

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

| | | |
|-----------------------|----------------------------|---------------------|
| Permit No: 04-1056 | Issue Date: AUG 11 2004 | CBL: 013 I020001 |
|-----------------------|----------------------------|---------------------|

| | | | |
|--|--|---|----------------------|
| Location of Construction: 43 Washington Ave | Owner Name: Bartlett Island Llc | Owner Address: 67 India St | Phone: 879-2233 |
| Business Name: | Contractor Name: Aero Heating and Ventilating | Contractor Address: 378 Presumpscot Portland | Phone: 2077612092 |
| Lessee/Buyer's Name | Phone: | Permit Type: HVAC | Zone: B-4 |

| | | | | |
|--------------------------|---|---|---|--------------------|
| Past Use: coffee shop | Proposed Use: coffee shop w/gas coffee roaster | Permit Fee: \$156.00 | Cost of Work: \$15,000.00 | CEO District: 1 |
| | | FIRE DEPT: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied | INSPECTION: Use Group: B/F Type: JB 8/13/04 | |

| | | |
|--|-------------------------------|-------------------------------|
| Proposed Project Description: install gas coffee roaster in coffee shop | Signature: <i>[Signature]</i> | Signature: <i>[Signature]</i> |
| PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.) | | |
| Action: <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied | | |
| Signature: | | Date: |

| | | |
|-----------------------------|---------------------------------|------------------------|
| Permit Taken By: jodinea | Date Applied For: 07/29/2004 | Zoning Approval |
|-----------------------------|---------------------------------|------------------------|

| | | | |
|---|---|--|---|
| <p>1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.</p> <p>2. Building permits do not include plumbing, septic or electrical work.</p> <p>3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..</p> | <p>Special Zone or Reviews</p> <p><input type="checkbox"/> Shoreland</p> <p><input type="checkbox"/> Wetland</p> <p><input type="checkbox"/> Flood Zone</p> <p><input type="checkbox"/> Subdivision</p> <p><input type="checkbox"/> Site Plan</p> <p>Maj <input type="checkbox"/> Minor <input type="checkbox"/> MM <input type="checkbox"/></p> <p>Date: <i>8/11/04</i></p> | <p>Zoning Appeal</p> <p><input type="checkbox"/> Variance</p> <p><input type="checkbox"/> Miscellaneous</p> <p><input type="checkbox"/> Conditional Use</p> <p><input type="checkbox"/> Interpretation</p> <p><input type="checkbox"/> Approved</p> <p><input type="checkbox"/> Denied</p> <p>Date:</p> | <p>Historic Preservation</p> <p><input checked="" type="checkbox"/> Not in District or Landmark</p> <p>Does Not Require Review</p> <p><input type="checkbox"/> Requires Review</p> <p><input type="checkbox"/> Approved</p> <p><input type="checkbox"/> Approved w/Conditions</p> <p>Denied</p> <p>Date:</p> |
| | <p><i>Please Note ODA Standards in the Ord. Area</i></p> | | |

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

| | | | |
|---|---------|------|-------|
| SIGNATURE OF APPLICANT | ADDRESS | DATE | PHONE |
| RESPONSIBLE PERSON IN CHARGE OF WORK. TITLE | | DATE | PHONE |

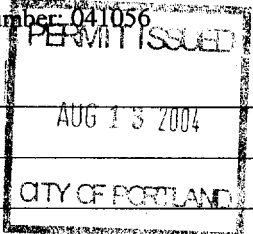
Form # P04

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK
CITY OF PORTLAND

BUILDING INSPECTION

Please Read Application And Notes, If Any, Attached

Permit Number: 041056



This is to certify that Bartlett Island Llc /Aero Heating and Ventilating
has permission to install gas coffee roaster in coffee shop
AT 43 Washington Ave City ID 013 1020001

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statutes of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of buildings and structures, and of the application on file in this department.

Apply to Public Works for street line and grade if nature of work requires such information.

Notification of inspection must be given and when permission is procured before this building or part thereof is altered or otherwise closed-in. HOUR NOTIFICATION IS REQUIRED.

A certificate of occupancy must be procured by owner before this building or part thereof is occupied.

OTHER REQUIRED APPROVALS

Fire Dept. [Signature]
Health Dept. _____
Appeal Board _____
Other _____
Department Name _____

[Signature] 8/13/04
Director - Building & Inspection Services

PENALTY FOR REMOVING THIS CARD

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

| | | |
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| Permit No: 04-1056 | Date Applied For: 07/29/2004 | CBL: 013 I020001 |
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| | | | |
|---|---|--|--------------------------------|
| Location of Construction: 43 Washington Ave | Owner Name: Bartlett Island Llc | Owner Address: 67 India St | Phone: () 879-2233 |
| Business Name: | Contractor Name: Aero Heating and Ventilating | Contractor Address: 378 Presumpscot Portland | Phone (207) 761-2092 |
| Lessee/Buyer's Name | Phone: | Permit Type: Hood Systems, Commerical | |

| | |
|--|--|
| Proposed Use: coffee shop w/gas coffee roaster | Proposed Project Description: install gas coffee roaster in coffee shop |
|--|--|

Dept: Zoning **Status:** Approved **Reviewer:** Marge Schmuckal **Approval Date:** 08/01/2004
Note: **Ok to Issue:**

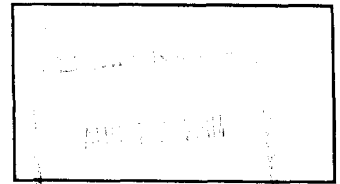
Dept: Building **Status:** Approved with Conditions **Reviewer:** Mike Nugent **Approval Date:** 08/13/2004
Note: **Ok to Issue:**
1) Must be installed in conformity with the manufacturers Listed installation specs and NFPA Codes

Dept: Fire **Status:** Approved with Conditions **Reviewer:** Lt. MacDougal **Approval Date:** 08/03/2004
Note: **Ok to Issue:**
1) the roaster shall be installed to manufactures recommendation



FILL IN AND SIGN WITH INK

APPLICATION FOR PERMIT HEATING OR POWER EQUIPMENT



013 I 020

To the INSPECTOR OF BUILDINGS, PORTLAND, ME.

The undersigned hereby applies for a permit to install the following heating, cooking or power equipment in accordance with the Laws of Maine, the Building Code of the City of Portland, and the following specifications:

Location / CBL 41-43 Washington Ave. Use of Building Retail, office Coffee Roasting Date 7/28/04

Name and address of owner of appliance Coffee By Design / Bartlett Island LLC 67 India St., Portland, ME 04101; Phone: 207 / 879-2233 ext. 6

Installer's name and address DUCTING: Aero heating and ventilating, Inc, 378 Presumpscot St., Portland, ME 04103, Phone: 761-2092
GAS: Mechanical Services Inc. 900 Presumpscot St., Portland, ME 04103 Telephone mechanical services: 774-1531

Location of appliance:

- Basement
- Floor - 1st floor
- Attic
- Roof

of Fuel:

- Gas
- Oil
- Solid

Appliance Name: Friedrich Coffee Roaster

U.L. Approved Yes No * see below

Will appliance be installed in accordance with the manufacture's installation instructions? Yes No

* ETL Listed, Conforms to ANSI Z83.12, certified to CAN/CGA 1.10 # 119625

The Type of License of Installer:

- Master Plumber # _____
- Solid Fuel # _____
- Oil # _____
- Gas # PNT 2322
- Other _____

Type of Chimney:

- Masonry Lined
- Factory built _____

Metal: metal - Fab, Inc.
Factory Built U.L. Listing # 1738
(see attached design manual)

Direct Vent
Type _____ UL# _____

Type of Fuel Tank

- Oil
- Gas Hooking up gas & ducting for coffee tank

Size of _____
of Tanks _____
Number of tanks _____

Distance from Tank to Center of Flame _____ feet.

Cost of Work: \$ 15,000.

Permit Fee: \$ 156.00

Approved

Fire: _____
Ele.: _____
Bldg.: _____

Approved with Conditions

- See attached letter or requirement

Signature of Installer Peter Callahan

Inspector's Signature _____ Date Approved _____

Fax

To: Rodgers
Atten: Jim Foley
Re: Coffee Roaster
Date: 07-21-04
Pages (including cover): 1
Comments:

IP31-1 Stainless Steel Roaster

10" 8"
8- 42" Pipe
1- 30" Pipe
2- Variable Length
2- 45MT
2- 90MT
5- TEE CAPS
1- TEE CAP w/ DRAIN
1- GUY RING
3- WALL SUPPORT BRACKETS
1- Plate Support
1- Stack Cap
1- Extra INNER Ring
Sealant

7- 42" Pipe
1- 30" Pipe
2- Variable Length
2- 45MT
2- 90MT
5- TEE CAPS
1- Tee Cap w/drain
1- GUY RING
3- WALL SUPPORT BRACKETS
1- Plate Support
1- Stack Cap
1 Extra INNER Ring
Sealant

Thanks
From the desk of...
Pete Collard
Project Manager
Aero Heating & Ventilating, Inc.
372 Presumpscot St.
Portland, ME 04103
Phone: 207-761-2092
Fax: 207-761-4471

DESIGN MANUAL

Metal-Fab, Inc.

**Pressure Rated Chimney & Vents
Generator & Fume Exhausts**

Models:

**PSW, PIC,
IPIC-1, -2, & -4**

**G-Series
Grease Duct Systems**

Models:

IPIC-1G, -2G, & -4G

SERIES 4G NOW UL LISTED & CLASSIFIED FOR 0" CLEARANCE TO COMBUSTIBLE (SEE PAGE 14)



QUICK REFERENCE - APPLICATION CHART

VENT AND CHIMNEY TYPES VS. LISTING CHARACTERISTICS

| VENT OR CHIMNEY TYPE VS. PROPERTY | SINGLE WALL | DOUBLE WALL NEGATIVE PRESSURE VENT AND CHIMNEY | | | | SPECIAL DOUBLE WALL GAS VENT | | DOUBLE WALL POSITIVE PRESSURE CHIMNEY WITH AIR INSULATION | | DOUBLE WALL POSITIVE PRESSURE CHIMNEY WITH FIBER INSULATION | | |
|---|--|--|--|---|--|---|--|---|--|---|--|-------------|
| | | TYPE B AND BW GAS VENT | BUILDING HEATING APPLIANCE CHIMNEY | TYPE A VENT | BUILDING HEATING APPLICATION TYPE HT CHIMNEY | NFPA 211 CATEGORY II, III AND IV APPLIANCES | BUILDING HEATING APPLIANCE CHIMNEY | BUILDING HEATING APPLIANCE CHIMNEY | BUILDING HEATING APPLIANCE CHIMNEY | 1400° F. (760° C.) CHIMNEY | GREASE DUCT | GREASE DUCT |
| NFPA 211 CLASSIFICATION | GENERAL USAGE | VENTS FOR CERTIFIED GAS APPLIANCE | DUAL-FUEL BOILERS, OVEN VENTS, WATER HEATERS | VENTS FOR LOW HEAT APPLIANCE | BUILDING HEATING APPLICATION TYPE HT CHIMNEY | NFPA 211 CATEGORY II, III AND IV APPLIANCES | BUILDING HEATING APPLIANCE CHIMNEY | BUILDING HEATING APPLIANCE CHIMNEY | 1400° F. (760° C.) CHIMNEY | GREASE DUCT | GREASE DUCT | |
| TYPICAL USE | CHIMNEY LINER, DISHWASHER OR TYPE II HOOD | VENTS FOR CERTIFIED GAS APPLIANCE | DUAL-FUEL BOILERS, OVEN VENTS, WATER HEATERS | VENTS FOR LOW HEAT APPLIANCE | BUILDING HEATING APPLICATION TYPE HT CHIMNEY | CONDENSING GAS APPLIANCES | BUILDING HEATING APPLIANCE CHIMNEY | BUILDING HEATING APPLIANCE CHIMNEY | 1400° F. (760° C.) CHIMNEY | GREASE DUCT | GREASE DUCT | |
| FUELS AND VAPORS | ALL FUELS MOST FUMES | NATURAL GAS OR PROPANE | NATURAL GAS OR PROPANE OR #2 FUEL OIL | OIL AND GAS | FIREPLACES AND OTHER SOLID FUEL BURNING APPLIANCES | NATURAL GAS OR PROPANE | ALL FUELS MOST FUMES | ALL FUELS MOST FUMES | ALL FUELS, MOST BQ & S | ALL FUELS, MOST BQ & S | COOKING VAPORS | |
| MAX. CONTINUOUS INTERMITTENT TEMPERATURE | 1000° F. (538° C.) 1400° F. (760° C.) 10 MINUTES | TYPE B: 480° F. (249° C.) TYPE BW: 650° F. (288° C.) | 1000° F. (538° C.) 1400° F. (760° C.) 10 MINUTES | 570° F. (300° C.) 1700° F. (928° C.) 10 MINUTES | 1000° F. (538° C.) 2100° F. (1150° C.) 10 MINUTES | MAX. CONT. 550° F. (228° C.) | 1000° F. (538° C.) 1400° F. (760° C.) 10 MINUTES | 1000° F. (538° C.) 1400° F. (760° C.) 10 MINUTES | 1000° F. (538° C.) 1400° F. (760° C.) 10 MINUTES | 1000° F. (538° C.) 1400° F. (760° C.) 10 MINUTES | 500° F. (260° C.) 2000° F. (1093° C.) 30 MINUTES | |
| INTERNAL PRESSURE | NEGATIVE, NEUTRAL OR POSITIVE | NEGATIVE, NEUTRAL OR POSITIVE | NEGATIVE, NEUTRAL OR POSITIVE | NEGATIVE, NEUTRAL OR POSITIVE | NEGATIVE, NEUTRAL OR POSITIVE | NEGATIVE, NEUTRAL OR POSITIVE | NEGATIVE, NEUTRAL OR POSITIVE | NEGATIVE, NEUTRAL OR POSITIVE | NEGATIVE, NEUTRAL OR POSITIVE | NEGATIVE, NEUTRAL OR POSITIVE | NEGATIVE, NEUTRAL OR POSITIVE | |
| TYPICAL SIZE RANGES | 6 TO 48 INCHES (152 TO 1220 MM) | CONNECTOR: 6" AND 8" (152 AND 204MM) CHIMNEY: 10" TO 30" (250 TO 762MM) | CONNECTOR: 6" AND 8" (152 AND 204MM) CHIMNEY: 10" TO 30" (250 TO 762MM) | 3" AND 4" (76 AND 102MM) | 3" AND 4" (76 AND 102MM) | 6" TO 24" (152 TO 610MM) | 6" TO 48" (152 TO 1220MM) | 6" TO 48" (152 TO 1220MM) | 6" TO 48" (152 TO 1220MM) | 6" TO 48" (152 TO 1220MM) | 6" TO 48" (152 TO 1220MM) NOTE: ALL SIZES NOT AVAILABLE | |
| INNER LINER MATERIAL | TYPE 304, 316, OR 29-4C STAINLESS STEEL | TYPE 1100 OR 3003 ALUMINUM | TYPE 430 STAINLESS STEEL | TYPE 304, 316 OR 430 STAINLESS STEEL | TYPE 304, 316 OR 430 STAINLESS STEEL | TYPE 29-4C STAINLESS STEEL | TYPE 304 OR 316 STAINLESS STEEL | TYPE 304 OR 316 STAINLESS STEEL | TYPE 304 OR 316 STAINLESS STEEL | TYPE 304 OR 316 STAINLESS STEEL | TYPE 304 OR 316 STAINLESS STEEL | |
| OUTER JACKET | NONE | GALVANIZED STEEL OR ALUMINIZED STEEL | GALVANIZED STEEL OR ALUMINIZED STEEL | GALVANIZED STEEL OR ALUMINIZED STEEL | GALVANIZED STEEL OR ALUMINIZED STEEL | ALUMINIZED OR STAINLESS STEEL | ALUMINIZED OR STAINLESS STEEL | ALUMINIZED OR STAINLESS STEEL | ALUMINIZED OR STAINLESS STEEL | ALUMINIZED OR STAINLESS STEEL | ALUMINIZED OR STAINLESS STEEL | |
| INSULATION | NONE | 1/4" - 1/2" (6 TO 13MM) AIR | 1/2" (13MM) AIR | 1/4" (6MM) AIR | 1" (25MM), 1 1/2" (38MM), 2" (51MM), OR 4" (102MM) FIBER | 1" (25MM) AIR | 1" (25MM) AIR | 1" (25MM) AIR | 1" (25MM) AIR | 1" (25MM) AIR | 1" (25MM) AIR | |
| METAL-FAB MODELS | PSW, CSSW (FUMES) | M B-VENT BW-OVAL MLK-LINERS | N/A | TYPE L VENT | TEMP/GUARD | CG \ CGSW | CG \ CGSW | CG \ CGSW | CG \ CGSW | CG \ CGSW | CG \ CGSW | |

* All sizes not available for all models noted.

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2. Warranties

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2. Definitions
3. Applications

SECTION B: ENGINE EXHAUST

1. Codes, Standards, Listings
2. Applications

SECTION C: KITCHEN VENTILATION

1. Codes, Standards, Listings
2. Definitions
3. Applications

SECTION D: DIMENSIONAL DATA / COMPONENTS

INTRODUCTION

INFORMATION

This manual contains data to assist in the proper selection, design, and layout of Chimney, Engine Exhaust, Fume Exhaust, and Grease Duct using Metal-Fab models:

PSW - Pressure Rated Single Wall
PIC - Air Insulated Double Wall
IPIC-1, 2, 4, 4G - Ceramic Insulated Double Wall

Pertinent information is consolidated in one publication to assist you with application information, codes and standards, dimensional information, support requirements and other data of special interest. It is our goal to enable you to select the proper product to meet the requirements of your project confidently and efficiently.

For additional information you may contact us via:

Web Site: www.metal-fabinc.com
Telephone: 316-943-2351
Toll Free Phone: 800-835-2830
Fax: 316-943-2717
E-mail: info@mtlfab.com

WARRANTIES

ONE YEAR

Metal-Fab warrants PSW, PIC, IPIC-1, -2, -4, and Series 4G when used in chimney, and exhaust systems for a period of one (1) year from date of original installation when designed, installed, and maintained in accordance with Metal-Fab specifications.

TWELVE YEAR

Metal-Fab further warrants PSW, PIC, IPIC-1, -2, -4, and Series 4G when used in chimney, exhaust, and Grease Duct systems for a period of twelve (12) years from date of original application when designed, installed, maintained, and registered as defined in the full warranty with Metal-Fab in accordance with Metal-Fab specifications.

Refer to Metal-Fab Warranty forms L865 and L961 for complete information on claim procedures, exclusions, and limitations.

SECTION A - CHIMNEYS / VENTS / FUME EXHAUSTS



MODEL CODES

ICC: The International Code Council is a not-for-profit organization established by the International Conference of Building Officials, Building Officials and Code Administrators International, and the Southern Building Code Congress International to create a single set of comprehensive and coordinated international codes. This set is called the International Codes. ICBO, BOCA, and SBCCI will no longer publish separate codes. Codes regarding chimneys and vents are in the 2000 International Mechanical Code (IMC). BOCA, ICBO, and SBCCI continue to provide services beyond the International Codes.

