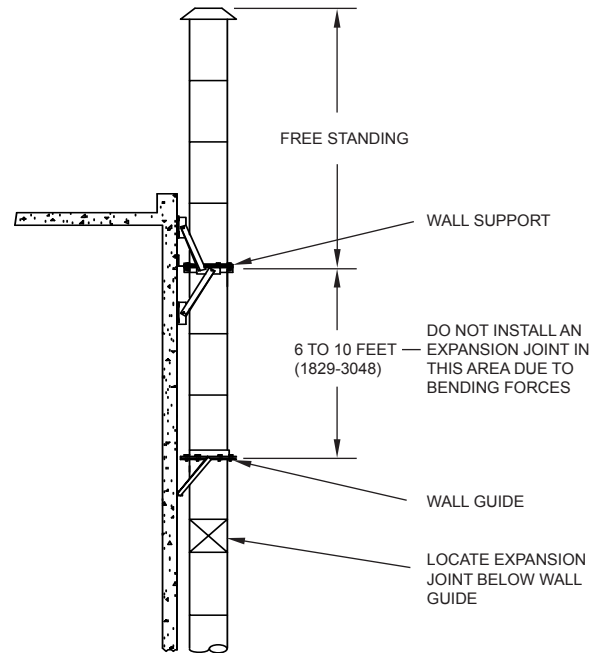
FIG. 26 - WALL GUIDE LOCATIONS



SPECIAL CONSIDERATIONS

When a wall support assembly is used to support a Grease Duct on an exterior wall, wind loading must also be considered. Below the highest wall support assembly, the Grease Duct must be resupported at intervals not greater than 40' (12.19m). The Grease Duct must be equipped with wall guides between each wall support assembly. Guide spacing is in accordance with dimension "A" in TABLE 5 on Page 13. Additionally, a wall guide must be located between 6' and 10' (1.83m and 3.05m) below the highest wall support to stabilize the freestanding portion of the Grease Duct above the wall support assembly (See FIG. 27).

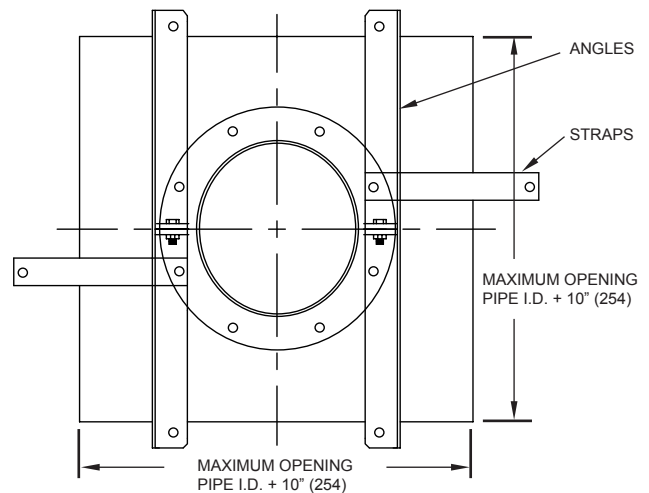
FIG. 27 - SPECIAL CONSIDERATIONS FOR GREASE DUCT OUTSIDE WALL



FLOOR GUIDE (IPICFG)

The floor guide is similar in function to a wall guide or full angle ring, but is modified specially for use at floor penetrations. The angle brackets and straps hold the guide centered in the floor penetration (See FIG. 28).