IAPMO: International Association of Plumbina & Mechanical Officials
IAPMO publishes the Uniform Plumbing Code (UPC), Uniform Mechanical Code (UMC), and a number of other life safety codes. IAPMO is most recognized for their development of the Uniform Plumbing Code.

NFPA. National Fire Protection Association
NFPA develops codes and standards for fire safety. There are over 300 NFPA codes and standards.

IAPMO and NFPA are jointly developing a new set of codes.

STANDARDS

- NFPA 37** Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines.
- NFPA 54** National Fuel Gas Code
- NFPA 211** Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning, Appliances.
- UL 103** Standard for Safety, Factory-Built Chimneys for Residential and Building Heating Appliances.
- UL 1738** Standard for Safety Venting Systems for Gas-Burning Appliances, Categories II, III, and IV.
- ULC/ORD-C959-1993** Canadian standard for Industrial Chimneys
- ASTM E119** Standard Test Methods for Fire Tests of Building Construction and Materials.

STANDARDS AND LISTINGS

| PRODUCT MODEL | PSW | PIC | IPIC-1 | IPIC-2 | IPIC-4 | IPIC SERIES 4G |
|--|--------|---------|---------|---------|---------|----------------|
| UL File No. - Chimney | MH8251 | MH8251 | MH8251 | MH8251 | MH8251 | MH8251 |
| cUL File No. | | CMH1272 | CMH1272 | CMH1272 | CMH1272 | |
| UL Listings | | | | | | |
| Building Heating Appliance | | X | X | X | X | X |
| 1400°F Factory-Built Chimney | | X | X | X | X | X |
| Standards | | | | | | |
| NFPA 37 | | X | X | X | X | X |
| NFPA 211 | X | X | X | X | X | X |
| UL 103 | | X | X | X | X | X |
| ULC/ORD-C959-1993 | | | X | X | X | X |
| Regional Acceptance | | | | | | |
| California State Fire Marshall Chimney No. 4146-296:100 | | X | | | | |
| City of New York Chimney No. MEA245-97-M | | X | X | X | X | X |
| School District 2 Massachusetts | | X | X | X | X | X |

SECTION A - CHIMNEYS / VENTS / FUME EXHAUSTS

DEFINITIONS

Alternative Methods: The use of other methods or devices for the compliance with a standard, provided that sufficient technical data are submitted to the Authority Having Jurisdiction to demonstrate that the proposed method or device is equivalent in quality, strength, fire endurance, effectiveness, durability and safety to that of the standard.

Authority Having Jurisdiction: The organization, office, or individual responsible for approving equipment, an installation, or procedure.

Breeching: That portion of the system that conveys products of combustion from the appliance(s) to the chimney. Also referred to as vent connector.

Chimney: A primarily vertical passageway for removing products of combustion from a structure. Factory-built chimneys shall be listed by an accredited testing agency.

Combustible Material: Material subject to an increase in combustibility or flame spread rating beyond the limits established in the definition of limited combustibles.

Limited Combustibles: Building combustible material that does not comply with the definition of a non combustible material, that in the form used, has a potential heat value not exceeding 3500 Btullb. (Abbreviated... see NFPA for full definition)

Liquid-tight: Constructed and performing in such a manner as not to permit the passage of any liquid at any temperature.

Listed: Equipment, materials, or services included in a list published by an organization that is acceptable to the Authority Having Jurisdiction and concerned with the evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material or service meets the identified standards or has been tested and found suitable for a specific purpose.

Non Combustibles: A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat. Materials that are reported to pass ASTM E 136 *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750C* shall be considered noncombustible materials.

Special Gas Vent: A vent constructed and listed to UL 1738. This standard refers to venting Category II, and IV appliances, considered to be condensing types. Metal-Fab Corr/Guard is recommended for these appliances.

Vents, Type B: Factory made vents listed by a nationally recognized testing agency for venting listed gas appliances with draft hoods and other Category I gas appliances listed for use with type B gas vents.

APPLICATIONS

Complete information for proper and safe installations is found in the Metal-Fab Installation Instructions for each product.

Model PIC and IPIC building heating appliance chimneys are suitable for use with building heating appliances and other low heat appliances as described in the chimney selection chart of the NFPA Standard 211, which produce exhaust flue gas temperature at a temperature not exceeding 1000°F continuous. The PIC and IPIC chimneys are also suitable for use in complete exhaust systems for natural gas / diesel engines and gas turbines. These chimneys are also listed for higher heat applications where continuous temperatures are not in excess of 1400°F and where the intermittent maximum temperature is less than 1800°F.

NOTE: Dimensions are American Standard (feet & inches), with metric in parenthesis except where stated otherwise.

SECTION A - CHIMNEYS / VENTS / FUME EXHAUSTS

FUEL TYPES

| | |
|------------|--|
| All Models | Natural and LP Gas, #2-6 Fuel Oil, Coal, Wood, Fumes |
|------------|--|

EXHAUST PRESSURE

| | |
|------------|---|
| All Models | Positive to 60" w.g., Neutral, Negative |
|------------|---|

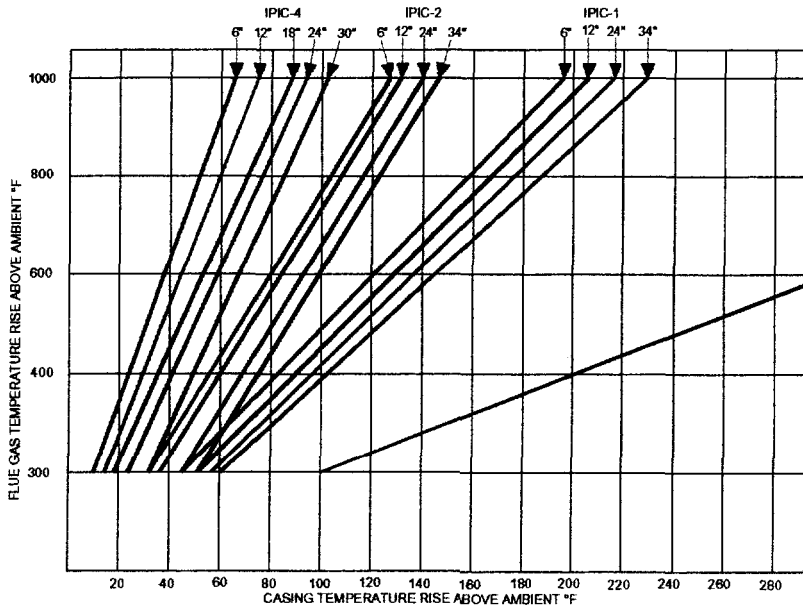
| Materials Selections | FLUE | CASING |
|----------------------|---------------------|--|
| Standard | 304 Stainless Steel | Aluminized Steel |
| Options | 316 Stainless Steel | 304 Stainless Steel 316 Stainless Steel |

| | Building Heating Appliances | Factory-Built Chimneys |
|--------------|-----------------------------|------------------------|
| Continuous | 1000F (538C) | 1400F (760C) |
| Intermittent | 1400F (760C) | 1800F (982C) |

| Diameter | PSW | PIC | IPIC-1 | IPIC-2 | IPIC-4 | IPIC-4G |
|-----------------------|----------------|------------------|------------|------------|------------|----------------------|
| Flue 6-36 | .035 (.9) | .035 (.9) | .035 (.9) | .035 (.9) | .035 (.9) | .035 (.9) |
| 38-48 Insulation | .048 (1.2) | .048 (1.2) | .048 (1.2) | .048 (1.2) | .048 (1.2) | .048 (1.2) |
| All Diameters | Not Applicable | 1" Air Insulated | 1" Ceramic | 2" Ceramic | 4" Ceramic | 4 Hi-Density Ceramic |
| Casing | | | | | | |
| 6-18" (152-457) | Not Applicable | 0.024 (.6) | 0.024 (.6) | 0.024 (.6) | 0.024 (.6) | 0.024 (.6) |
| 20" (508) | | 0.024 (.6) | 0.024 (.6) | 0.024 (.6) | 0.034 (.9) | 0.034 (.9) |
| 22" (559) | | 0.024 (.6) | 0.024 (.6) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) |
| 24" (610) | | 0.024 (.6) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) |
| 26"-36" (660-914) | | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) |
| 38"-48" (965-1219) | | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) | N/A |

| PSW | PIC | IPIC-1 | IPIC-2 | IPIC-4 | IPIC-4G |
|------|--------------|------------|-----------|------------|-----------------------|
| None | 1" Air Space | 1" Ceramic | 2 Ceramic | 4" Ceramic | 4" Hi-Density Ceramic |

APPROXIMATE CASING TEMPERATURE CHART



SECTION A - CHIMNEYS / VENTS / FUME EXHAUSTS

CLEARANCES

Refer to the table clearances to building components. Consideration in design should be given to allow adequate clearances for installation. Roof support Assemblies (RSA) and Ventilated Thimble Assemblies (VTA) are used to penetrate a combustible roof. All other parts are for attachment to noncombustible construction (i.e. floor guides, wall guides, plate and wall support assemblies).

DO NOT ENCLOSE WITH COMBUSTIBLE CONSTRUCTION

CLEARANCE: 1000°F (538°C) CONTINUOUS, 1400°F (760°C) INTERMITTENT

BUILDING HEATING APPLIANCE - TO COMBUSTIBLES (UNENCLOSED)

| DIAMETER | PSW | | PIC | | IPIC-1 | | IPIC-2 | | IPIC-4 | |
|----------------------|-----------|-----------|-----------|----------|----------|----------|---------|---------|---------|---------|
| | INT. | EXT. | INT. | EXT. | INT. | EXT. | INT. | EXT. | INT. | EXT. |
| 6" (152) | 18" (457) | 18" (457) | 4" (102) | 4" (102) | 1" (25) | 1" (25) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 8"-16" (203-406) | 18" (457) | 18" (457) | 4" (102) | 4" (102) | 2" (51) | 2" (51) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 18" (457) | 18" (457) | 18" (457) | 5" (127) | 5" (127) | 3" (76) | 3" (76) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 20" (508) | 18" (457) | 18" (457) | 6" (152) | 6" (152) | 3" (76) | 3" (76) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 22" (559) | 18" (457) | 18" (457) | 7" (178) | 6" (152) | 3" (76) | 3" (76) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 24" (610) | 18" (457) | 18" (457) | 8" (203) | 6" (152) | 3" (76) | 3" (76) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 26" (508) | 18" (457) | 18" (457) | 9" (229) | 6" (152) | 3" (76) | 3" (76) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 28"-32" (711-813) | 18" (457) | 18" (457) | 10" (254) | 6" (152) | 4" (102) | 4" (102) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 34" (864) | 18" (457) | 18" (457) | 10" (254) | 6" (152) | 5" (127) | 5" (127) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 36"-40" (914-1016) | 18" (457) | 18" (457) | 10" (254) | 6" (152) | 5" (127) | 5" (127) | 3" (76) | 1" (25) | 3" (76) | 1" (25) |
| 42"-44" (1067-1118) | 18" (457) | 18" (457) | 10" (254) | 6" (152) | 6" (152) | 6" (152) | 3" (76) | 1" (25) | 3" (76) | 1" (25) |
| 46" (1168) | 18" (457) | 18" (457) | 10" (254) | 6" (152) | 6" (152) | 6" (152) | 3" (76) | 1" (25) | 3" (76) | 1" (25) |
| 48" (1219) | 18" (457) | 18" (457) | 10" (254) | 6" (152) | 6" (152) | 6" (152) | 3" (76) | 1" (25) | 3" (76) | 1" (25) |
| TO NON COMBUSTIBLES: | INT. | EXT. | INT. | EXT. | INT. | EXT. | INT. | EXT. | INT. | EXT. |
| 6" (152) | 18" (457) | | 2" (51) | | 1" (25) | | 1" (25) | | 1" (25) | |
| 8"-18" (203-457) | 18" (457) | | 2" (51) | | 2" (51) | | 1" (25) | | 1" (25) | |
| 20"-38" (508-965) | 18" (457) | | 4" (102) | | 3" (76) | | 1" (25) | | 1" (25) | |
| 40"-48" (914-1219) | 18" (457) | | 4" (102) | | 4" (102) | | 1" (25) | | 1" (25) | |

CLEARANCE: 1400°F (760°C) CONTINUOUS, 1800°F (982°C) INTERMITTENT

FACTORY BUILT CHIMNEY - TO COMBUSTIBLES (UNENCLOSED)

| DIAMETER | PSW | | PIC | | IPIC-1 | | IPIC-2 | | IPIC-4 | |
|----------------------|-----------|-----------|-----------|-----------|----------|----------|---------|---------|---------|---------|
| | INT. | EXT. | INT. | EXT. | INT. | EXT. | INT. | EXT. | INT. | EXT. |
| 6" (152) | 18" (457) | 18" (457) | 4" (102) | 4" (102) | 1" (25) | 1" (25) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 8"-16" (203-406) | 18" (457) | 18" (457) | 4" (102) | 4" (102) | 2" (51) | 2" (51) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 18" (457) | 18" (457) | 18" (457) | 6" (152) | 6" (152) | 3" (76) | 3" (76) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 20" (508) | 18" (457) | 18" (457) | 8" (203) | 8" (203) | 3" (76) | 3" (76) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 22" (559) | 18" (457) | 18" (457) | 9" (229) | 9" (229) | 3" (76) | 3" (76) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 24" (610) | 18" (457) | 18" (457) | 10" (254) | 10" (254) | 3" (76) | 3" (76) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 26" (508) | 18" (457) | 18" (457) | 10" (254) | 10" (254) | 3" (76) | 3" (76) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 28"-32" (711-813) | 18" (457) | 18" (457) | 10" (254) | 10" (254) | 4" (102) | 4" (102) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 34" (864) | 18" (457) | 18" (457) | 10" (254) | 10" (254) | 5" (127) | 5" (127) | 1" (25) | 1" (25) | 1" (25) | 1" (25) |
| 36"-40" (914-1016) | 18" (457) | 18" (457) | 10" (254) | 10" (254) | 5" (127) | 5" (127) | 3" (76) | 1" (25) | 3" (76) | 1" (25) |
| 42"-48" (1067-1219) | 18" (457) | 18" (457) | 10" (254) | 10" (254) | 6" (152) | 6" (152) | 3" (76) | 1" (25) | 3" (76) | 1" (25) |
| TO NON COMBUSTIBLES: | INT. | EXT. | INT. | EXT. | INT. | EXT. | INT. | EXT. | INT. | EXT. |
| 6" (152) | 18" (457) | | 2" (51) | | 1" (25) | | 1" (25) | | 1" (25) | |
| 8"-18" (203-457) | 18" (457) | | 2" (51) | | 2" (51) | | 1" (25) | | 1" (25) | |
| 20"-42" (508-1067) | 18" (457) | | 4" (102) | | 3" (76) | | 1" (25) | | 1" (25) | |
| 44"-48" (1118-1219) | 18" (457) | | 4" (102) | | 4" (102) | | 1" (25) | | 1" (25) | |

SECTION A - CHIMNEYS / VENTS / FUME EXHAUSTS

APPLICATIONS

DESIGN CONSIDERATIONS

Always consult appliance installation instructions for exhaust temperatures, pressures, and operating conditions. Appliance manufacturer may limit horizontal runs, elbows, offsets, vertical heights, etc.

PIPE WEIGHTS

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

$$\text{Weight (lbs. per lineal foot)} = (\text{Pipe Dia. in inches}) \times \text{"weight factor"}$$

WEIGHT FACTOR

| | |
|---------------|----------------|
| PSW = 0.40 | IPIC-2 = 1.05 |
| PIC = 0.80 | IPIC-4 = 1.45 |
| IPIC-1 = 0.95 | IPIC-4G = 1.65 |

Example: 8"IPIC-1 Weight calculated: 8 x 0.95 = 7.6 lbs. per lineal foot.

STACK LIFT CHART

| PIPE DIA. | PSW Height | PIC Height | IPIC-1 Height | IPIC-2 Height | IPIC-4 Height |
|--------------|---------------|---------------|------------------|------------------|------------------|
| 6" (152mm) | 220' (67m) | 110' (34m) | 90' (27m) | 80' (24m) | 60' (18m) |
| 8" (203mm) | 190' (59m) | 90' (27m) | 80' (24m) | 70' (21m) | 50' (15m) |
| 10" (254mm) | 170' (52m) | 80' (24m) | 70' (21m) | 60' (18m) | 40' (12m) |
| 12" (305mm) | 150' (46m) | 80' (24m) | 70' (21m) | 60' (18m) | 40' (12m) |
| 14" (356mm) | 140' (43m) | 70' (21m) | 60' (18m) | 50' (15m) | 40' (12m) |
| 16" (406mm) | 130' (40m) | 70' (21m) | 60' (18m) | 50' (15m) | 40' (12m) |
| 18" (457mm) | 120' (37m) | 60' (18m) | 50' (15m) | 50' (15m) | 40' (12m) |
| 20" (508mm) | 110' (34m) | 60' (18m) | 50' (15m) | 40' (12m) | 30' (9m) |
| 22" (559mm) | 110' (34m) | 50' (15m) | 40' (12m) | 40' (12m) | 30' (9m) |
| 24" (610mm) | 100' (30m) | 50' (15m) | 40' (12m) | 40' (12m) | 30' (9m) |
| 26" (660mm) | 90' (27m) | 50' (15m) | 40' (12m) | 40' (12m) | 30' (9m) |
| 28" (711mm) | 90' (27m) | 40' (12m) | 40' (12m) | 30' (9m) | 20' (6m) |
| 30" (762mm) | 80' (24m) | 40' (12m) | 40' (12m) | 30' (9m) | 20' (6m) |
| 32" (813mm) | 80' (24m) | 40' (12m) | 30' (9m) | 30' (9m) | 20' (6m) |
| 34" (864mm) | 70' (21m) | 40' (12m) | 30' (9m) | 30' (9m) | 20' (6m) |
| 36" (914mm) | 70' (21m) | 30' (9m) | 30' (9m) | 30' (9m) | 20' (6m) |
| 38" (965mm) | | 30' (9m) | 30' (9m) | 30' (9m) | 20' (6m) |
| 40" (1016mm) | | 30' (9m) | 30' (9m) | 20' (6m) | 20' (6m) |
| 42" (1067mm) | | 30' (9m) | 30' (9m) | 20' (6m) | 20' (6m) |
| 44" (1118mm) | | 30' (9m) | 20' (6m) | 20' (6m) | 20' (6m) |
| 46" (1168mm) | | 30' (9m) | 20' (6m) | 20' (6m) | 10' (3m) |
| 48" (1219mm) | | 30' (9m) | 20' (6m) | 20' (6m) | 10' (3m) |

NOTE: This chart indicates maximum height that can be suspended from overhead.

CHIMNEY ENVIRONMENT

When a chimney is installed in, and exposed to a corrosive atmosphere, consideration should be given to the types of materials used in the chimney construction. Chemical vapors, when passed through the combustion process, may produce acids, which can corrode the heating equipment and the chimney.

316 stainless is more resistant to corrosion than 304 stainless steel. It is recommended that aluminized Steel casings, exposed to an atmosphere high in pollutants, be protected with one base coat and one finish coat of heat resistant primer and paint. 304 and 316 stainless is also available for flue and casing materials.

For additional information on corrosive materials, visit www.coleparmer.com/technfo/default.html. Metal-Fab provides this information as a convenience only. Use at your discretion.

SECTION B - ENGINE EXHAUST

CODES - STANDARDS - LISTINGS

Metal-Fab product models PSW, PIC, IPIC-1, -2, -4, and -4G are suitable for exhausting gasoline, natural gas/LP, diesel and turbine type engines. Installations comply with NFPA 37, Standard for Installation and Use of Stationary Combustion Engines and Gas Turbines, when installed in accordance with Metal-Fab installation instructions.

APPLICATIONS

Special consideration should be given to engine exhaust systems. There is the possibility of delayed fuel ignition in the exhaust system that can result in an explosion. It is important to protect all changes in direction with additional supports.

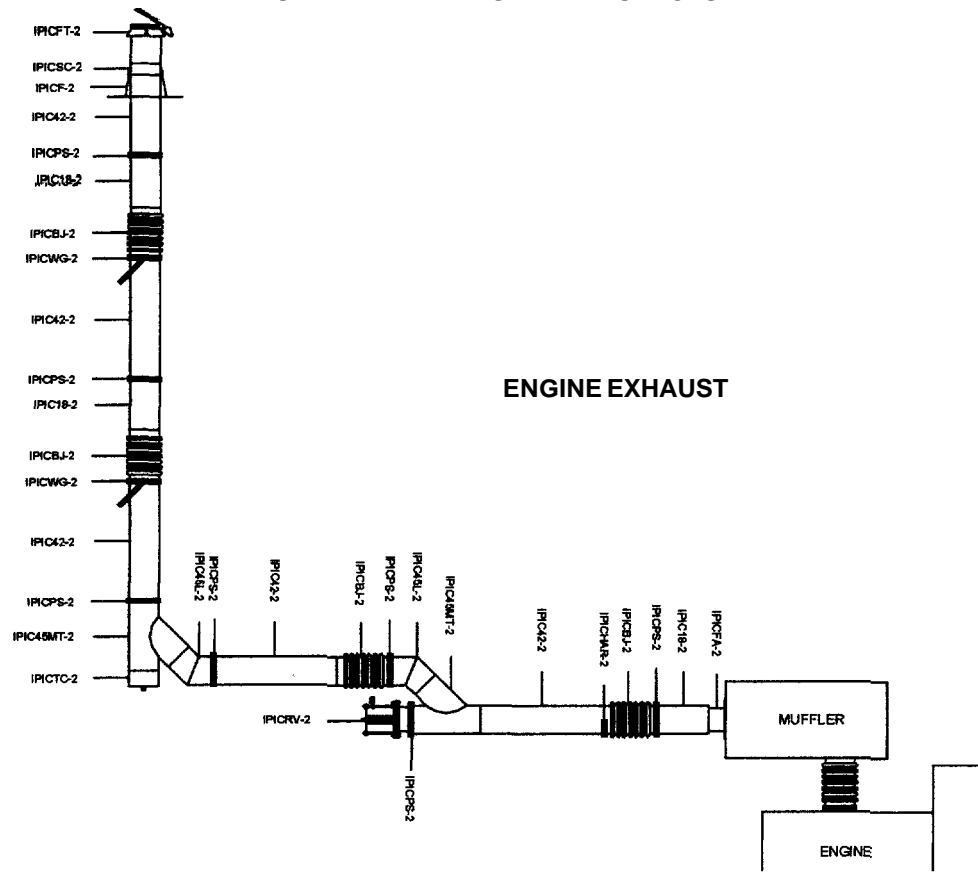
Bellows joints are recommended for expansion. Install in a non-compressed position. As the exhaust system expands, the bellows compress. Install the bellows joint one (1) pipe section below a fixed support in vertical runs. Do not position where the weight of the stack will compress the bellows.

Relief valves are available and recommended where there is the chance of explosion within the system. Locate them as close as possible to the muffler/silencer and without change in direction if possible. Support independently of the exhaust system using a plate support and appropriate bracing where attached to the adjacent component.

Flip Tops are available through 24" DIA. to keep rain, debris, etc. from entering the system. Drain Sections or Tees with a Drain Tee Cap are recommended at the base of vertical sections.

Seal clips used in conjunction with Vee Bands are recommended on exhaust systems. See page 32 for sealant requirements.

DO NOT COMMON VENT ENGINE EXHAUST SYSTEMS UNLESS APPROVED BY THE ENGINE MANUFACTURER.



SECTION C - KITCHEN VENTILATION

Metal-Fab provides the most complete selection of factory-built grease duct systems available today. Six systems are available from cost effective PSW single wall systems to Series 4G, the ultimate in temperature control and safety. Series 4G consists of a factory-built Stainless Steel Grease Duct, 4" of high density ceramic insulation, and an integral steel chase. See the selection table for additional information.

MODEL CODES

ICC: The International Code Council is a non-profit organization established by the International Conference of Building Officials, Building Officials and Code Administrators International, and the Southern Building Code Congress International to create a single set of comprehensive and coordinated international codes. The set is called the International Codes. ICBO, BOCA, and SBCCI will no longer publish separate codes. Codes regarding chimneys and vents are in the 2000 International Mechanical Code (IMC). BOCA, ICBO, and SBCCI continue to provide services beyond the international codes.

IAPMO: International Association of Plumbing & Mechanical Officials

IAPMO publishes the Uniform Plumbing Code (UPC), Uniform Mechanical Code (UMC), and a number of other life safety codes. IAPMO is most recognized for their development of the Uniform Plumbing Code.

NFPA: National Fire Protection Association

NFPA develops codes and standards for fire safety. There are over 300 NFPA codes and standard. IAPMO and NFPA are jointly developing a new set of codes.

GREASE DUCT STANDARDS

- NFPA 96** Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.
- AC 121** ICBO Acceptance Criteria for Grease Duct Systems, Self enclosed.
- UL 103** Standard For Safety, Factory Built Chimneys for Residential and Building Heating Appliances.
- UL 1978** Standard For **Safety** For Grease Ducts.
- UL 2221** Tests for Fire Resistive Grease Duct Enclosure Assemblies.
- ASTM E 119** Standard test methods for Fire Tests of Building Construction and Materials.
- ASTM E 814** Standard Test Method for Through-Penetration Fire Stops.

| LISTING/CLASSIFICATION | PRODUCT/MODEL | | | | | |
|---|---------------|-----|--------|--------|--------|----------------|
| | PSW | PIC | IPIC-1 | IPIC-2 | IPIC-4 | IPIC SERIES 4G |
| UL File No. MH8251/MH25506 | X | X | X | X | X | X |
| UL Listing 1978 | X | X | X | X | X | X |
| UL Classification R15388 | | | | | | X |
| STANDARDS | | | | | | |
| NFPA 96 | X | X | X | X | X | X |
| AC 121 | | | | | | X |
| ASTM E 814 | | | | | | X |
| ASTM E 119 | | | | | | X |
| EVALUATIONS | | | | | | |
| *BOCA, Research Report No. 96-37 | | | | | | X |
| *ICBO, Evaluation Report No. ER-5301 | | | | | | X |
| *SBCCI, Report No. 9666 | | | | | | X |
| REGIONAL ACCEPTANCE | | | | | | |
| City of New York Grease Duct No. MEA 57-95-S | | | | | | X |
| State of Wisconsin 990074-H | | | | | | X |

* See SBCCI PST & ESI Report No. 9666, **BOCA** Evaluation Services Inc. Research Report No. 96-37, and ICBO Evaluation Service Inc. Evaluation Report No. ER-5301 for allowable values and/or conditions of use concerning material presented in this brochure.

SECTION C - KITCHEN VENTILATION

DEFINITIONS

In addition to definitions found on page 4, the following definitions from NFPA 96 relating to grease duct installations are provided.

Access Panel: A closure device used to cover an opening into a duct, an enclosure, equipment or appurtenance.

Approved: Acceptable to the Authority Having Jurisdiction.

Continuous Enclosure (Chase): A recognized architectural or mechanical component of a building having a fire resistance rating as required for the structure and whose purpose is to enclose the vapor removal duct for the full length to its termination point outside the structure without any portion of the enclosure having a fire resistance rating less than the required value.

Factory-Builtgrease Duct Enclosures: A listed factory-built grease duct enclosure system evaluated for reduced clearances to combustibles and as an alternative to a duct with a fire rated enclosure.

Greasetight: Constructed and performing in such a manner as not to permit the passage of any grease under normal cooking conditions.

APPLICATIONS

Complete information for proper and safe installations is found in the Metal-Fab Installation Instructions for each product.

| Material Selections | Inner (Flue) | Outer (Casing) |
|---------------------|---------------------|--|
| Standard | 304 Stainless Steel | Aluminized Steel |
| Options | 316 Stainless Steel | 304 Stainless Steel 316 Stainless Steel |

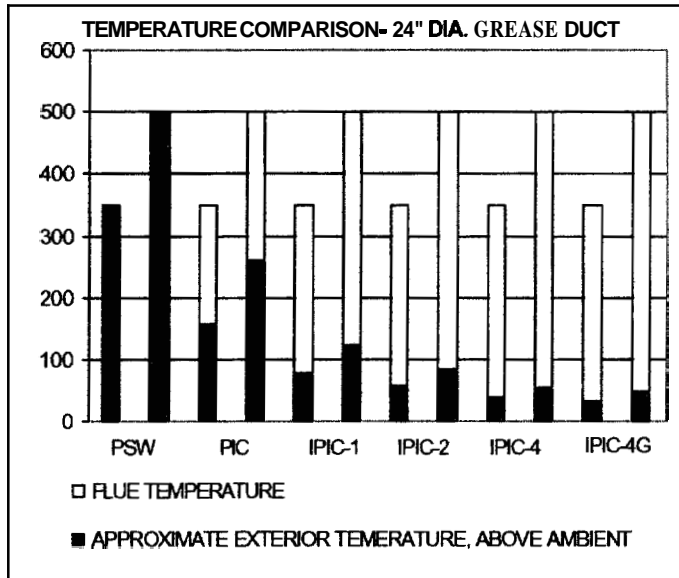
| Diameter | PSW | PIC | IPIC-1 | IPIC-2 | IPIC-4 | IPIC-4G |
|-----------------------|----------------|------------------|------------|------------|------------|-----------------------|
| Flue 6-36 | .035 (.9) | .035 (.9) | .035 (.9) | .035 (.9) | .035 (.9) | .035 (.9) |
| 38-48 | .048 (1.2) | .048 (1.2) | .048 (1.2) | .048 (1.2) | .048 (1.2) | .048 (1.2) |
| Insulation | | | | | | |
| All Diameters | Not Applicable | 1" Air Insulated | 1" Ceramic | 2" Ceramic | 4" Ceramic | 4" Hi-Density Ceramic |
| Casing | | | | | | |
| 6"-18" (152457) | Not Applicable | 0.024 (.6) | 0.024 (.6) | 0.024 (.6) | 0.024 (.6) | 0.024 (.6) |
| 20" (508) | | 0.024 (.6) | 0.024 (.6) | 0.024 (.6) | 0.034 (.9) | 0.034 (.9) |
| 22" (559) | | 0.024 (.6) | 0.024 (.6) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) |
| 24" (610) | | 0.024 (.6) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) |
| 26"-36" (660-914) | | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) |
| 38"-48" (965-1219) | | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) | 0.034 (.9) | N/A |

TEMPERATURE SELECTION

Temperature control should be a major consideration in duct selection. Maintaining constant temperatures within the duct helps keep grease in a vapor state. Reducing grease deposition on the duct surfaces extends cleaning cycles thereby reducing maintenance costs.

An insulated system also improves the working environment, retaining heat within the system, reducing air conditioning loads and increasing worker comfort.

SECTION C - KITCHEN VENTILATION



GREASE DUCT CLEARANCES

NOTES: All clearances shown in this table comply with UL listings. A fire rated chase is required when penetrating a fire rated partition.

| UL Listed/Classified Grease Duct Clearance to Combustibles-Interiors | | | | | |
|--|-----------|-----------|----------|----------|----------------|
| Inside Duct Diameters | Models | | | | |
| | PSW | PIC | IPIC-1G | IPIC-2G | IPIC SERIES 4G |
| 6" (152) | 18" (457) | 5" (127) | 2" (51) | 1" (25) | 0" |
| 8" (203) | 18" (457) | 5" (127) | 3" (76) | 1" (25) | 0" |
| 10" (250) | 18" (457) | 5" (127) | 3" (76) | 1" (25) | 0" |
| 12" (305) | 18" (457) | 7" (178) | 3" (76) | 1" (25) | 0" |
| 14" (356) | 18" (457) | 9" (229) | 3" (76) | 1" (25) | 0" |
| 16" (406) | 18" (457) | 10" (250) | 3" (76) | 1" (25) | 0" |
| 18" (457) | 18" (457) | 12" (305) | 3" (76) | 1" (25) | 0" |
| 20" (508) | 18" (457) | 14" (356) | 4" (102) | 2" (51) | 0" |
| 22"-32" (559-813) | 18" (457) | 18" (457) | 4" (102) | 2" (51) | 0" |
| 34"-36" (864-914) | 18" (457) | 18" (457) | 5" (127) | 3" (76) | 0" |
| 38"-42" (965-1067) | 18" (457) | 18" (457) | 5" (127) | 3" (76) | N/A |
| 44"-48" (1118-1219) | 18" (457) | 18" (457) | 6" (152) | 4" (102) | N/A |

Clearance to Non-Combustibles: 0, all products

ADDITIONAL TESTS BY INDEPENDENT TESTING AGENCIES TO PORTIONS OF UL 103, UL 1978, ASTM E119, AND ASTM E 814 HAVE BEEN EVALUATED AND ACCEPTED BY **BOCA, ICBO, AND SBCCI**. THESE EVALUATIONS ALLOW IPIC SERIES 4G TO BE INSTALLED WITH:

0" CLEARANCE TO COMBUSTIBLES.

NO ADDITIONAL CHASE REQUIREMENT BEYOND A 2 HOUR FIRE RATED PARTITION WHEN INSTALLED IN ACCORDANCE WITH METAL-FAB INSTALLATION INSTRUCTIONS.

FURTHERMORE METAL-FAB IPIC SERIES 4G HAS BEEN EVALUATED BY **UNDERWRITERS LABORATORIES** AND IS CLASSIFIED IN ACCORDANCE WITH THE ACCEPTANCE CRITERIA OF **SBCCI** AS AN ALTERNATIVE TO 3 HR. FIRE RESISTANCE RATED SHAFT ENCLOSURES WITH A MINIMUM ZERO CLEARANCE TO COMBUSTIBLES. THE DUCT ASSEMBLY IS CLASSIFIED UNDER THE GREASE DUCT ASSEMBLIES SUB-CATEGORY AS ASSEMBLY NO. G-1. REFER TO UNDERWRITERS LABORATORIES FIRE RESISTANCE DIRECTORY, VOLUME 2.



SECTION C - KITCHEN VENTILATION

DESIGN CONSIDERATIONS

Metal-Fab offers special grease duct components including square to round transitions, Cleanout access with grease dams, nozzle sections, fan adaptor plates and more. See the component section.

Grease duct fires create tremendous heat, causing thermal expansion, which will distort and fracture any duct system that does not allow for expansion. We recommend using Metal-Fab Adjustable Lengths between fixed points. Adjustable lengths are liquid tight, maintaining integrity of the system in the event of a fire.

All Metal-Fab grease duct systems are UL listed to be installed at, 3 inches (76mm) per 100 feet (33m) or 1/32:1 slope significantly reducing height requirements on long runs. International Mechanical Code, 1996, Section 506.9 requirements for welded rectangular duct are a minimum slope of 1/4:12 up to 75 feet (23m) horizontally and 1:12 over 75 feet (23m).

Examples: 50 foot (15m) horizontal run:

Conventional duct rise @ 1/4:12=12.5 inches (281mm)

Metal-Fab duct rise @ 1/32:12=1.5 inches (39mm)

100 foot (30m) horizontal run:

Conventional duct rise @ 1:12=8.33 feet (100 inches (3937mm))

Metal-Fab duct rise @ 1/32:12=0.25 feet (3 inches (76mm))

DUCT WEIGHTS

Weight (lbs. per lineal foot) = (Pipe Dia. in inches) x "weight factor"

WEIGHT FACTOR

PSW = 0.40

PIC = 0.80

IPIC-1 = 0.95

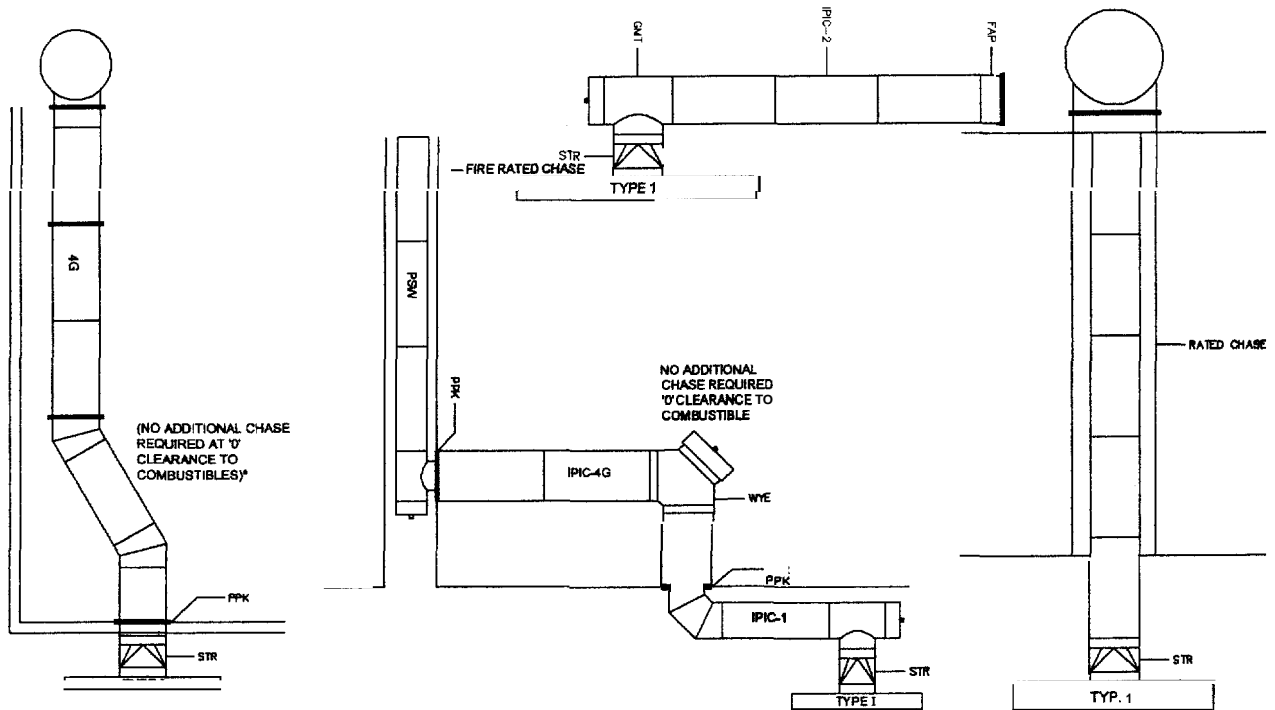
IPIC-2 = 1.05

IPIC-4 = 1.45

IPIC-4G = 1.65

Example: 8"IPIC-1 Weight calculated: 8 x 0.95 = 7.6 lbs. per lineal foot.