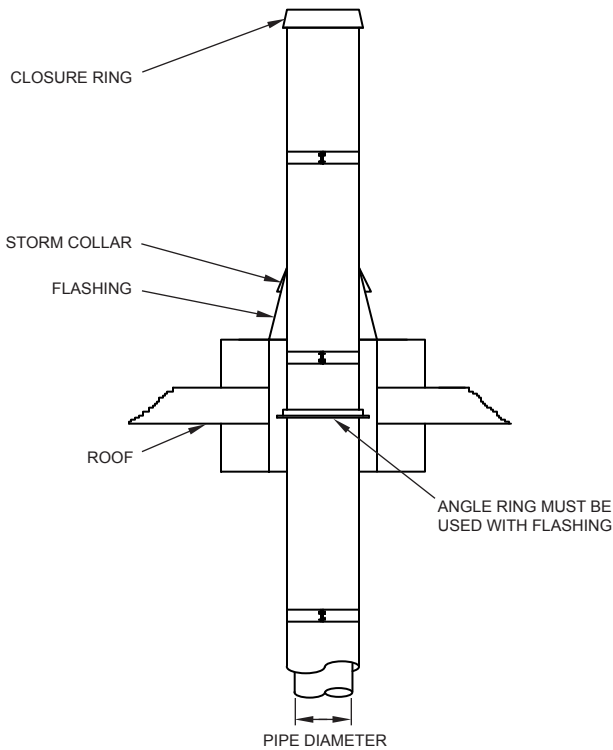
FIG. 28 - FLOOR GUIDE



GREASE DUCT ABOVE ROOF

When Grease Duct is extended above roofline, special consideration should be given to support and guying requirements. Use of a standard or variable pitch flashing requires that the Grease Duct be stabilized to resist side loading. Figures 29 and 33 depict methods of protecting a flashing from side loads using a full angle ring or plate support. Ventilated thimble and roof support assemblies include lateral support rings, and additional guidance at the roofline is not required.

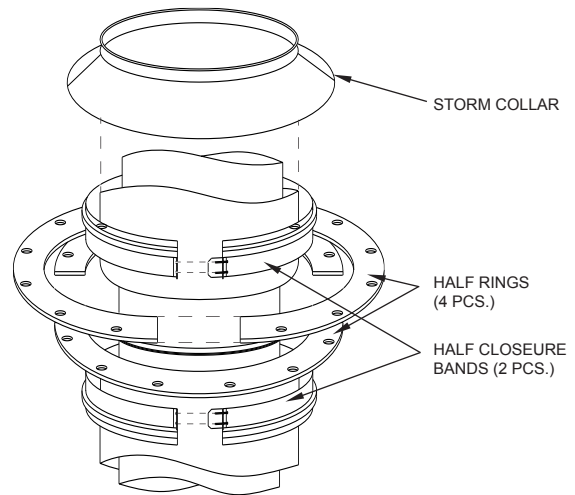
FIG. 29 - FULL ANGLE RING FOR LATERAL SUPPORT



GUY RING (IPICGR)

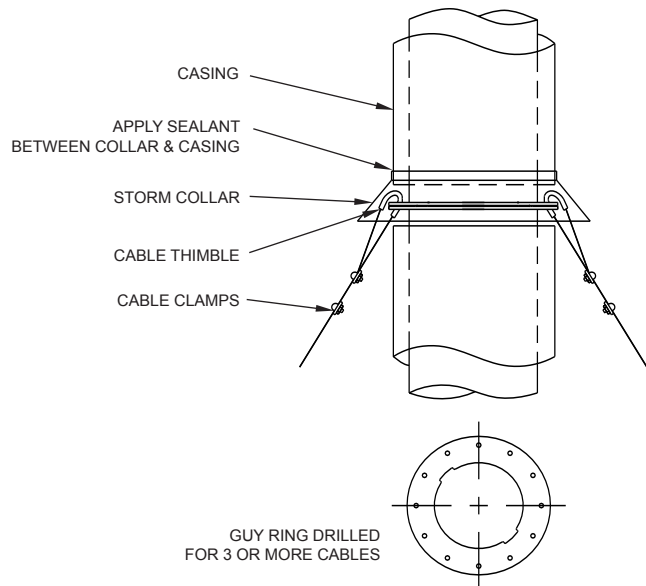
Grease Ducts that extend above the roof line, or are installed in severe weather regions, may require a guy ring (IPICGR) to enable the Grease Duct to resist wind loads. The guy ring is connected to the building or other structure by means of cables or braces. Table 4 provides the spacing between guy rings and freestand height for Model IPIC Series 4G Grease Duct.

FIG. 30 - IPIC GUY RING, EXPLODED VIEW



The guy ring consist of four (4) identical half rings with hardware to secure them together, two (2) half closure bands and a storm collar (FIG. 30). Select the joint where the guy ring is to be located and assemble the inner wall joint (Steps 1 to 4 under PIPE AND FITTING ASSEMBLY on Page 3). Sandwich the flange between the guy rings with the joints of the top and bottom rings 90° apart and the cutouts aligned. Clamp the guy ring with the nuts and bolts provided. Install the half closure bands above and below the guy ring, then attach the cables or braces (See FIG. 31). Install the storm collar above the upper half closure. The collar should be caulked with sealant to prevent water entry.