APPLICATIONS



SECTION D - COMPONENTS

PART DESIGNATIONS

Components are identified by a **part** number **AND** a configuration code. The **part** number consists of three sections: first the diameter, second the model designation, and third the component code. Example: **24** inch diameter, Insulated Pressure Industrial Chimney **42** inch long pipe section with **2** inches of insulation = **24|PIC42-2**. Several material **options** are available, and defined by the CTO code. The CTO code consists of three fields. The first position defines the flue material. The second position defines the casing material. The third position designates the insulation thickness. See the table below.

| CTO CODES | | |
|--|---|---|
| First Position (Flue Material) | Second Position (Casing Material) | Third Position (Insulation) |
| 4 = 304 S/S 6 = 316 S/S | A = ALUMINIZED STEEL 4 = 304 S/S 6 = 316 S/S | 0 = 1" AIRSPACE 1 = 1" CERAMIC 2 = 2" CERAMIC 4 = 4" CERAMIC G = 4" HI-DENSITY CERAMIC |

24|PIC42-2 **4A2** = 24 inch diameter, Insulated Pressure Industrial Chimney, 42 inch pipe length, with a 304 stainless steel flue, aluminized steel casing, and 2 ceramic insulation between the flue and casing.

STRAIGHT LENGTH DIMENSIONAL CHART

I.D. = Flue Diameter

O.D. = Casing Diameter

| PIPE I.D. | PIPE O.D. | | | |
|------------|------------|--------------|------------|------------|
| | PSW | PIC / IPIC-1 | IPIC-2 | IPIC-4 |
| 6" (153) | 8" (204) | 10" (254) | 14" (356) | 14" (356) |
| 8" (204) | 10" (254) | 12" (305) | 16" (407) | 16" (407) |
| 10" (254) | 12" (305) | 14" (356) | 18" (458) | 18" (458) |
| 12" (305) | 14" (356) | 16" (407) | 20" (508) | 20" (508) |
| 14" (356) | 16" (407) | 18" (458) | 22" (559) | 22" (559) |
| 16" (407) | 18" (458) | 20" (508) | 24" (610) | 24" (610) |
| 18" (458) | 20" (508) | 22" (559) | 26" (661) | 26" (661) |
| 20" (508) | 22" (559) | 24" (610) | 28" (712) | 28" (712) |
| 22" (559) | 24" (610) | 26" (661) | 30" (762) | 30" (762) |
| 24" (610) | 26" (661) | 28" (712) | 32" (813) | 32" (813) |
| 26" (661) | 28" (712) | 30" (762) | 34" (864) | 34" (864) |
| 28" (712) | 30" (762) | 32" (813) | 36" (915) | 36" (915) |
| 30" (762) | 32" (813) | 34" (864) | 38" (966) | 38" (966) |
| 32" (813) | 34" (864) | 36" (915) | 40" (1016) | 40" (1016) |
| 34" (864) | 36" (915) | 38" (966) | 42" (1067) | 42" (1067) |
| 36" (915) | 38" (966) | 40" (1016) | 44" (1118) | 44" (1118) |
| 38" (966) | 40" (1016) | 42" (1067) | 46" (1169) | |
| 40" (1016) | 42" (1067) | 44" (1118) | 48" (1220) | |
| 42" (1067) | 44" (1118) | 46" (1169) | 50" (1270) | |
| 44" (1118) | 46" (1169) | 48" (1220) | 52" (1321) | |
| 46" (1169) | 48" (1220) | 50" (1270) | 54" (1372) | |
| 48" (1220) | 50" (1270) | 52" (1321) | 56" (1423) | |

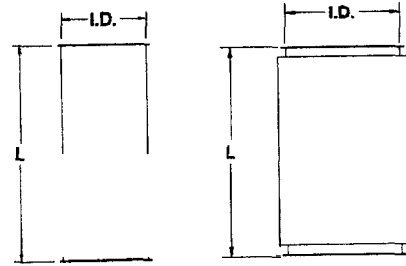
Dimensions In Inches (mm).

SECTION D - COMPONENTS

PIPE LENGTHS

- 9 (229)
- 18" (458)
- 30" (762)
- 42" (1067)

Flow Resistance $K = .4 \left(\frac{L}{D}\right)$ 6" (152) - 16" (606) diameters
 Flow Resistance $K = .3 \left(\frac{L}{D}\right)$ 18" (458) - 48" (1219) diameters
 Flow Resistance $K = .25 \left(\frac{L}{D}\right)$ Engine and turbine exhausts,
 and Grease Duct.



L = pipe length in feet
 D = pipe diameter in inches

NOTE: Custom lengths available, contact factory.

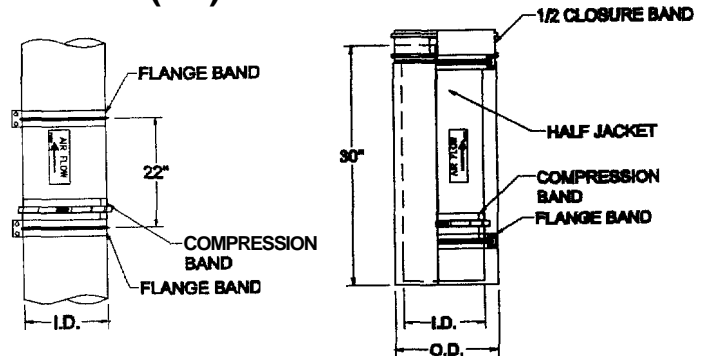
ADJUSTABLE LENGTH/ EXPANSION JOINT (AL)

Flow Resistance $K = .4 \left(\frac{L}{D}\right)$
 L = pipe length in feet
 D = pipe diameter in inches (see the chart above)

NOTE: This part can be field adjusted to fill gaps between standard length components or be used to compensate for thermal expansion and contraction between two fixed points.

INSTALLED LENGTH

Minimum: 5 1/2" (140)
 Maximum: 22" (559)



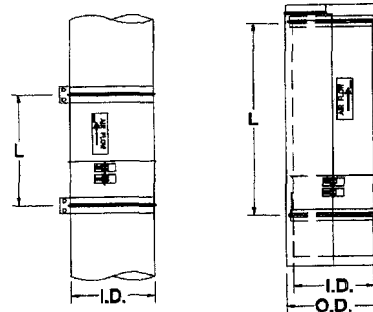
VARIABLE LENGTH (VL)

Flow Resistance $K = .4 \left(\frac{L}{D}\right)$
 L = pipe length in feet
 D = flue diameter

NOTE: Used to fill gaps between standard length components. Does not allow for expansion.

INSTALLED LENGTH

Minimum: 4" (140)
 Maximum: 26" (559)



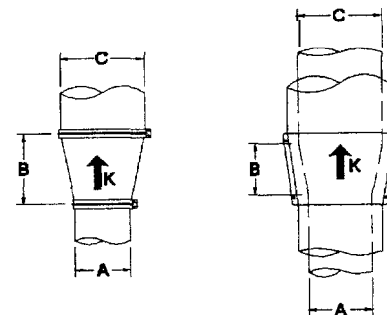
TAPERED INCREASER (TI)

$$\text{Flow Resistance } K = \frac{.51 \left[1 - \left(\frac{A}{C}\right) \right]^2}{\left(\frac{A}{C}\right)^4}$$

NOTE: The number of steps is determined by the number of pipe sizes the Tapered Increaser enlarges. Each step increases "B" dimension 5" (127).

Tapered increasers are preferred over step increasers when space permits.

NOTE: When ordering, specify both diameters with small diameter first (ie. 18PICTI22 for 18" to 22")



| | 1 Step | 2 Step | 3 Step | 4 Step | 5 Step | 6 Step |
|----------|--------|--------|--------|--------|--------|--------|
| E | 5 | 10" | 15" | 20 | 25" | 30 |

for all diameters

SECTION D - COMPONENTS

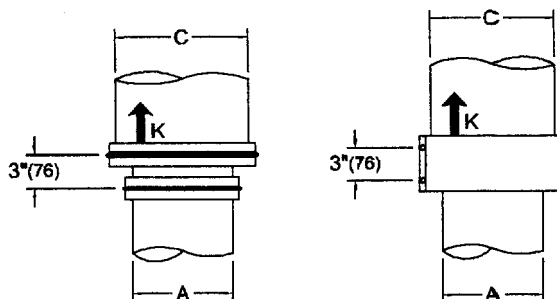
STEP INCREASER (SI)

$$\text{Flow Resistance } K = \frac{[1 - (\frac{A}{C})]^2}{(\frac{A}{C})^4}$$

LENGTH

Step Inserter installs at 3.

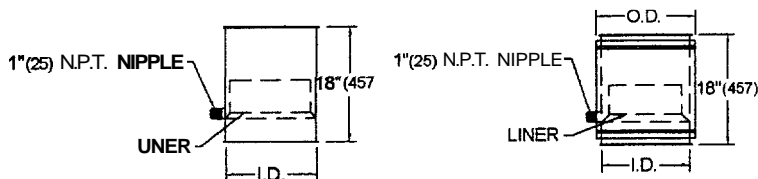
NOTE: When ordering, specify both diameters with small diameter first (ie. 18PIC122 for 18" to 22")



DRAIN SECTION (DS)

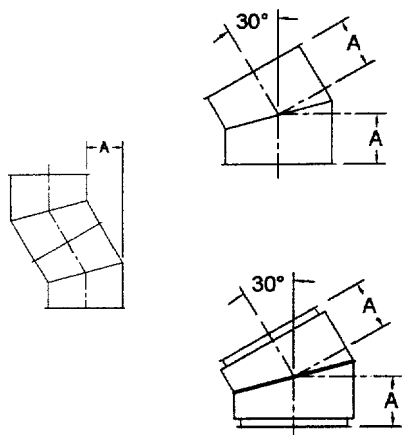
Flow Resistance $K = 0.25$

NOTE: Used to drain rain water or condensation from inside the stack.



30° ELBOW (30L)

Flow Resistance $K = 0.12$



| PIPE I.D. | A | | | |
|------------|-----------------------|-------------|-------------|-------------|
| | PSW / PIC / IPIC-1 | IPIC-2 | IPIC-4 | IPIC-4G |
| 6" (153) | 6.00 (153) | 6.00 (153) | 6.00 (153) | 6.00 (153) |
| 8" (204) | 6.00 (153) | 6.00 (153) | 7.75 (197) | 7.75 (197) |
| 10" (254) | 6.00 (153) | 6.00 (153) | 7.75 (197) | 7.75 (197) |
| 12" (305) | 6.00 (153) | 7.75 (197) | 7.75 (197) | 7.75 (197) |
| 14" (356) | 7.75 (197) | 7.75 (197) | 7.75 (197) | 7.75 (197) |
| 16" (407) | 7.75 (197) | 7.75 (197) | 7.75 (197) | 7.75 (197) |
| 18" (458) | 7.75 (197) | 7.75 (197) | 7.75 (197) | 7.75 (197) |
| 20" (508) | 7.75 (197) | 7.75 (197) | 7.75 (197) | 7.75 (197) |
| 22" (559) | 7.75 (197) | 7.75 (197) | 8.50 (216) | 8.50 (216) |
| 24" (610) | 7.75 (197) | 8.50 (216) | 8.50 (216) | 8.50 (216) |
| 26" (661) | 8.50 (216) | 8.50 (216) | 8.50 (216) | 8.50 (216) |
| 28" (712) | 8.50 (216) | 8.50 (216) | 8.50 (216) | 8.50 (216) |
| 30" (762) | 8.50 (216) | 8.50 (216) | 8.50 (216) | 8.50 (216) |
| 32" (813) | 8.50 (216) | 8.50 (216) | 11.00 (280) | 11.00 (280) |
| 34" (864) | 8.50 (216) | 8.50 (216) | 11.00 (280) | 11.00 (280) |
| 36" (915) | 8.50 (216) | 11.00 (280) | 11.00 (280) | 11.00 (280) |
| 38 (966) | 11.00 (280) | 11.00 (280) | 11.00 (280) | |
| 40" (1016) | 11.00 (280) | 11.00 (280) | 11.00 (280) | |
| 42" (1067) | 11.00 (280) | 11.00 (280) | 11.00 (280) | |
| 44" (1118) | 11.00 (280) | 11.00 (280) | 12.75 (324) | |
| 46" (1169) | 11.00 (280) | 11.00 (280) | 12.75 (324) | |
| 48" (1220) | 11.00 (280) | 12.75 (324) | 12.75 (324) | |

Dimensions in inches (mm).

Offset Distance = "A"

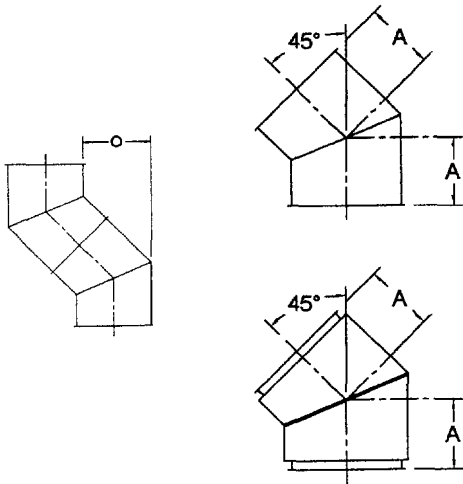
Offset distance between 2 elbow with a straight length between is:

$$O = (2 \times A + \text{pipe length}) \times 0.5$$

SECTION D - COMPONENTS

45° ELBOW (45L)

Flow Resistance $K = 0.15$



Offset Distance:

$$O = 2 \times "A" \times 0.707$$

Offset Distance with pipe length between elbows:

$$O = (2 \times "A" + \text{pipe length}) \times 0.707$$

| PIPE I.D. | A | | | |
|------------|-----------------------|-------------|-------------|-------------|
| | PSW / PIC / IPIC-1 | IPIC-2 | IPIC-4 | IPIC-4G |
| 6" (153) | 7.00 (178) | 7.00 (178) | 7.00 (178) | 7.00 (178) |
| 8" (204) | 7.00 (178) | 7.00 (178) | 10.00 (254) | 10.00 (254) |
| 10" (254) | 7.00 (178) | 7.00 (178) | 10.25 (261) | 10.25 (261) |
| 12" (305) | 7.00 (178) | 10.00 (254) | 10.25 (261) | 10.25 (261) |
| 14" (356) | 10.00 (254) | 10.25 (261) | 10.25 (261) | 10.25 (261) |
| 16" (407) | 10.25 (261) | 10.25 (261) | 10.25 (261) | 10.25 (261) |
| 18" (458) | 10.25 (261) | 10.25 (261) | 11.75 (299) | 11.75 (299) |
| 20" (508) | 10.25 (261) | 10.25 (261) | 11.75 (299) | 11.75 (299) |
| 22" (559) | 10.25 (261) | 11.75 (299) | 11.75 (299) | 11.75 (299) |
| 24" (610) | 10.25 (261) | 11.75 (299) | 11.75 (299) | 11.75 (299) |
| 26" (661) | 11.75 (299) | 11.75 (299) | 11.75 (299) | 11.75 (299) |
| 28" (712) | 11.75 (299) | 11.75 (299) | 11.75 (299) | 11.75 (299) |
| 30" (762) | 11.75 (299) | 11.75 (299) | 14.00 (356) | 14.00 (356) |
| 32" (813) | 11.75 (299) | 11.75 (299) | 14.00 (356) | 14.00 (356) |
| 34" (864) | 11.75 (299) | 14.00 (356) | 14.00 (356) | 14.00 (356) |
| 36" (915) | 11.75 (299) | 14.00 (356) | 14.00 (356) | 14.00 (356) |
| 38" (966) | 14.00 (356) | 14.00 (356) | 14.00 (356) | |
| 40" (1016) | 14.00 (356) | 14.00 (356) | 14.00 (356) | |
| 42" (1067) | 14.00 (356) | 14.00 (356) | 14.00 (356) | |
| 44" (1118) | 14.00 (356) | 14.00 (356) | 15.25 (387) | |
| 46" (1169) | 14.00 (356) | 14.00 (356) | 15.25 (387) | |
| 48" (1220) | 14.00 (356) | 15.25 (387) | 15.25 (387) | |

90° ELBOW (90L)

Flow Resistance K :

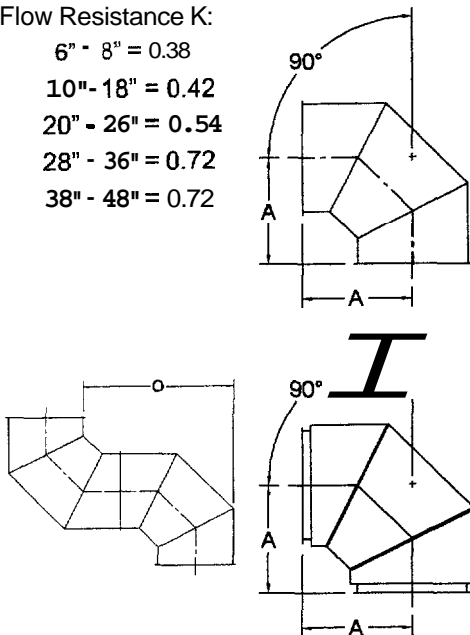
$$6" - 8" = 0.38$$

$$10" - 18" = 0.42$$

$$20" - 26" = 0.54$$

$$28" - 36" = 0.72$$

$$38" - 48" = 0.72$$



Offset Distance:

$$O = 2 \times "A"$$

Offset Distance with pipe length between elbows:

$$O = 2 \times "A" + \text{pipe length}$$

| PIPE I.D. | A | | | |
|------------|-----------------------|-----------|-----------|-----------|
| | PSW / PIC / IPIC-1 | IPIC-2 | IPIC-4 | IPIC-4G |
| 6" (153) | 11" (280) | 12" (305) | 14" (356) | 14" (356) |
| 8" (204) | 12" (305) | 13" (331) | 15" (381) | 15" (381) |
| 10" (254) | 13" (331) | 14" (356) | 16" (407) | 16" (407) |
| 12" (305) | 14" (356) | 15" (381) | 17" (432) | 17" (432) |
| 14" (356) | 15" (381) | 16" (407) | 18" (458) | 18" (458) |
| 16" (407) | 16" (407) | 17" (432) | 19" (483) | 19" (483) |
| 18" (458) | 17" (432) | 18" (458) | 20" (508) | 20" (508) |
| 20" (508) | 18" (458) | 19" (483) | 21" (534) | 21" (534) |
| 22" (559) | 19" (483) | 20" (508) | 22" (559) | 22" (559) |
| 24" (610) | 20" (508) | 21" (534) | 23" (585) | 23" (585) |
| 26" (661) | 21" (534) | 22" (559) | 24" (610) | 24" (610) |
| 28" (712) | 22" (559) | 23" (585) | 25" (635) | 25" (635) |
| 30" (762) | 23" (585) | 24" (610) | 26" (661) | 26" (661) |
| 32" (813) | 24" (610) | 25" (635) | 27" (686) | 27" (686) |
| 34" (864) | 25" (635) | 26" (661) | 28" (712) | 28" (712) |
| 36" (915) | 26" (661) | 27" (686) | 29" (737) | 29" (737) |
| 38" (966) | 27" (686) | 28" (712) | 30" (762) | |
| 40" (1016) | 28" (712) | 29" (737) | 31" (788) | |
| 42" (1067) | 29" (737) | 30" (762) | 32" (813) | |
| 44" (1118) | 30" (762) | 31" (788) | 33" (838) | |
| 46" (1169) | 31" (788) | 32" (813) | 34" (864) | |
| 48" (1220) | 32" (813) | 33" (838) | 35" (889) | |

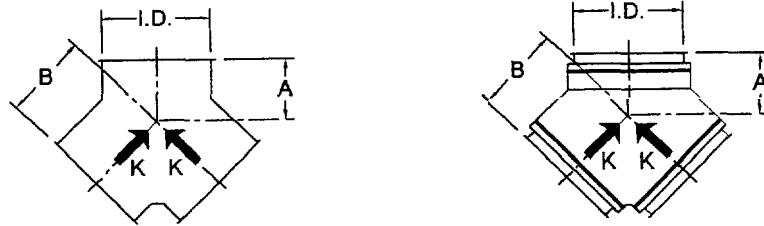
Dimensions in inches (mm).

SECTION D - COMPONENTS

90° WYE (90Y)

Flow Resistance $K = 0.6$

NOTE: Available in 6" - 36" diameters only.



| PIPE I.D. | PSW / PIC / IPIC-1 | | IPIC-2 | | IPIC-4 / IPIC-4G | |
|-----------|--------------------|-----------|-------------|-----------|------------------|-----------|
| | A | B | A | B | A | B |
| 6" (153) | 5.12 (131) | 9" (229) | 5.62 (143) | 10" (254) | 6.50 (166) | 12" (305) |
| 8" (204) | 5.62 (143) | 10" (254) | 6.00 (153) | 11" (280) | 7.00 (178) | 13" (331) |
| 10" (254) | 6.00 (153) | 11" (280) | 6.50 (166) | 12" (305) | 7.25 (185) | 14" (356) |
| 12" (305) | 6.50 (166) | 12" (305) | 7.00 (178) | 13" (331) | 7.75 (197) | 15" (381) |
| 14" (356) | 7.00 (178) | 13" (331) | 7.25 (185) | 14" (356) | 8.12 (207) | 16" (407) |
| 16" (407) | 7.25 (185) | 14" (356) | 7.75 (197) | 15" (381) | 8.50 (216) | 17" (432) |
| 18" (458) | 7.75 (197) | 15" (381) | 8.12 (207) | 16" (407) | 9.00 (229) | 18" (458) |
| 20" (508) | 8.12 (207) | 16" (407) | 8.50 (216) | 17" (432) | 9.37 (238) | 19" (483) |
| 22" (559) | 8.50 (216) | 17" (432) | 9.00 (229) | 18" (458) | 9.75 (248) | 20" (508) |
| 24" (610) | 9.00 (229) | 18" (458) | 9.37 (238) | 19" (483) | 10.25 (261) | 21" (534) |
| 26" (661) | 9.37 (238) | 19" (483) | 9.75 (248) | 20" (508) | 10.62 (270) | 22" (559) |
| 28" (712) | 9.75 (248) | 20" (508) | 10.25 (261) | 21" (534) | 11.12 (283) | 23" (585) |
| 30" (762) | 10.25 (261) | 21" (534) | 10.62 (270) | 22" (559) | 11.50 (292) | 24" (610) |
| 32" (813) | 10.62 (270) | 22" (559) | 11.12 (283) | 23" (585) | 11.87 (302) | 25" (635) |
| 34" (864) | 11.12 (283) | 23" (585) | 11.50 (292) | 24" (610) | 12.25 (311) | 26" (661) |
| 36" (915) | 11.50 (292) | 24" (610) | 11.87 (302) | 25" (635) | 12.62 (321) | 27" (686) |

Dimensions in inches (mm) .

90° MANIFOLD TEE (90MT)

Flow Resistance $K = 1.25$

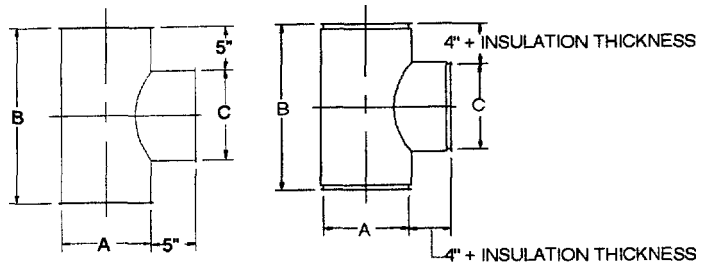
A = Pipe I.O.

B = "C" I.D. + 8" + (2 x insulation thickness)

C = Tap I.D.

NOTE: Specify tap diameter (C) at time of order.

NOTE: PIC has 1" of air clearance between the flue and casing which is equal to having 1" of insulation.



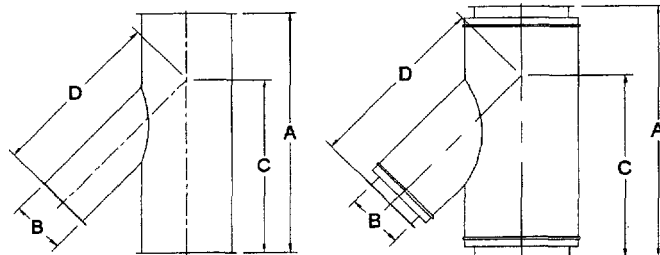
45° MANIFOLD TEE (45MT)

Available through 48" dia.

Flow Resistance $K = 0.4$

NOTE: Used for low resistance flow into vertical or horizontal run. Specify Tap Diameter "B" at time of order

NOTE: For dimensional information see charts at end of this section.



SECTION D - COMPONENTS

DOUBLE LATERAL (DL)

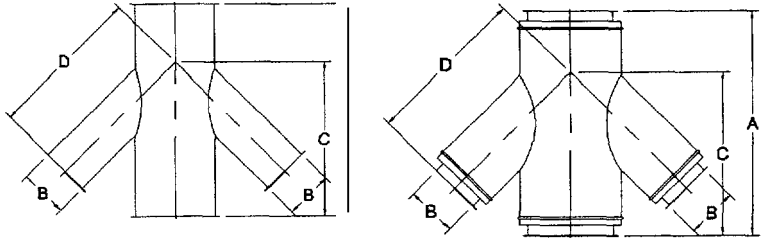
Available in 8 to 48" dia.

Flow Resistance $K = 0.4$

NOTE: Used to centrally connect two appliance manifolds to a common chimney. Specify tap diameter " B at time of order.

NOTE: Tap dia. must be less than Body dia.

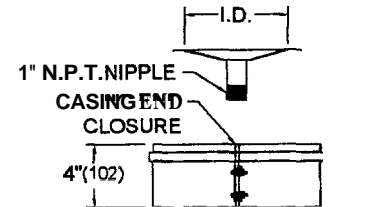
NOTE: For dimensional information see charts at end of this section.



DRAIN TEE CAP W/ CASING END CLOSURE (TC)

NOTE: Used to close and seal unused port of Tee Section (90MT).

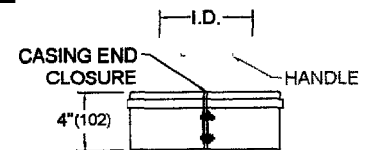
NOTE: Casing end closure not included with PSW - single wall Caps.



TEE CAP LESS DRAIN W/ CASING END CLOSURE (TCN)

NOTE: Used to close and seal unused port of Tee Section (90MT).

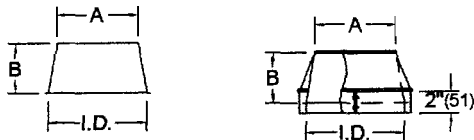
NOTE: Casing end closure not included with PSW - single wall Caps.



EXIT CONE (EC)

Flow resistance $K = 1.25$

NOTE: Used to increase velocity of exiting flue gases. Provide for moisture removal with a Drain Tee Cap or Drain Section.



| PIPE I.D. | A | B | PIPE I.D. | A | B |
|-----------|-------------|------------|------------|-------------|-------------|
| 6" (153) | 4.87 (124) | 2.25 (58) | 28" (712) | 22.87 (581) | 10.25 (261) |
| 8" (204) | 6.50 (166) | 3.00 (77) | 30" (762) | 24.75 (629) | 11.00 (280) |
| 10" (254) | 8.12 (207) | 3.75 (96) | 32" (813) | 26.37 (670) | 11.75 (299) |
| 12" (305) | 9.75 (248) | 4.37 (112) | 34" (864) | 28.00 (712) | 12.12 (308) |
| 14" (356) | 11.37 (289) | 5.12 (131) | 36" (915) | 29.62 (753) | 13.12 (334) |
| 16" (407) | 13.00 (331) | 5.87 (150) | 38" (966) | 30.87 (785) | 14.25 (362) |
| 18" (458) | 14.75 (375) | 6.62 (169) | 40" (1016) | 32.50 (826) | 15.00 (381) |
| 20" (508) | 16.37 (416) | 7.37 (188) | 42" (1067) | 34.12 (867) | 15.75 (400) |
| 22" (559) | 17.87 (455) | 8.12 (207) | 44" (1118) | 35.75 (909) | 16.50 (420) |
| 24" (610) | 19.62 (499) | 8.87 (226) | 46" (1069) | 37.37 (950) | 17.25 (439) |
| 26" (661) | 21.12 (537) | 9.50 (242) | 48" (1220) | 39.00 (991) | 18.00 (458) |

Dimensions in inches (mm).

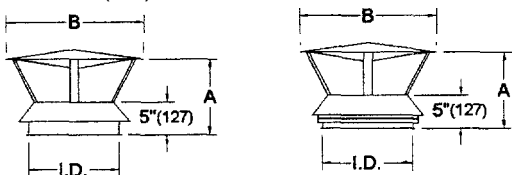
STACK CAP (C)

Flow resistance $K = 0.5$

NOTE: Available through 36" diameter only.

NOTE: Provides partial rain protection. Use of Drain Tee Cap (TC) or Drain Section (DS) is recommended.

NOTE: Also available with bird screen order as (CB).



| PIPE I.D. | A | B | PIPE I.D. | A | B |
|-----------|-----------|-----------|-----------|-----------|------------|
| 6" (153) | 8" (204) | 11" (280) | 22" (559) | 20" (508) | 38" (966) |
| 8" (204) | 10" (254) | 14" (356) | 24" (610) | 22" (559) | 41" (1042) |
| 10" (254) | 12" (305) | 17" (432) | 26" (661) | 23" (585) | 44" (1118) |
| 12" (305) | 13" (331) | 21" (534) | 28" (712) | 25" (635) | 48" (1220) |
| 14" (356) | 14" (356) | 24" (610) | 30" (762) | 27" (686) | 52" (1321) |
| 16" (407) | 16" (407) | 28" (712) | 32" (813) | 28" (712) | 55" (1397) |
| 18" (458) | 17" (432) | 31" (788) | 34" (864) | 30" (762) | 58" (1474) |
| 20" (508) | 19" (483) | 34" (864) | 36" (915) | 31" (788) | 62" (1575) |

Dimensions in inches (mm).

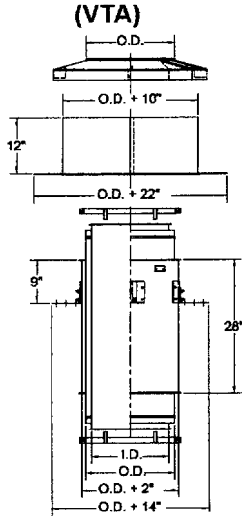
SECTION D - COMPONENTS

VENTILATED THIMBLE ASSEMBLIES

Used when pipe passes through a roof structure.

Ventilated Thimble Assemblies come complete with parts shown.

STANDARD PART NO.



Available in I.D. sizes from 6" to 48"

Available in Pitch 1/12 to 12/12

Framing Dimension - VTA or FPVTA

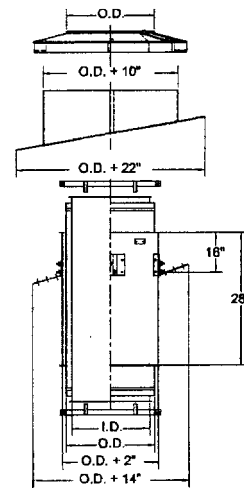
PIC/IPIC-1: I.D. + 8

IPIC-2: I.D. + 10"

IPIC-4: I.D. + 14"

FIXED PITCH PART NO.

(FPVTA)



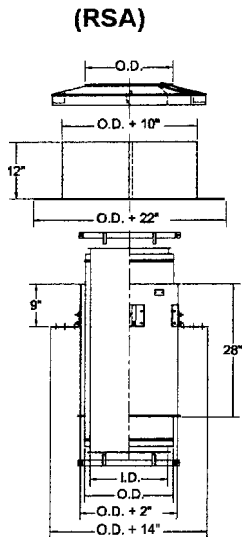
- NOTES:**
1. Thimble extends 9" (229) into flashing of VTA.
 2. FPVTA flashings over 36" (559) in diameter are available by special order only.
 3. Use FPVTA on 1/12 to 12/12 pitch applications.

ROOF SUPPORT ASSEMBLIES

Used when pipe passes through a roof structure.

Ventilated Thimble Assemblies come complete with parts shown.

STANDARD PART NO.



Available in I.D. sizes from 6" to 48"

Available in I.D. Pitch 1/12 to 12/12

Framing Dimension - RSA or FPRSA

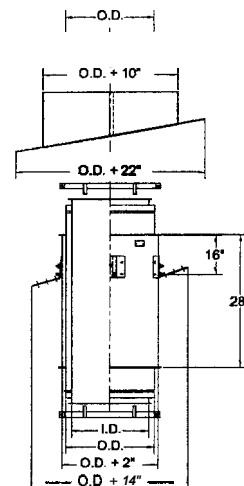
PIC/IPIC-1: I.D. + 8

IPIC-2: I.D. + 10"

IPIC-4: I.D. + 14"

FIXED PITCH PART NO.

(FPRSA)

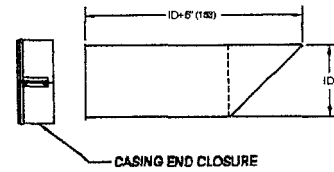


- NOTES:**
1. Thimble extends 9" (229) into flashing of RSA.
 2. FPRSA flashings over 36" (559) in diameter are available by special order only.
 3. Use FPRSA on 1/12 to 12/12 pitch applications.

SECTION D - COMPONENTS

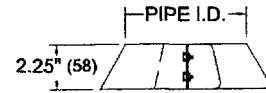
MITER CUT (MC)

NOTE: Used for horizontal termination with inline fan. Standard with bird screen.



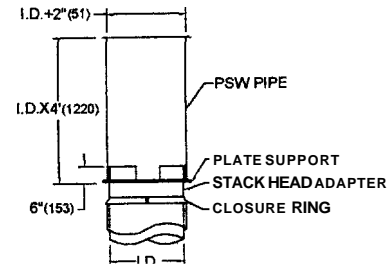
STACK CLOSURE RING (CR)

NOTE: Used to shield insulation from the weather when open stack is desired. Provide for moisture removal with a Drain Tee Cap (TC) or Drain Section (DS).



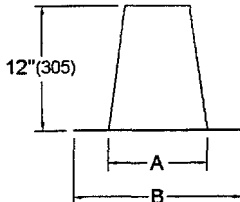
STACK HEAD ASSEMBLY (SHA)

Used for low loss stack termination. Conforms to Industrial Ventilation Handbook Standards. For plate support details, see installation instructions.



TALL CONE FLASHING (F)

Used for flat roof applications.



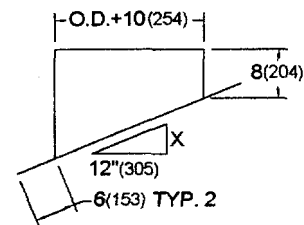
| PIPE I.D. | PSW | | PIC / IPIC-1 | | IPIC-2 | | IPIC-4 / IPIC-4G | |
|------------|------------|------------|--------------|------------|------------|------------|------------------|------------|
| | A | B | A | B | A | B | A | B |
| 6" (153) | 10" (254) | 22" (559) | 12" (305) | 24" (610) | 14" (356) | 26" (661) | 18" (458) | 30" (762) |
| 8" (204) | 12" (305) | 24" (610) | 14" (356) | 26" (661) | 16" (407) | 28" (712) | 20" (508) | 32" (813) |
| 10" (254) | 14" (356) | 26" (661) | 16" (407) | 28" (712) | 18" (458) | 30" (762) | 22" (559) | 34" (864) |
| 12" (305) | 16" (407) | 28" (712) | 18" (458) | 30" (762) | 20" (508) | 32" (813) | 24" (610) | 36" (915) |
| 14" (356) | 18" (458) | 30" (762) | 20" (508) | 32" (813) | 22" (559) | 34" (864) | 26" (661) | 38" (966) |
| 16" (407) | 20" (508) | 32" (813) | 22" (559) | 34" (864) | 24" (610) | 36" (915) | 28" (712) | 40" (1016) |
| 18" (458) | 22" (559) | 34" (864) | 24" (610) | 36" (915) | 26" (661) | 38" (966) | 30" (762) | 42" (1067) |
| 20" (508) | 24" (610) | 36" (915) | 26" (661) | 38" (966) | 28" (712) | 40" (1016) | 32" (813) | 44" (1118) |
| 22" (559) | 26" (661) | 38" (966) | 28" (712) | 40" (1016) | 30" (762) | 42" (1067) | 34" (864) | 46" (1169) |
| 24" (610) | 28" (712) | 40" (1016) | 30" (762) | 42" (1067) | 32" (813) | 44" (1118) | 36" (915) | 48" (1220) |
| 26" (661) | 30" (762) | 42" (1067) | 32" (813) | 44" (1118) | 34" (864) | 46" (1169) | 38" (966) | 50" (1270) |
| 28" (712) | 32" (813) | 44" (1118) | 34" (864) | 46" (1169) | 36" (915) | 48" (1220) | 40" (1016) | 52" (1321) |
| 30" (762) | 34" (864) | 46" (1169) | 36" (915) | 48" (1220) | 38" (966) | 50" (1270) | 42" (1067) | 54" (1372) |
| 32" (813) | 36" (915) | 48" (1220) | 38" (966) | 50" (1270) | 40" (1016) | 52" (1321) | 44" (1118) | 56" (1423) |
| 34" (864) | 38" (966) | 50" (1270) | 40" (1016) | 52" (1321) | 42" (1067) | 54" (1372) | 46" (1169) | 58" (1474) |
| 36" (915) | 40" (1016) | 52" (1321) | 42" (1067) | 54" (1372) | 44" (1118) | 56" (1423) | 48" (1220) | 60" (1524) |
| 38" (966) | 42" (1067) | 54" (1372) | 44" (1118) | 56" (1423) | 46" (1169) | 58" (1474) | 50" (1270) | 62" (1475) |
| 40" (1016) | 44" (1118) | 56" (1423) | 46" (1169) | 58" (1474) | 48" (1220) | 60" (1524) | 52" (1321) | 64" (1626) |
| 42" (1067) | 46" (1169) | 58" (1474) | 48" (1220) | 60" (1524) | 50" (1270) | 62" (1475) | 54" (1372) | 66" (1677) |
| 44" (1118) | 48" (1220) | 60" (1524) | 50" (1270) | 62" (1475) | 52" (1321) | 64" (1626) | 56" (1423) | 68" (1728) |
| 46" (1169) | 50" (1270) | 62" (1475) | 52" (1321) | 64" (1626) | 54" (1372) | 66" (1677) | 58" (1474) | 70" (1778) |
| 48" (1220) | 52" (1321) | 64" (1626) | 54" (1372) | 66" (1677) | 56" (1423) | 68" (1728) | 60" (1524) | 72" (1829) |

Dimensions in inches (mm)

FIXED PITCH FLASHING (FPF)

NOTES:

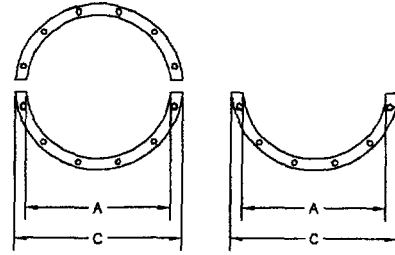
1. X=PITCH RATE, AVAILABLE RATES 1/12 12/12. Please specify pitch rate with order.
2. Storm collar is included with flashing.
3. Fixed pitch flashing is available in sizes from 6" to 36", inclusive.