FIG. 31 - GUY RING CABLE ATTACHMENT



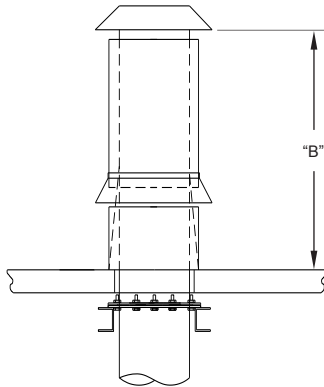
NOTE: Cable, cable clamps and cable thimble supplied by others.

Cable or braces (supplied by installer) should be slightly loose to allow for thermal expansion for singly guy ring installations (FIG. 33) or be equipped with tensioning springs on multiple guy ring installations (FIG. 34). To reduce the effect of thermal expansion on the guy cables or braces, a fixed-point support (plate or wall support assembly) may be installed immediately below the roofline as shown in FIG. 33.

Table 5 IPIC-4G GUYING REQUIREMENTS

Pipe Diameter	"A"	"B"
6"	8' 3" (2.51m)	6' 8" (2.03m)
8"	9' 7" (2.92m)	7' 3" (2.21m)
10"	10' 9" (3.28m)	7' 9" (2.36m)
12"	11' 11" (3.63m)	8' 4" (2.54m)
14"	13' 2" (4.01m)	8' 11" (2.71m)
16"	14' 2" (4.32m)	9' 6" (2.90m)
18"	15' 4" (4.67m)	10' 1" (3.07m)
20"	16' 4" (4.98m)	10' 8" (3.25m)
22"	17' 0" (5.18m)	11' 0" (3.35m)
24"	17' 7" (5.36m)	11' 6" (3.51m)
26"	18' 2" (5.54m)	11' 10" (3.61m)
28"	18' 9" (5.72m)	12' 4" (3.67m)
30"	19' 4" (5.89m)	12' 8" (3.86m)
32"	19' 11" (6.07m)	13' 2" (4.01m)
34"	20' 6" (6.25m)	13' 6" (4.11m)
36"	21' 0" (6.40m)	13' 11" (4.24m)

FIG. 32 - MAXIMUM FREE - STANDING HEIGHT ABOVE ROOF



NOTE: See Table 5 for "A" and "B" dimensions.

NOTE: When Grease Duct is installed outside building, adjacent to wall, spacing between guides is equal to dimension "A" in Table 5 above (refer to FIG. 27 on Page 11).

FIG. 33 - GUYING FOR SINGLE SECTION

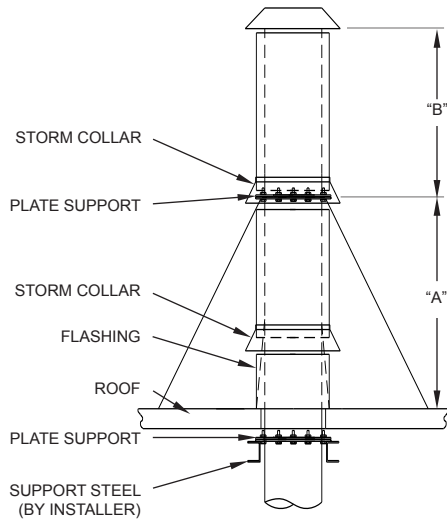
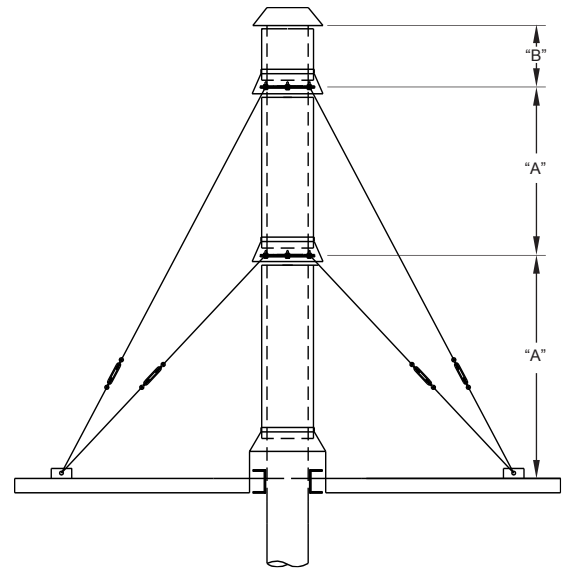
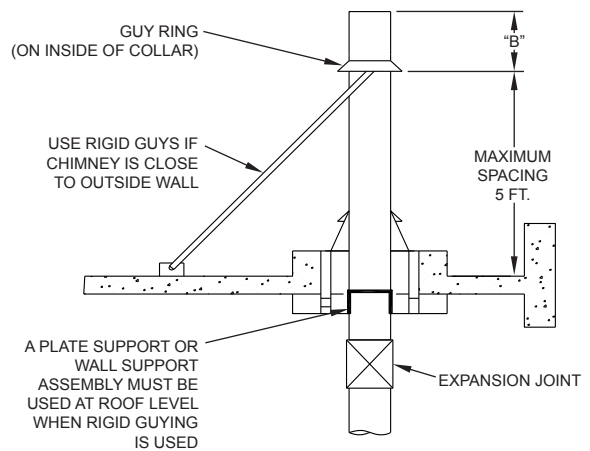