SECTION D - COMPONENTS

FULL ANGLE RING (FAR)

Provides lateral support for vertical runs. Allows pipe movement for thermal expansion.



HALF ANGLE RING (HAR)

Used to support horizontal runs.

NOTE: Bolt hole pattern = 125 lb. ANSI.

B = Bolt Hole Center Pattern = ANSI 125lb.

D = Bolt hole quantity *per* ANSI 125 LB. standard.

| PIPE I.D. | PSW | | | | PIC / IPIC | | | |
|------------|--------------|--------------|--------------|----|--------------|--------------|--------------|----|
| | A | B | C | D | A | B | C | D |
| 6" (153) | 6.12 (156) | 7.50 (191) | 8.62 (220) | 8 | 8.12 (207) | 9.50 (242) | 10.62 (270) | 8 |
| 8" (204) | 8.12 (207) | 9.50 (242) | 10.62 (270) | 8 | 10.12 (258) | 11.50 (292) | 12.75 (324) | 8 |
| 10" (254) | 10.12 (258) | 11.50 (292) | 12.75 (324) | 12 | 12.12 (308) | 13.75 (350) | 15.12 (385) | 12 |
| 12" (305) | 12.12 (308) | 13.75 (350) | 15.12 (385) | 12 | 14.12 (359) | 15.75 (400) | 17.12 (435) | 12 |
| 14" (356) | 14.12 (359) | 15.75 (400) | 17.12 (435) | 12 | 16.25 (413) | 18.12 (461) | 19.75 (502) | 12 |
| 16" (407) | 16.25 (413) | 18.12 (461) | 19.75 (502) | 16 | 18.25 (464) | 20.12 (512) | 21.75 (553) | 16 |
| 18" (458) | 18.25 (464) | 20.12 (512) | 21.75 (553) | 16 | 20.25 (515) | 22.12 (562) | 23.75 (604) | 16 |
| 20" (508) | 20.25 (515) | 22.12 (562) | 23.75 (604) | 20 | 22.25 (566) | 24.12 (613) | 25.75 (654) | 20 |
| 22" (559) | 22.25 (566) | 24.12 (613) | 25.75 (654) | 20 | 24.25 (616) | 26.12 (664) | 27.75 (705) | 20 |
| 24" (610) | 24.25 (616) | 26.12 (664) | 27.75 (705) | 28 | 26.25 (667) | 28.50 (724) | 30.25 (769) | 28 |
| 26" (661) | 26.25 (667) | 28.50 (724) | 30.25 (769) | 32 | 28.25 (718) | 30.50 (775) | 32.25 (820) | 32 |
| 28" (712) | 28.25 (718) | 30.50 (775) | 32.25 (820) | 20 | 30.25 (769) | 32.50 (826) | 34.25 (870) | 20 |
| 30" (762) | 30.25 (769) | 32.50 (826) | 34.25 (870) | 24 | 32.25 (820) | 34.50 (877) | 36.25 (921) | 24 |
| 32" (813) | 32.25 (820) | 34.50 (877) | 36.25 (921) | 28 | 34.25 (870) | 36.50 (928) | 38.25 (972) | 28 |
| 34" (864) | 34.50 (877) | 36.50 (928) | 38.50 (978) | 28 | 36.25 (921) | 38.50 (978) | 40.25 (1023) | 28 |
| 36" (915) | 36.50 (928) | 38.50 (978) | 40.50 (1029) | 32 | 38.25 (972) | 40.50 (1029) | 42.25 (1074) | 32 |
| 38" (966) | 38.50 (978) | 40.50 (1029) | 42.50 (1080) | 32 | 40.25 (1023) | 42.50 (1080) | 44.25 (1124) | 32 |
| 40" (1016) | 40.50 (1029) | 42.50 (1080) | 44.50 (1131) | 36 | 42.25 (1074) | 44.50 (1131) | 46.25 (1175) | 36 |
| 42" (1067) | 42.50 (1080) | 44.50 (1131) | 46.50 (1182) | 36 | 44.25 (1124) | 46.50 (1182) | 48.25 (1226) | 36 |
| 44" (1118) | 44.50 (1131) | 46.50 (1182) | 48.50 (1232) | 40 | 46.25 (1175) | 48.50 (1232) | 50.25 (1277) | 40 |
| 46" (1069) | 46.50 (1182) | 48.50 (1232) | 50.50 (1283) | 40 | 48.25 (1226) | 50.50 (1283) | 52.25 (1328) | 40 |
| 48" (1220) | 48.50 (1232) | 50.50 (1283) | 52.50 (1334) | 44 | 50.25 (1277) | 52.50 (1334) | 54.25 (1378) | 44 |

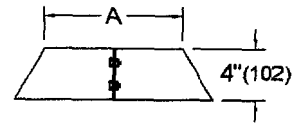
| PIPE I.D. | IPIC-2 | | | | IPIC-4 / IPIC-4G | | | |
|------------|--------------|--------------|--------------|----|------------------|--------------|--------------|----|
| | A | B | C | D | A | B | C | D |
| 6" (153) | 10.12 (258) | 11.50 (292) | 12.75 (324) | 8 | 14.12 (359) | 15.75 (400) | 17.12 (435) | 8 |
| 8" (204) | 12.12 (308) | 13.75 (350) | 15.12 (385) | 8 | 16.25 (413) | 18.12 (461) | 19.75 (502) | 8 |
| 10" (254) | 14.12 (359) | 15.75 (400) | 17.12 (435) | 12 | 18.25 (464) | 20.12 (512) | 21.75 (553) | 12 |
| 12" (305) | 16.25 (413) | 18.12 (461) | 19.75 (502) | 12 | 20.25 (515) | 22.12 (562) | 23.75 (604) | 12 |
| 14" (356) | 18.25 (464) | 20.12 (512) | 21.75 (553) | 12 | 22.25 (566) | 24.12 (613) | 25.75 (654) | 12 |
| 16" (407) | 20.25 (515) | 22.12 (562) | 23.75 (604) | 16 | 24.25 (616) | 26.12 (664) | 27.75 (705) | 16 |
| 18" (458) | 22.25 (566) | 24.12 (613) | 25.75 (654) | 16 | 26.25 (667) | 28.50 (724) | 30.25 (769) | 16 |
| 20" (508) | 24.25 (616) | 26.12 (664) | 27.75 (705) | 20 | 28.25 (718) | 30.50 (775) | 32.25 (820) | 20 |
| 22" (559) | 26.25 (667) | 28.50 (724) | 30.25 (769) | 20 | 30.25 (769) | 32.50 (826) | 34.25 (870) | 20 |
| 24" (610) | 28.25 (718) | 30.50 (775) | 32.25 (820) | 28 | 32.25 (820) | 34.50 (877) | 36.25 (921) | 28 |
| 26" (661) | 30.25 (769) | 32.50 (826) | 34.25 (870) | 32 | 34.25 (870) | 36.50 (928) | 38.25 (972) | 32 |
| 28" (712) | 32.25 (820) | 34.50 (877) | 36.25 (921) | 20 | 36.25 (921) | 38.50 (978) | 40.25 (1023) | 20 |
| 30" (762) | 34.25 (870) | 36.50 (928) | 38.25 (972) | 24 | 38.25 (972) | 40.50 (1029) | 42.25 (1074) | 24 |
| 32" (813) | 36.25 (921) | 38.50 (978) | 40.25 (1023) | 28 | 40.25 (1023) | 42.50 (1080) | 44.25 (1124) | 28 |
| 34" (864) | 38.25 (972) | 40.50 (1029) | 42.25 (1074) | 28 | 42.25 (1074) | 44.50 (1131) | 46.25 (1175) | 28 |
| 36" (915) | 40.25 (1023) | 42.50 (1080) | 44.25 (1124) | 32 | 44.25 (1124) | 46.50 (1182) | 48.25 (1226) | 32 |
| 38" (966) | 42.25 (1074) | 44.50 (1131) | 46.25 (1175) | 32 | 46.25 (1175) | 48.50 (1232) | 50.25 (1277) | 32 |
| 40" (1016) | 44.25 (1124) | 46.50 (1182) | 48.25 (1226) | 36 | 48.25 (1226) | 50.50 (1283) | 52.25 (1328) | 36 |
| 42" (1067) | 46.25 (1175) | 48.50 (1232) | 50.25 (1277) | 36 | 50.25 (1277) | 52.50 (1334) | 54.25 (1378) | 36 |
| 44" (1118) | 48.25 (1226) | 50.50 (1283) | 52.25 (1328) | 40 | 52.25 (1328) | 54.50 (1384) | 56.25 (1429) | 40 |
| 46" (1069) | 50.25 (1277) | 52.50 (1334) | 54.25 (1378) | 40 | 54.25 (1378) | 56.50 (1436) | 58.25 (1480) | 40 |
| 48" (1220) | 52.25 (1334) | 54.50 (1384) | 56.25 (1429) | 44 | 56.25 (1429) | 58.50 (1486) | 60.25 (1531) | 44 |

Dimensions in inches (mm).

SECTION D - COMPONENTS

STORM COLLAR (SC)

A = Pipe Diameter (O.D.)



WALL PENETRATOR (WP)

LENGTH = 30 (762)

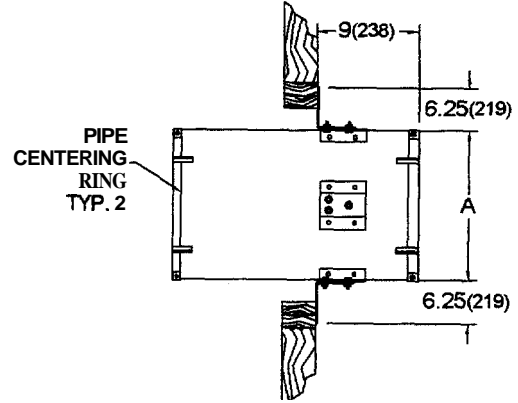
PIC / IPIC-1: A = PIPE I.D. + 4" (102)

IPIC-2: A = PIPE I.D. + 6" (213)

IPIC-4: A = PIPE I.D. + 10" (254)

Used for horizontal penetrations.

N/A for PSW.

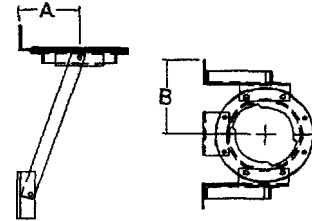


WALL SUPPORT ASSEMBLY

Used to provide either vertical or horizontal rigid support point

NOTE: Does not allow for thermal expansion.

NOTE: Bolt hole pattern = 125 lb. ANSI.



| PIPE I.D. | PSW / PIC / IPIC-1 | | IPIC-2 | | IPIC-4 / IPIC-4G | |
|-----------|--------------------|-------------|-------------|-------------|------------------|-------------|
| | A | B | A | B | A | B |
| 6" (153) | 7.87 (200) | 7.25 (185) | 8.87 (226) | 8.12 (207) | 11.12 (283) | 10.50 (267) |
| 8" (204) | 8.87 (226) | 8.12 (207) | 10.12 (258) | 9.50 (242) | 12.37 (315) | 11.75 (299) |
| 10" (254) | 10.12 (258) | 9.50 (242) | 11.12 (283) | 10.50 (267) | 13.37 (340) | 12.75 (324) |
| 12" (305) | 11.12 (283) | 10.50 (267) | 12.37 (315) | 11.75 (299) | 14.37 (366) | 13.75 (350) |
| 14" (356) | 12.37 (315) | 11.75 (299) | 13.37 (340) | 12.75 (324) | 15.37 (391) | 14.75 (375) |
| 16" (407) | 13.37 (340) | 12.75 (324) | 14.37 (366) | 13.75 (350) | 16.37 (416) | 15.75 (400) |
| 18" (458) | 14.37 (366) | 13.75 (350) | 15.37 (391) | 14.75 (375) | 17.62 (448) | 17.00 (432) |
| 20" (508) | 15.37 (391) | 14.75 (375) | 16.37 (416) | 15.75 (400) | 18.62 (473) | 18.00 (458) |
| 22" (559) | 16.37 (416) | 15.75 (400) | 17.62 (448) | 17.00 (432) | 19.62 (499) | 19.00 (483) |
| 24" (610) | 17.62 (448) | 17.00 (432) | 18.62 (473) | 18.00 (458) | 20.62 (524) | 20.00 (508) |
| 26" (661) | 18.62 (473) | 18.00 (458) | 19.62 (499) | 19.00 (483) | 21.62 (550) | 21.00 (534) |
| 28" (712) | 19.62 (499) | 19.00 (483) | 20.62 (524) | 20.00 (508) | 23.12 (588) | 22.50 (572) |
| 30" (762) | 20.62 (524) | 20.00 (508) | 21.62 (550) | 21.00 (534) | 24.12 (613) | 23.50 (597) |
| 32" (813) | 21.62 (550) | 21.00 (534) | 23.12 (588) | 22.50 (572) | 25.12 (639) | 24.50 (623) |
| 34" (864) | 23.12 (588) | 22.50 (572) | 24.12 (613) | 23.50 (597) | 26.12 (664) | 25.50 (648) |
| 36" (915) | 24.12 (613) | 23.50 (597) | 25.12 (639) | 24.50 (623) | 27.12 (689) | 26.50 (674) |

Dimensions in inches (mm).

SECTION D - COMPONENTS

PLATE SUPPORT (PS)

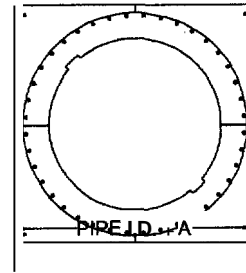
Provides vertical or horizontal rigid support.

Includes split plates, clamp flanges, and 1/2 closure bands.

NOTE: Does not allow for thermal expansion.

NOTE: Bolt hole pattern = 125lb. ANSI.

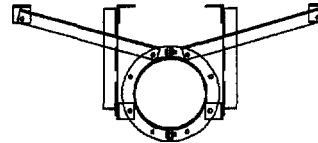
| | |
|----------------|-------|
| PSW/PIC/IPIC-1 | A=6" |
| IPIC-2 | A=8" |
| IPIC-4/IPIC-4G | A=12" |



WALL GUIDE (WG)

NOTE: Used to provide lateral guidance and allow for thermal expansion.

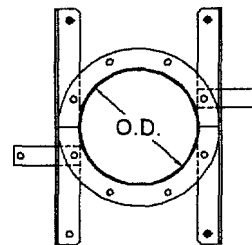
NOTE: Bolt hole pattern = 125 lb. ANSI.



FLOOR GUIDE (FG)

NOTE: Used at each floor to insure correct alignment through floor opening.

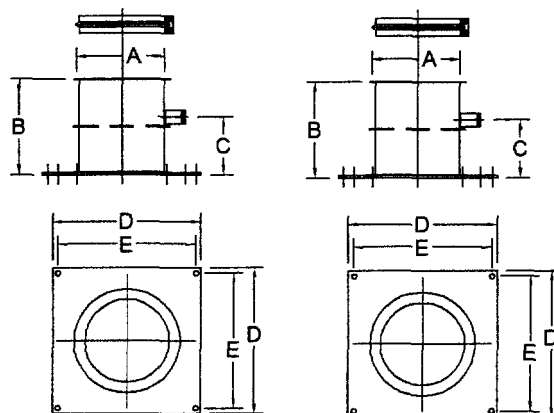
NOTE: ANSI 125lb. bolt hole quantities per diameter.



STACK SUPPORT ASSY. (SSA)

Supports Vertical Stack at floor level. Includes moisture drain.

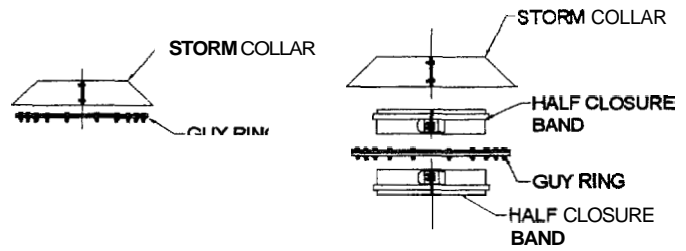
| PSW / PIC / IPIC-1 | IPIC-2 | IPIC-4 / IPIC-4G |
|--------------------|----------------|------------------|
| A = PIPE | A = PIPE I.D. | A = PIPE I.D. |
| B = 9" (229) | B = 9" (229) | B = 9" (229) |
| C = 5.5" (140) | C = 5.5" (140) | C = 5.5" (140) |
| D = A+6" (153) | D = A+8" (204) | D = A+12" (305) |
| E = A+5" (127) | E = A+7" (178) | E = A+11" (280) |



SECTION D - COMPONENTS

GUY RING (GR)

NOTE: Guy Ring is installed at the flange to flange joint of two sections of pipe. Storm Collar and Half Closure Bands are included. See installation instructions for correct location.

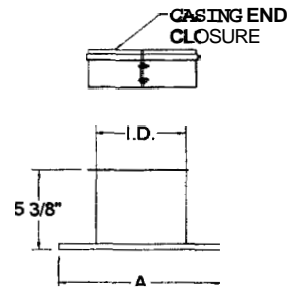


FLANGE ADAPTER (FA)

Flow Resistance $K \neq$ same as pipe

NOTE: Used to attach pipe to heating equipment. Casing End Closure packaged with flange adapter.

NOTE: Closure band for PIC and IPIC applications only.



| PIPE I.D. | A |
|-----------|--------------|
| 6" (153) | 11.00 (280) |
| 8" (204) | 13.50 (343) |
| 10" (254) | 16.00 (407) |
| 12" (305) | 19.00 (483) |
| 14" (356) | 21.00 (534) |
| 16" (407) | 23.50 (597) |
| 18" (458) | 25.00 (635) |
| 20" (508) | 27.50 (699) |
| 24" (610) | 32.00 (813) |
| 30" (762) | 38.75 (985) |
| 36" (915) | 46.00 (1169) |

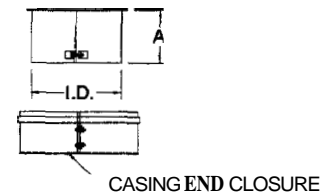
Dimensions in inches (mm).

SINGLE WALL BOILER ADAPTER (SBA)

Flow Resistance $K \neq$ same as pipe

NOTE: A is 6 or 4" (opt.) specify when ordering
 e.g. 6PICSBA - A=6"
 6PICSBA4 - A=4"

NOTE: Used to attach pipe to straight shank outlets. Closure band included with flange adapter on PIC and IPIC applications. Closure band not required on PSW applications.



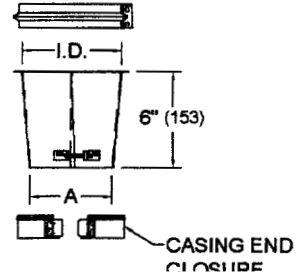
SECTION D - COMPONENTS

REDUCER COLLAR (RC)

Flow Resistance K= same as pipe

A= Diameter to be specified per application.
e.g. 6PIC4RC

NOTE: Used to attach pipe to an outlet source of a smaller diameter.

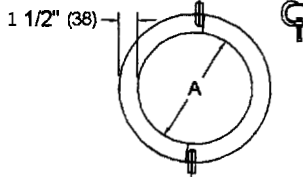


BOILER FLANGE ADAPTER (BFA)

Flow Resistance = N/A

A= Pipe I.D.

NOTE: Used to secure pipe flange to heating equipment.

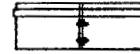


| CLAMP QUANTITY | | | |
|----------------|----------|------------|----------|
| PIPE I.D. | QUANTITY | PIPE I.D. | QUANTITY |
| 6" (153) | 4 | 28" (712) | 14 |
| 8" (204) | 4 | 30" (762) | 14 |
| 10" (254) | 5 | 32" (813) | 16 |
| 12" (305) | 6 | 34" (864) | 16 |
| 14" (356) | 7 | 36" (915) | 18 |
| 16" (407) | 8 | 38" (966) | 18 |
| 18" (458) | 9 | 40" (1016) | 18 |
| 20" (508) | 10 | 42" (1067) | 18 |
| 22" (559) | 10 | 44" (1118) | 18 |
| 24" (610) | 12 | 46" (1169) | 18 |
| 26" (661) | 12 | 48" (1220) | 18 |

CASING END CLOSURE (CEC)

NOTE: Used as a end cover when transitioning from one insulation thickness to **PSW**.
When ordering, specify PICCEC

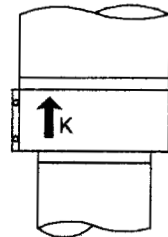
IPICCEC-1
-2
-4



TRANSITION BAND (TB)

NOTE: Used as a joint closure when transitioning from one insulation thickness to another. When ordering, specify IPICTB

-1-2
-1-4
-2-4



SECTION D - COMPONENTS

SPECIAL GREASE DUCT COMPONENTS

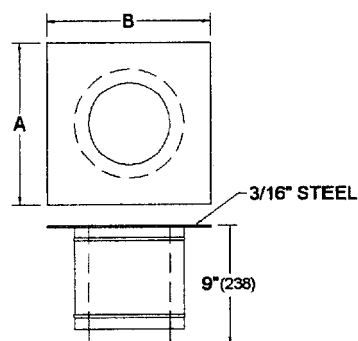
FAN ADAPTER PLATE (FAP)

Plate dimensions (AxB) = outside dimensions of curb less .25" (7).

- NOTE:**
1. Used to connect to the inlet of an upblast fan.
 2. Plate size may be varied to fit application. Advise outside dimensions of fan curb at the time of order. (AxB)

A = curb - .25"(7)

NOTE: Not U.L. listed.

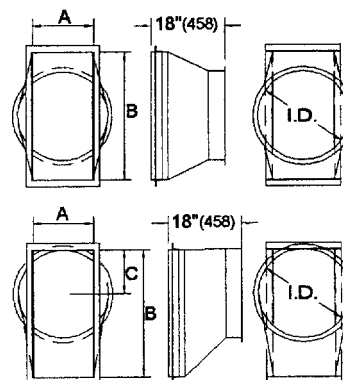


SQUARE TO ROUND (STR)

NOTE: Specify dimensional data at order entry.

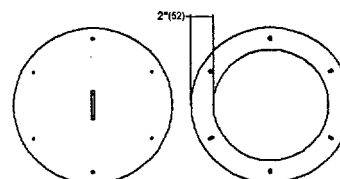
NOTE: Eccentric STR and STR available on custom order **only**.

NOTE: Not U.L. listed.



TOOLESS ACCESS PANEL (TAP)

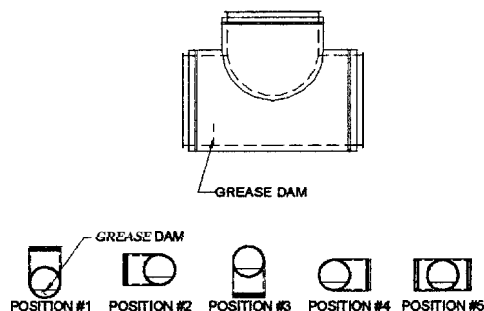
Panel diameter is equal to flue diameter.



GREASE MANIFOLD TEE (GMT)

Dimensions are the same as a 90° Manifold Tee.

- NOTE:**
1. Positioned to retain effluent in ductwork when access Tee Caps are removed for inspection.
 2. Position of grease dam (1-5) must be specified at the time of order entry.
 3. Reduced taps are available. Specify tap diameter at time of order.
 4. Not required when Access Panels are installed

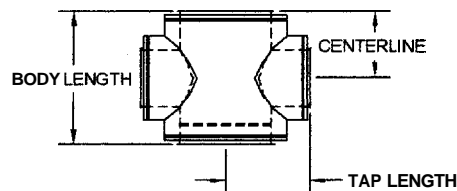


DOUBLE GREASE TEE (DGT)

Body Size _____ Tap Size _____

Material: Inner _____ Outer _____

- NOTE:**
1. Tap diameter must be smaller than body diameter.
 2. Not U.L. listed.
 3. Specify grease dam location if required.

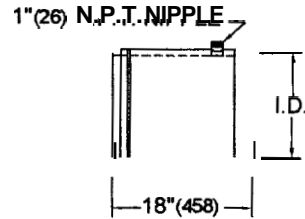


SECTION D - COMPONENTS

NOZZLE SECTION (NS)

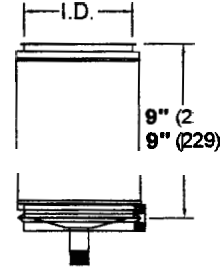
NOTE: Used to insert a fire suppression or wash down nozzle or as a drain point in a horizontal run.

NOTE: Specify dimensional data at order entry.



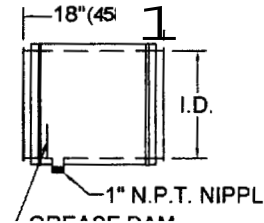
DRAIN BUCKET (DB)

NOTE: Used at the base of a vertical riser as a drain reservoir and to provide cleanout access.



DUCT DRAIN (DR)

NOTE: Used as a point drain for horizontal runs.

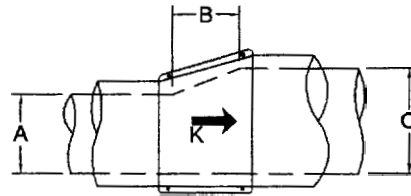


ECCENTRIC TAPERED INCREASER (ETI)

NOTE: The number of steps is determined by the number of pipe sizes the tapered increaser enlarges. Each step increases " B dimension 5" (127).

Tapered increasers are preferred over step increasers when space permits.

NOTE: When ordering, specify both diameters with small diameter first (ie. 18PICT122 for 18" to 22")

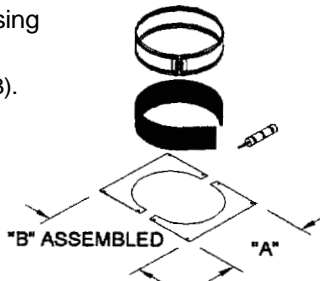


| | 1 Step | 2 Step | 3 Step | 4 Step | 5 Step | 6 Step |
|----------|--------|--------|--------|--------|--------|--------|
| B | 10" | 10" | 15" | 20" | 25" | 30" |

for all diameters

THROUGH PENETRATION FIRESTOP KIT (PPK)

- NOTE:**
- Kit consists of closure band, plate, insulation and caulk
 - Used to maintain fire resistance rating of floor or wall at duct penetration.
 - Diameter of penetration is casing diameter + 2 inches.
 - Closure band height is 6" (153).



| PIPE I.D. | A | B |
|-----------|------------|------------|
| 6" (153) | 18" (458) | 18" (458) |
| 8" (204) | 20" (508) | 20" (508) |
| 10" (254) | 22" (559) | 22" (559) |
| 12" (305) | 24" (610) | 24" (610) |
| 14" (356) | 26" (661) | 26" (661) |
| 16" (407) | 28" (712) | 28" (712) |
| 18" (458) | 30" (762) | 30" (762) |
| 20" (508) | 32" (813) | 32" (813) |
| 22" (559) | 34" (864) | 34" (864) |
| 24" (610) | 36" (915) | 36" (915) |
| 26" (661) | 38" (966) | 38" (966) |
| 28" (712) | 40" (1016) | 40" (1016) |
| 30" (762) | 42" (1067) | 42" (1067) |
| 32" (813) | 44" (1118) | 44" (1118) |
| 34" (864) | 46" (1169) | 46" (1169) |
| 36" (915) | 48" (1220) | 48" (1220) |

Dimensions in inches (mm)

SECTION D - COMPONENTS

SPECIAL ENGINE EXHAUST COMPONENTS

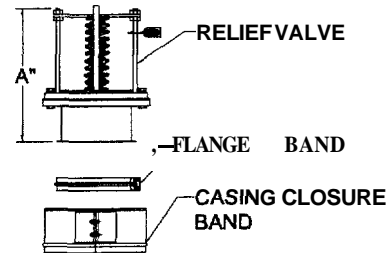
RELIEF VALVE ASSEMBLY (RV)

Available in 6" (153) to 24" (610) diameters.

Assembly includes:

- Relief Valve
- Flange Band
- Casing Closure Band

NOTE: Used to help relieve excessive back pressure in an engine exhaust system.



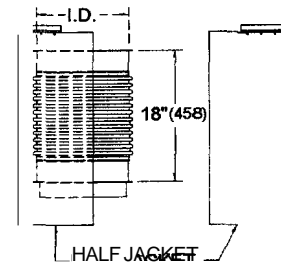
| DESCRIPTION | "A" |
|-------------|-------|
| 6RV - 40RV | 10.75 |
| 42RV - 48RV | 11.75 |

LINED BELLOWS JOINT (BJ)

Flow Resistance $K = 0.08$

NOTE: Recommended for Diesel Engines / Turbine Exhausts. May be used in place of the (AL) as an expansion joint to compensate for linear thermal expansion in chimney systems. Maximum compressive travel is 3" (76).

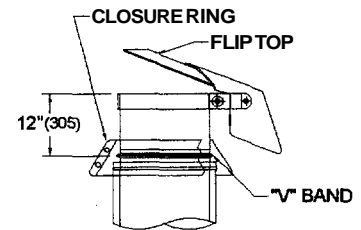
Liner extends 2" beyond the installed length of the Bellows Joint.



FLIPTOP (FT)

NOTE: Used to prevent rain from entering generator exhaust pipe. Opens with internal pressure.

Sizes available: 6 thru 24".



SEAL CLIPS

USE ON HIGH PRESSURE APPLICATIONS.

| Pipe Diameter | Number of Clips |
|---------------|-----------------|
| SCK6-8 | 2ea. |
| SCK10 | 1ea. |
| SCK12-22 | 1ea. |
| SCK24-48 | 2ea. |

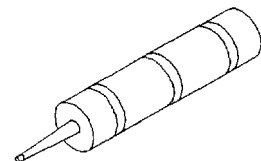
SEALANTS

P071 - High Temperature Joint Sealant * 600° and over.

P077 - 600° Joint Sealant for sealing pipe joints when operating temperatures do not exceed 600° F.

P080 - High Temperature sealant for Grease Duct.

NOTE: P080 sealant is specially designed and tested for grease duct applications. (**DONOT** SUBSTITUTE).



SECTION D - COMPONENTS

SEALANT REQUIREMENTS

P077 Joint Sealant, use for flue temperatures to 600" F.
P071 Joint Sealant, use for flue temperatures above 600°F.
P080 Joint Sealant, Use for Grease Duct applications

| Flue Diameter | Tubes /Joint | Tubes / Joint High Pressure Applications |
|---------------|--------------|--|
| 6" | 0.20 | 0.60 |
| 8" | 0.20 | 0.70 |
| 10" | 0.20 | 0.90 |
| 12" | 0.25 | 1.00 |
| 14" | 0.25 | 1.10 |
| 16" | 0.25 | 1.33 |
| 18" | 0.33 | 1.50 |
| 20" | 0.33 | 1.67 |
| 22" | 0.33 | 1.80 |
| 24" | 0.50 | 2.10 |
| 26" | 0.50 | 2.20 |
| 28" | 0.50 | 2.40 |
| 30" | 0.67 | 2.67 |
| 32" | 0.67 | 2.90 |
| 34" | 0.67 | 3.00 |
| 36" | 0.67 | 3.20 |
| 38" | 1.00 | 3.60 |
| 40" | 1.00 | 3.70 |
| 42" | 1.00 | 3.80 |
| 44" | 1.00 | 4.10 |
| 46" | 1.20 | 4.30 |
| 48" | 1.20 | 4.50 |

NOTE: Order Seal Clips when installing High Pressure applications.

Refer to Metal-Fab installation instructions for additional *information*.

DESIGN CHECKLIST

In order to quickly and accurately design a chimney installation, Metal-Fabs Engineering Department needs basic information about the system. Listed below are those items about which information is needed:

1. Application (Boilers, Exhaust, Diesel Engine Exhaust, etc.).
2. Type of fuel to be used (LP Gas, Natural Gas, Number 2 Oil, etc.).
3. BTU Input or Boiler H.P.
4. Equipment Outlet Pressure:
 - a. Drafthood
 - b. Forced draft with positive, negative or zero inches of water at appliance outlet.
 - c. Induced draft capability and how much.
 - d. Barometric damper
5. Total Vertical Stack Height figured from:
 - a. Top of the draft hood.
 - b. Flue outlet top of boiler (direct connect).
 - c. At barometric damper.
6. Connector rise (piping from the appliance to the center line of breeching).
7. The total length of breeching for one appliance application, or the system length between the flue outlet center line for multiple boiler installations.
8. Single wall or double wall breeching.
9. Type of roof penetration or chase installation.
10. Type of construction- combustible, noncombustible, or fire-rated.
11. Type of chimney support.
12. Obstructions or dimensional restrictions that may exist.

Receipt of this information will speed the design process.

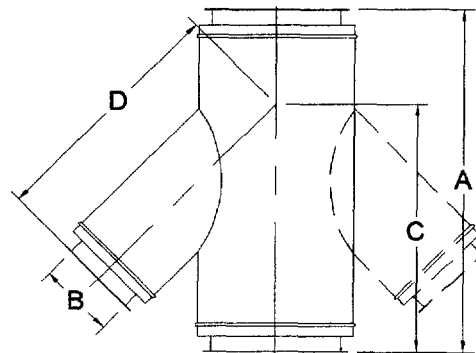
Thank you.