FIG. 34 - GUYING FOR MULTIPLE SECTIONS



Cables should be spaced at or near 120° intervals (3 cables) or 90° (4 cables). Rigid bracing requires (2) braces spaced between 60° and 150° apart. Maximum spacing between the fixed support and the guy ring is 5 feet when rigid bracing is used (See FIG. 35).

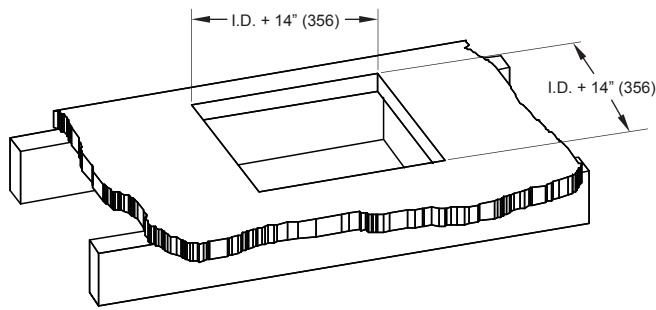
FIG. 35 - HEIGHT LIMITS FOR RIGID GUYING



VENTILATED THIMBLE ASSEMBLY (IPICVTA) AND ROOF SUPPORT ASSEMBLY (IPICRSA)

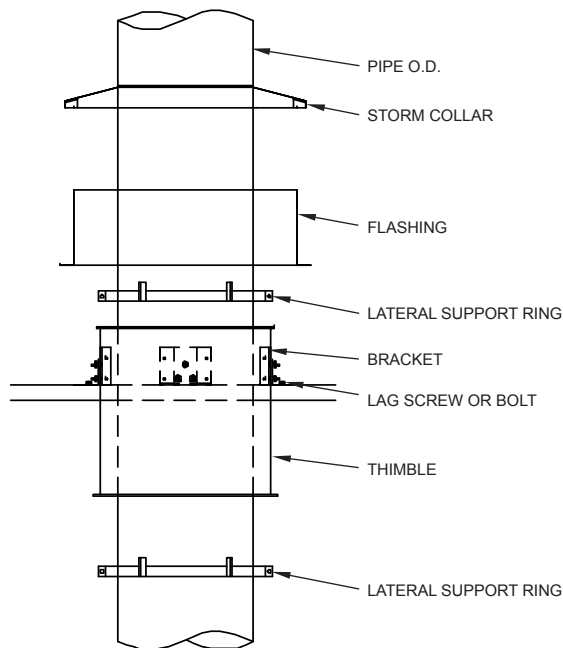
The ventilated thimble assembly is designed to allow Model IPIC Grease Duct Series 4G to penetrate a combustible roof at a nominal 3" clearance to combustibles. Figure 36 illustrates the required minimum framing dimensions. The ventilated thimble is intended for installation on a flat roof. It may be used on a pitched roof if a curb is installed at the penetration to provide a level surface for mounting the thimble.

FIG. 36 - ROOF FRAMING FOR VENTILATED THIMBLE



The ventilated thimble consists of the thimble with 4 support brackets; 2 lateral support rings, split for ease of installation; a flashing; a storm collar.

FIG. 37 - VENTILATED THIMBLE ASSEMBLY INSTALLATION



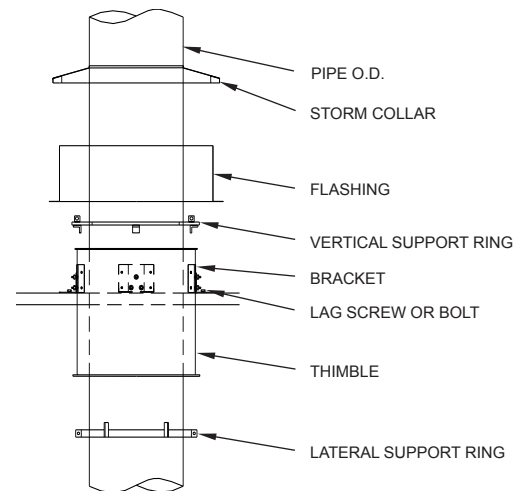
Installation of the ventilated thimble is as follows (See FIG. 37):

1. Cut the roof opening and reinforce the edges of the hole as appropriate for the expected load bearing requirements. Attach the thimble brackets to the thimble using the hardware provided.
2. Set the thimble through the roof, making sure it is centered in the roof penetration hole, and secure it to the roof deck with bolts or lag screws supplied. The brackets may be welded to a metal roof, if desired.

3. Install the Grease Duct passing through the thimble and extending above the roof.
4. Install the 2 split lateral support rings on the Grease Duct casing, one above the thimble and one below the thimble. Leave the bolts loose enough to allow the ring to slide along the casing. The spacer tabs are to be toward the thimble.
5. Push the lateral rings along the Grease Duct casing until they are completely enclosed in the thimble.
6. Install the flashing centered on the thimble. Secure it to the roof and seal it to the roof membrane as appropriate.
7. Install the storm collar around the Grease Duct casing allowing the ventilation spacers on the underside of the collar to rest on the upper edge of the flashing. Tighten the draw screw and seal between the collar and the Grease Duct casing with P077 Grease Duct sealant.

The roof support assembly consists of the same parts as the ventilated thimble except that one of the lateral rings is replaced with a vertical support. Installation is identical to the ventilated thimble except step 4 (See FIG.38).

FIG. 38 - ROOF SUPPORT ASSEMBLY INSTALLATION



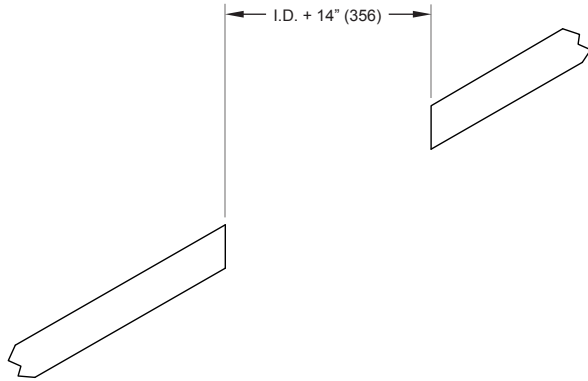
The roof support assembly is a special variation of the ventilated thimble which also provides support to the Grease Duct. It is especially useful when the Grease Duct rise below the roof is long enough to cause movement from thermal expansion to exceed approximately 2" (51).

Install lateral support ring below thimble as per step 4 above. Then install the vertical support ring. Vertical ring consists of 4 half-clamp rings designed to lock together when assembled. Splits of rings should be 90° apart and notches on inside of ring should align. Rings are assembled with one on top of flange band and one below flange band. When top and bottom halves are bolted together, they form a rigid circular plate around the inner wall of the pipe. This plate rest on the top flange of the thimble and carries the weight of the Grease Duct. Because it is not fastened to the thimble, the Grease Duct can expand upward in the thimble if needed.

VARIABLE PITCH VENTILATED THIMBLE ASSEMBLY (IPICVTA) AND VARIABLE PITCH ROOF SUPPORT ASSEMBLY (IPICVPRSA)

These components are special variations of the ventilated thimble assembly. They provide the same clearance to combustibles and types of support, but are designed to be installed in pitched roofs. Installation is similar to the flat roof versions except for the following.

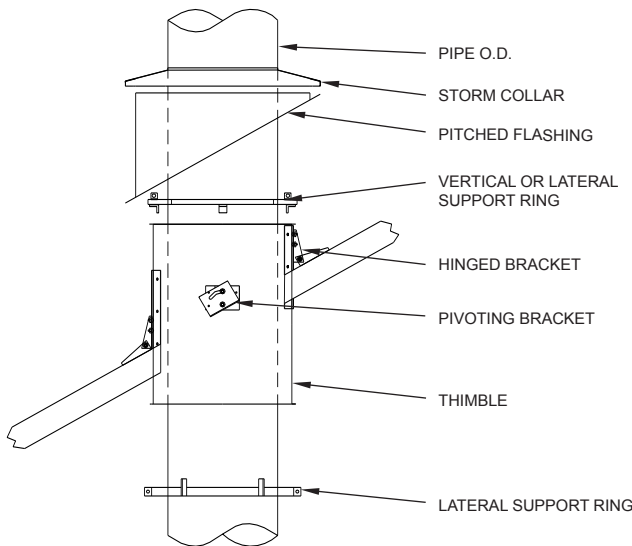
FIG. 39 - ROOF FRAMING FOR VENTILATED THIMBLE ASSEMBLY OR ROOF SUPPORT ASSEMBLY



The roof opening is sized as a flat projection (See FIG. 39) to provide the correct clearance.
 The thimble is centered in the roof hole with the two pivoting brackets oriented parallel to the roof ridge and the hinged brackets running up and down the roof. The brackets are secured to the roof with bolts, lag screws or welding as appropriate. Leave the bolts of the sliding mount loose until the brackets are attached to the roof. Then tighten all bolts and nuts.
 Install the flashing centered on the thimble. Secure it to the roof and seal it to the roof membrane as appropriate.
NOTE: The flashing pitch is fixed, specify required pitch rate with order.

FIG. 40 illustrates details of the pitched roof penetration component installation.

FIG. 40 - VARIABLE PITCH ROOF PENETRATION INSTALLATION

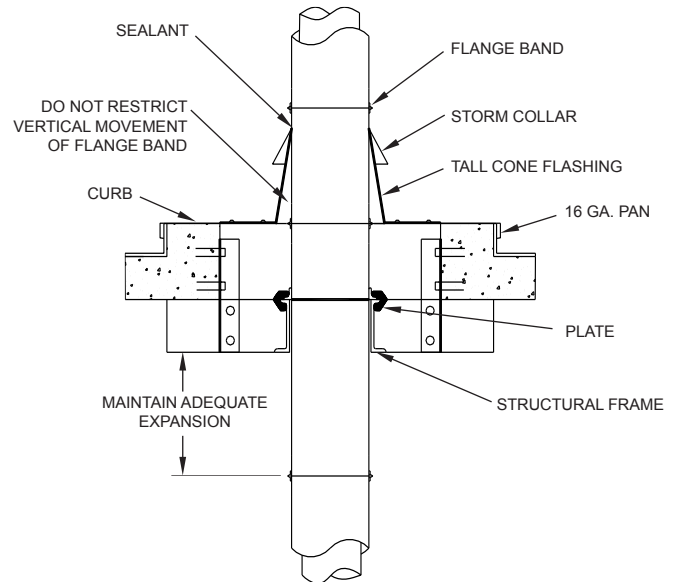


FLASHING (IPICF) VARIABLE PITCH FLASHING (IPICVPF) AND STORM COLLAR (IPICSC)

Flashings, both standard and pitched, are intended for installation on non-combustible roofs only. The flashing is non-ventilated and does not provide for any reduced clearance to combustibles.

To install the flashing, place it around the Grease Duct. Secure and seal it to the roof (See FIG. 41).

FIG. 41 - INSTALLATION OF FLASHING AND STORM COLLAR



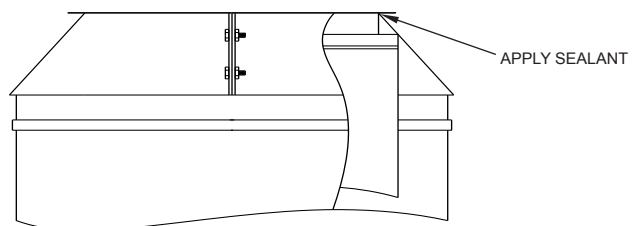
With the flashing in place, the storm collar is placed around the Grease Duct and sealed to the casing with P077 Grease Duct Sealant. The storm collar should not quite rest on the flashing when the Grease Duct is cold (1/4" gap between the collar and the top of the flashing).

When a Grease Duct is installed with a flashing and collar rather than a ventilated thimble, the Grease Duct must be stabilized by installing either a full angle ring or a plate support just below the roof. If the Grease Duct height above the plate support or full angle ring exceeds the "B" dimension in Table 5, it must be guyed to avoid wind damage.

CHIMNEY TERMINATIONS CLOSURE RING (IPICCR)

The closure ring (See FIG. 42) is the simplest method of terminating a Grease Duct. It provides protection of the annular space between the inner and outer walls and leaves the top of the Grease Duct open to the elements. A drain section (or tee with drain tee cap) should always be installed when a closure ring is used as termination. The closure ring is installed on the inner wall and overlaps the outer wall. The joint at the inner wall should be sealed with P080 Grease Duct Sealant. A closure ring may be used for either vertical or horizontal discharge.

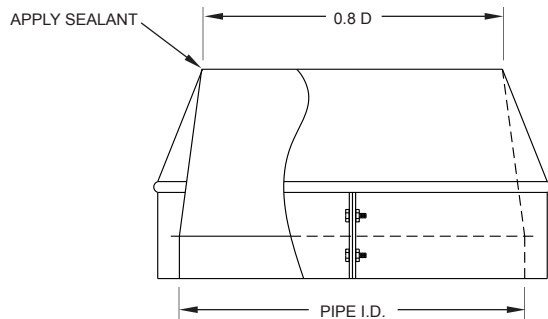
FIG. 42 - TACK CLOSURE RING



EXIT CONE (IPICEC)

The exit cone (See FIG. 43) is designed to produce additional gas velocity at the Grease Duct exit to help disperse the effluent. The opening of the cone is based on a ratio of 0.8 times the nominal pipe diameter. Since the exit cone is an open top termination, provision for drainage is recommended. An exit cone may be used for either vertical or horizontal discharge.

FIG. 43 - EXIT CONE

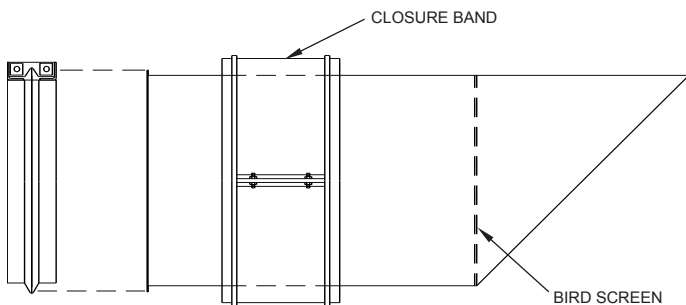


MITER CUT (IPICMC)

The miter cut is intended for use as a termination for a horizontal discharge. It is designed to minimize the entry of rainwater when installed in the proper orientation. Note that the miter cut is a single wall part and requires a clearance of 18" (457) to combustibles.

The miter cut is equipped with a birdscreen at the short side of the miter (See FIG. 44). The miter must be installed so that the long side of miter is on the top of the pipe to afford protection from rain.

FIG. 44 - MITER CUT (IPICMC)



THROUGH-PENETRATION FIRESTOP SYSTEM

When penetrating a fire-resistance related floor or wall, a Through-Penetration Firestop System is used to retain the fire resistance rating on the floor or walls. Use only the model PICPPK (See FIG. 45).

1. Determine flue size of Grease Duct.
2. A circular hole that is 10" (254) greater than flue size, or 2.0 inches greater than duct O.D., is required in the masonry floor or wall.
3. Center the Model IPIC Series 4G Grease Duct within the hole. The duct is to be properly supported to maintain location.
4. Insert 3 1/2" (89) wide ceramic fiber provided. The fiber must encircle the outer casing of the Grease Duct and fill the cavity within 1/2" (13) of the floor (wall) surface, pack the fiber within the cavity, if required.
5. On the downstream side of the floor or wall, closest to the appliance, apply the caulk provided, P082 3M Part Number CP25WB+, to a depth of 1/2" (13) deep around the duct.

NOTE: THE OPENING BETWEEN THE GREASE DUCT AND THE FLOOR (WALL) MUST BE CLOSED.

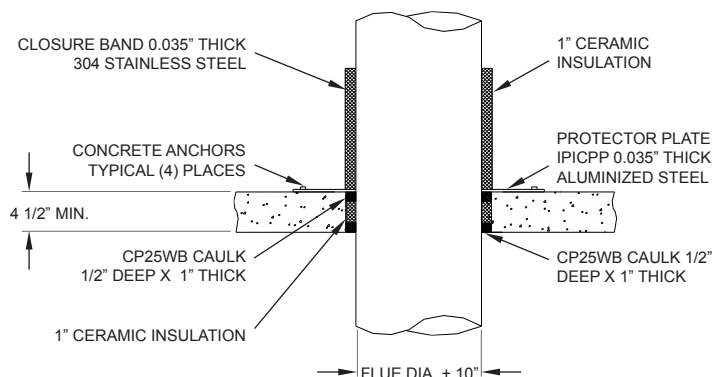
6. Apply the caulk to a depth of 1/2" (13) from the upstream side, filling the cavity.
7. Install two (2) halves of protector plate to the upstream side of the floor (wall). Secure with masonry hardware.

NOTE: THE PROTECTOR PLATE HALVES ARE DESIGNED TO FIT AROUND THE CASING AND OVERLAP EACH OTHER BY 1/2" (13).

8. Position the closure band around the casing, making sure that the 12" wide ceramic fiber is between the closure band and casing. Secure the closure band.

NOTE: THE CLOSURE BAND AND CERAMIC FIBER IS DESIGNED TO BE TOUCHING THE PROTECTOR PLATES AFTER INSTALLATION (See FIG. 45).

FIG. 45 - 3 HOUR F, 3 HOUR T, THROUGH PENETRATION FIRESTOP



MAINTENANCE

Grease Duct is required by NFPA 96 and many local building codes to be inspected and cleaned if necessary at specific intervals. Metal-Fab Model IPIC Grease Duct must be inspected and cleaned in accordance with local requirements. It requires no additional internal maintenance.

Metal-Fab 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.

Where the duct is installed outside the building, the aluminized 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.

AUTOMATIC CLEANING

An automatic hot water/detergent cleaning system can be integrated into the IPIC Grease Duct by utilizing any of the specialized parts such as the Nozzle Section (IPICNS). All of the specialized parts have standard 1 inch diameter NPT coupling capabilities making attachment easy.

The typical water temperature for automatic cleaning system is 160° F. and the entire duct system can be scrubbed down daily for removal of grease and dirt depending on the application. Automatic cleaning systems should be connected to the correct hardware so that the residues from the process are directly piped to drains and not grease traps.

NOTE: When solid fuel fired cooking appliances are vented with Model IPIC Grease Duct, creosote and grease may build up on the inner pipe wall. 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.

TABLE 4 WEIGHT CALCULATIONS

IPIC-G WEIGHT CALCULATIONS

Pipe ID	I.D. x 1.65 = lbs/ft	No. of ft supported	ft. x lbs/ft = lbs.	Safety Factor	Test lbs.	lbs. x 1/.7584 = psi
6	9.9	20	198	4	792	1044.3
8	13.2	20	264	4	1056	1392.4
10	16.5	20	330	4	1320	1740.5
12	19.8	20	396	4	1584	2088.6
14	23.1	20	462	4	1848	2436.7
16	26.4	20	528	4	2112	2784.8
18	29.7	15	445.5	4	1782	2349.7
20	33	15	495	4	1980	2610.8
22	36.3	15	544.5	4	2178	2871.8
24	39.6	10	396	4	1584	2088.6
26	42.9	10	429	4	1716	2262.7
28	46.2	10	462	4	1848	2436.7
30	49.5	10	495	4	1980	2610.8
32	52.8	10	528	4	2112	2784.8
34	56.1	10	561	4	2244	2958.9
36	59.4	9	534.6	4	2138	2819.6

THE INFORMATION ON THIS PAGE PERTAINS TO ALL APPLICATIONS

EXPECTED NUMBER OF JOINTS PER TUBE (P080 SEALANT)					
Pipe Diameter	No. of Joints	Pipe Diameter	No. of Joints	Pipe Diameter	No. of Joints
6"	5	22"	3	38"	1
8"	5	24"	2	40"	1
10"	5	26"	2	42"	1
12"	4	28"	2	44"	1
14"	4	30"	2	46"	1
16"	4	32"	2	48"	1
18"	3	34"	1		
20"	3	36"	1		

NOTE: Sealant is supplied by Metal-Fab and individual tubes are marked P080-(3M #2000 Caulk).

CAUTION: The use of any other sealant on the flange surface will negate all listings of the product and impair the sealing effectiveness.

NOTE: Through Penetration Firestop System (PICPPK) is supplied with 3M&CP25WB+ firestop caulk in individual tubes marked P082. (Refer to installation Instructions for further details.)

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