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SECTION D - COMPONENTS

| | | | | | | | | | | | | | | |
|--------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 4BPC | A | 80.75 | 77.88 | 75.13 | 72.25 | 69.38 | 66.63 | 63.75 | 60.88 | 58.13 | 55.25 | 52.50 | 50.50 | 48.7 |
| | B | 48 | 46 | 44 | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 |
| | C | 65.35 | 63.94 | 62.53 | 61.11 | 59.70 | 58.28 | 56.87 | 55.46 | 54.04 | 52.63 | 51.21 | 49.80 | 48.3 |
| | D | 4 | 44 | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 |
| | | | | | | | | | | | | | | |
| 42PC | A | 60.53 | 59.53 | 58.53 | 57.53 | 56.53 | 55.53 | 54.53 | 53.53 | 52.53 | 51.53 | 50.53 | 49.53 | 48.53 |
| | B | 42 | 4 | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 |
| | C | 72.22 | 69.40 | 66.57 | 63.74 | 60.91 | 58.08 | 55.26 | 52.43 | 49.60 | 46.77 | 43.94 | 41.11 | 38.28 |
| | D | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 |
| 40PC | A | 69.40 | 66.51 | 63.14 | 60.91 | 58.08 | 55.26 | 52.43 | 49.60 | 46.77 | 43.94 | 41.11 | 38.28 | 35.46 |
| | B | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 |
| | C | 56.70 | 54.28 | 52.87 | 51.46 | 50.04 | 48.63 | 47.21 | 45.80 | 44.39 | 42.97 | 41.56 | 40.14 | 38.73 |
| | D | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 |
| 38PC | A | 66.57 | 63.74 | 60.91 | 58.08 | 55.26 | 52.43 | 49.60 | 46.77 | 43.94 | 41.11 | 38.28 | 35.46 | 32.63 |
| | B | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 |
| | C | 53.28 | 51.81 | 50.46 | 49.04 | 47.63 | 46.21 | 44.80 | 43.39 | 41.97 | 40.56 | 39.14 | 37.73 | 36.31 |
| | D | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 |
| 36PC | A | 63.74 | 60.91 | 58.08 | 55.26 | 52.43 | 49.60 | 46.77 | 43.94 | 41.11 | 38.28 | 35.46 | 32.63 | 29.80 |
| | B | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 |
| | C | 50.87 | 49.46 | 48.04 | 46.63 | 45.21 | 43.80 | 42.39 | 40.97 | 39.56 | 38.14 | 36.73 | 35.31 | 33.90 |
| | D | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 |
| 34PC | A | 60.91 | 58.08 | 55.26 | 52.43 | 49.60 | 46.77 | 43.94 | 41.11 | 38.28 | 35.46 | 32.63 | 29.80 | 27.14 |
| | B | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 |
| | C | 48.46 | 47.04 | 45.63 | 44.21 | 42.80 | 41.39 | 39.97 | 38.56 | 37.14 | 35.73 | 34.31 | 32.90 | 31.49 |
| | D | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 |
| C | A | 58.08 | 55.26 | 52.43 | 49.60 | 46.77 | 43.94 | 41.11 | 38.28 | 35.46 | 32.63 | 29.80 | 27.14 | 24.51 |
| | B | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 |
| | C | 46.04 | 44.63 | 43.21 | 41.80 | 40.39 | 38.97 | 37.56 | 36.14 | 34.73 | 33.31 | 31.90 | 30.49 | 29.07 |
| | D | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 |
| 32PC | A | 55.26 | 52.43 | 49.60 | 46.77 | 43.94 | 41.11 | 38.28 | 35.46 | 32.63 | 29.80 | 27.14 | 24.51 | 21.86 |
| | B | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 |
| | C | 43.63 | 42.21 | 40.80 | 39.39 | 37.97 | 36.56 | 35.14 | 33.73 | 32.31 | 30.90 | 29.49 | 28.07 | 26.66 |
| | D | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 |
| 28PC | A | 52.43 | 49.60 | 46.77 | 43.94 | 41.11 | 38.28 | 35.46 | 32.63 | 29.80 | 27.14 | 24.51 | 21.86 | 19.21 |
| | B | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 |
| | C | 41.21 | 39.80 | 38.39 | 36.97 | 35.56 | 34.14 | 32.73 | 31.31 | 29.90 | 28.49 | 27.07 | 25.66 | 24.25 |
| | D | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 |
| 26P | A | 49.60 | 46.77 | 43.94 | 41.11 | 38.28 | 35.46 | 32.63 | 29.80 | 27.14 | 24.51 | 21.86 | 19.21 | 16.56 |
| | B | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 |
| | C | 38.80 | 37.39 | 35.97 | 34.56 | 33.14 | 31.73 | 30.31 | 28.90 | 27.49 | 26.07 | 24.66 | 23.25 | 21.84 |
| | D | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 |
| C | A | 46.77 | 43.94 | 41.11 | 38.28 | 35.46 | 32.63 | 29.80 | 27.14 | 24.51 | 21.86 | 19.21 | 16.56 | 13.91 |
| | B | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 |
| | C | 36.39 | 34.97 | 33.56 | 32.14 | 30.73 | 29.31 | 27.90 | 26.49 | 25.07 | 23.66 | 22.25 | 20.84 | 19.43 |
| | D | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 |
| 22PC | A | 43.94 | 41.11 | 38.28 | 35.46 | 32.63 | 29.80 | 27.14 | 24.51 | 21.86 | 19.21 | 16.56 | 13.91 | 11.26 |
| | B | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 |
| | C | 33.07 | 32.66 | 31.14 | 29.73 | 28.31 | 26.90 | 25.49 | 24.07 | 22.66 | 21.25 | 19.84 | 18.43 | 17.02 |
| | D | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 |
| 20PC | A | 41.11 | 38.28 | 35.46 | 32.63 | 29.80 | 27.14 | 24.51 | 21.86 | 19.21 | 16.56 | 13.91 | 11.26 | 8.61 |
| | B | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 |
| | C | 31.58 | 30.14 | 28.73 | 27.31 | 25.90 | 24.49 | 23.07 | 21.66 | 20.25 | 18.84 | 17.43 | 16.02 | 14.61 |
| | D | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 |
| 18PC | A | 38.28 | 35.46 | 32.63 | 29.80 | 27.14 | 24.51 | 21.86 | 19.21 | 16.56 | 13.91 | 11.26 | 8.61 | 5.96 |
| | B | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 |
| | C | 29.14 | 27.73 | 26.31 | 24.90 | 23.49 | 22.07 | 20.66 | 19.25 | 17.84 | 16.43 | 15.02 | 13.61 | 12.20 |
| | D | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16PC | A | 35.46 | 32.63 | 29.80 | 26.97 | 24.14 | 21.31 | 18.48 | 15.65 | 12.82 | 10.00 | 7.17 | 4.34 | 1.51 |
| | B | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 |
| | C | 26.73 | 25.31 | 23.90 | 22.49 | 21.07 | 19.66 | 18.25 | 16.84 | 15.43 | 14.02 | 12.61 | 11.20 | 9.79 |
| | D | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14P IC | A | 32.63 | 29.80 | 26.97 | 24.14 | 21.31 | 18.48 | 15.65 | 12.82 | 10.00 | 7.17 | 4.34 | 1.51 | 0 |
| | B | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 24.31 | 22.90 | 21.49 | 20.07 | 18.66 | 17.25 | 15.84 | 14.43 | 13.02 | 11.61 | 10.20 | 8.79 | 7.38 |
| | D | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12P IC | A | 29.80 | 26.97 | 24.14 | 21.31 | 18.48 | 15.65 | 12.82 | 10.00 | 7.17 | 4.34 | 1.51 | 0 | 0 |
| | B | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 21.89 | 20.48 | 19.07 | 17.65 | 16.24 | 14.83 | 13.42 | 12.01 | 10.60 | 9.19 | 7.78 | 6.37 | 4.96 |
| | D | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| IC | A | 26.97 | 24.14 | 21.31 | 18.48 | 15.65 | 12.82 | 10.00 | 7.17 | 4.34 | 1.51 | 0 | 0 | 0 |
| | B | 10 | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 19.49 | 18.07 | 16.66 | 15.25 | 13.84 | 12.43 | 11.02 | 9.61 | 8.20 | 6.79 | 5.38 | 3.97 | 2.56 |
| | D | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8PC | A | 24.14 | 21.31 | 18.48 | 15.65 | 12.82 | 10.00 | 7.17 | 4.34 | 1.51 | 0 | 0 | 0 | 0 |
| | B | 8 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 17.07 | 15.66 | 14.25 | 12.84 | 11.43 | 10.02 | 8.61 | 7.20 | 5.79 | 4.38 | 2.97 | 1.56 | 0.15 |
| | D | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6PC | A | 21.31 | 18.48 | 15.65 | 12.82 | 10.00 | 7.17 | 4.34 | 1.51 | 0 | 0 | 0 | 0 | 0 |
| | B | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 14.66 | 13.25 | 11.84 | 10.43 | 9.02 | 7.61 | 6.20 | 4.79 | 3.38 | 1.97 | 0.56 | 0 | 0 |
| | D | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

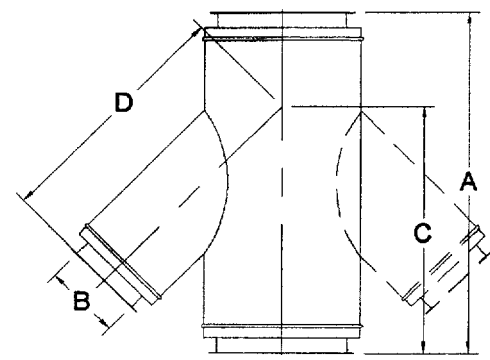
SEE NEXT PAGE FOR METRIC CHART



PSW, PIC AND IPIC-1 45MT CHART IN INCHES

SECTION D - COMPONENTS

| | | TAP I.D. | | | | | | | | | | | |
|------|---|----------|------|------|------|------|------|------|------|------|------|------|------|
| | | 48 | 46 | 44 | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 24 |
| 48PT | A | 266 | 2194 | 2122 | 1978 | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1429 |
| | B | 1219 | 1188 | 1118 | 1067 | 1016 | 965 | 914 | 864 | 813 | 762 | 711 | 660 |
| | C | 1844 | 1806 | 1772 | 1736 | 1700 | 1664 | 1628 | 1593 | 1557 | 1521 | 1486 | 1449 |
| 46PT | A | 46 | 44 | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 |
| | B | 2194 | 2122 | 2050 | 1978 | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 |
| | C | 1188 | 1118 | 1067 | 1016 | 965 | 914 | 864 | 813 | 762 | 711 | 660 | 610 |
| 44PT | A | 2122 | 2050 | 1978 | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 | 1357 |
| | B | 1118 | 1067 | 1016 | 965 | 914 | 864 | 813 | 762 | 711 | 660 | 610 | 560 |
| | C | 1721 | 1685 | 1649 | 1614 | 1578 | 1542 | 1506 | 1470 | 1434 | 1398 | 1362 | 1326 |
| 42PT | A | 2050 | 1978 | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 | 1332 | 1286 |
| | B | 1067 | 1016 | 965 | 914 | 864 | 813 | 762 | 711 | 660 | 610 | 560 | 508 |
| | C | 1680 | 1635 | 1599 | 1562 | 1525 | 1488 | 1451 | 1414 | 1377 | 1340 | 1303 | 1266 |
| 40PT | A | 1978 | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1230 |
| | B | 1016 | 965 | 914 | 864 | 813 | 762 | 711 | 660 | 610 | 560 | 508 | 457 |
| | C | 1599 | 1563 | 1527 | 1491 | 1455 | 1419 | 1383 | 1347 | 1311 | 1275 | 1239 | 1204 |
| 38PT | A | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 | 1141 |
| | B | 965 | 914 | 864 | 813 | 762 | 711 | 660 | 610 | 560 | 508 | 457 | 406 |
| | C | 1537 | 1512 | 1487 | 1461 | 1436 | 1410 | 1385 | 1360 | 1334 | 1309 | 1283 | 1258 |
| 36PT | A | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 | 1141 | 1095 |
| | B | 914 | 864 | 813 | 762 | 711 | 660 | 610 | 560 | 508 | 457 | 406 | 356 |
| | C | 1476 | 1440 | 1404 | 1368 | 1332 | 1296 | 1260 | 1225 | 1189 | 1153 | 1117 | 1081 |
| 34PT | A | 1691 | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 | 1116 | 1044 | 1000 | 960 |
| | B | 864 | 813 | 762 | 711 | 660 | 610 | 560 | 508 | 457 | 406 | 356 | 305 |
| | C | 1415 | 1389 | 1364 | 1339 | 1313 | 1288 | 1262 | 1237 | 1212 | 1186 | 1161 | 1135 |
| 32PT | A | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 | 1116 | 1044 | 1000 | 972 | 930 |
| | B | 813 | 762 | 711 | 660 | 610 | 560 | 508 | 457 | 406 | 356 | 305 | 254 |
| | C | 1353 | 1317 | 1282 | 1246 | 1210 | 1174 | 1138 | 1102 | 1066 | 1030 | 994 | 958 |
| 30PT | A | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 | 1116 | 1044 | 998 | 951 | 905 | 864 |
| | B | 762 | 711 | 660 | 610 | 560 | 508 | 457 | 406 | 356 | 305 | 254 | 203 |
| | C | 1292 | 1267 | 1241 | 1216 | 1190 | 1165 | 1140 | 1114 | 1089 | 1063 | 1038 | 1013 |
| 28PT | A | 1475 | 1403 | 1332 | 1260 | 1188 | 1116 | 1044 | 972 | 926 | 880 | 858 | 816 |
| | B | 711 | 660 | 610 | 560 | 508 | 457 | 406 | 356 | 305 | 254 | 203 | 152 |
| | C | 1231 | 1196 | 1169 | 1143 | 1117 | 1091 | 1065 | 1039 | 1013 | 987 | 961 | 935 |
| 26PT | A | 1403 | 1332 | 1260 | 1188 | 1116 | 1044 | 972 | 901 | 854 | 833 | 810 | 788 |
| | B | 660 | 610 | 560 | 508 | 457 | 406 | 356 | 305 | 254 | 203 | 152 | 101 |
| | C | 1199 | 1164 | 1139 | 1113 | 1087 | 1061 | 1035 | 1009 | 983 | 957 | 931 | 905 |
| 24PT | A | 1332 | 1260 | 1188 | 1116 | 1044 | 972 | 901 | 829 | 782 | 757 | 731 | 705 |
| | B | 610 | 560 | 508 | 457 | 406 | 356 | 305 | 254 | 203 | 152 | 101 | 50 |
| | C | 1108 | 1072 | 1036 | 1000 | 964 | 928 | 892 | 856 | 820 | 784 | 748 | 712 |
| 22PT | A | 1260 | 1188 | 1116 | 1044 | 972 | 901 | 829 | 757 | 710 | 685 | 659 | 633 |
| | B | 508 | 457 | 406 | 356 | 305 | 254 | 203 | 152 | 101 | 50 | 0 | 0 |
| | C | 1047 | 1011 | 975 | 939 | 903 | 867 | 831 | 795 | 759 | 723 | 687 | 651 |
| 20PT | A | 1188 | 1116 | 1044 | 972 | 901 | 829 | 757 | 685 | 638 | 613 | 587 | 561 |
| | B | 457 | 406 | 356 | 305 | 254 | 203 | 152 | 101 | 50 | 0 | 0 | 0 |
| | C | 985 | 950 | 914 | 878 | 842 | 806 | 770 | 734 | 698 | 662 | 626 | 590 |
| 18PT | A | 1116 | 1044 | 972 | 901 | 829 | 757 | 685 | 613 | 566 | 541 | 515 | 489 |
| | B | 406 | 356 | 305 | 254 | 203 | 152 | 101 | 50 | 0 | 0 | 0 | 0 |
| | C | 924 | 889 | 853 | 817 | 781 | 745 | 709 | 673 | 637 | 601 | 565 | 529 |
| 16PT | A | 1044 | 972 | 901 | 829 | 757 | 685 | 613 | 541 | 494 | 469 | 443 | 417 |
| | B | 356 | 305 | 254 | 203 | 152 | 101 | 50 | 0 | 0 | 0 | 0 | 0 |
| | C | 801 | 766 | 730 | 694 | 658 | 622 | 586 | 550 | 514 | 478 | 442 | 406 |
| 14PT | A | 972 | 901 | 829 | 757 | 685 | 613 | 541 | 469 | 422 | 397 | 371 | 345 |
| | B | 305 | 254 | 203 | 152 | 101 | 50 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 740 | 704 | 668 | 632 | 596 | 560 | 524 | 488 | 452 | 416 | 380 | 344 |
| 12PT | A | 901 | 829 | 757 | 685 | 613 | 541 | 469 | 397 | 350 | 325 | 299 | 273 |
| | B | 254 | 203 | 152 | 101 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 679 | 643 | 607 | 571 | 535 | 499 | 463 | 427 | 391 | 355 | 319 | 283 |
| 10PT | A | 829 | 757 | 685 | 613 | 541 | 469 | 397 | 325 | 278 | 253 | 227 | 201 |
| | B | 203 | 152 | 101 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 618 | 582 | 546 | 510 | 474 | 438 | 402 | 366 | 330 | 294 | 258 | 222 |
| 8PT | A | 757 | 685 | 613 | 541 | 469 | 397 | 325 | 253 | 206 | 181 | 155 | 129 |
| | B | 152 | 101 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 556 | 520 | 484 | 448 | 412 | 376 | 340 | 304 | 268 | 232 | 196 | 160 |



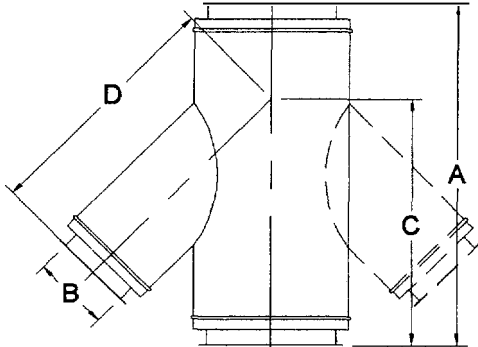
PSW, PIC AND IPIC-1 45MT CHART IN METRIC

SECTION D - COMPONENTS

TAP I.D.

| | | | | | | | | | | | | | | | |
|--|-----|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 48P | 46 | 63.94 | 62.52 | 61.11 | 59.70 | 58.28 | 56.87 | 55.45 | 54.04 | 52.63 | 51.21 | 49.80 | 48.38 | 46.97 |
| | 44P | 77.87 | 75.05 | 72.22 | 63.39 | 86.56 | 63.73 | 60.91 | 58.08 | 55.25 | 52.42 | 49.59 | 48.77 | 46.04 | 45.11 |
| | 42P | 60.52 | 59.11 | 57.70 | 56.28 | 54.87 | 53.45 | 52.04 | 50.63 | 49.21 | 47.80 | 46.38 | 44.97 | 43.56 | 42.14 |
| | 40C | 72.22 | 68.38 | 66.58 | 63.73 | 60.91 | 58.08 | 55.25 | 52.42 | 48.50 | 46.77 | 44.94 | 43.11 | 42.28 | 40.63 |
| | 38P | 69.39 | 68.56 | 63.73 | 60.81 | 58.08 | 55.25 | 52.42 | 49.59 | 46.77 | 43.94 | 42.11 | 41.28 | 39.63 | 38.63 |
| | 36P | 55.70 | 54.70 | 53.70 | 52.70 | 51.70 | 50.70 | 49.70 | 48.70 | 47.70 | 46.70 | 45.70 | 44.70 | 43.70 | 42.70 |
| | 34P | 50.87 | 49.87 | 48.87 | 47.01 | 46.687 | 45.01 | 44.87 | 43.87 | 42.87 | 41.87 | 40.87 | 39.87 | 38.87 | 37.87 |
| | 32P | 48.45 | 41.04 | 45.63 | 44.21 | 42.80 | 41.38 | 39.97 | 38.56 | 37.14 | 35.73 | 34.31 | 32.90 | 31.49 | 30.07 |
| | 30P | 58.08 | 55.25 | 52.42 | 49.59 | 46.77 | 43.94 | 41.11 | 38.28 | 35.45 | 32.63 | 29.80 | 26.97 | 24.14 | 21.31 |
| | 28P | 52.42 | 49.59 | 46.77 | 43.94 | 41.11 | 38.28 | 35.45 | 32.63 | 29.80 | 26.97 | 24.14 | 21.31 | 18.48 | 15.65 |
| | 26P | 46.77 | 43.94 | 41.11 | 38.28 | 35.45 | 32.63 | 29.80 | 26.97 | 24.14 | 21.31 | 18.48 | 15.65 | 12.82 | 10.00 |
| | 24P | 41.11 | 38.28 | 35.45 | 32.63 | 29.80 | 26.97 | 24.14 | 21.31 | 18.48 | 15.65 | 12.82 | 10.00 | 7.18 | 4.35 |
| | 22P | 35.45 | 32.63 | 29.80 | 26.97 | 24.14 | 21.31 | 18.48 | 15.65 | 12.82 | 10.00 | 7.18 | 4.35 | 1.53 | |
| | 20P | 29.80 | 26.97 | 24.14 | 21.31 | 18.48 | 15.65 | 12.82 | 10.00 | 7.18 | 4.35 | 1.53 | | | |
| | 18P | 24.14 | 21.31 | 18.48 | 15.65 | 12.82 | 10.00 | 7.18 | 4.35 | 1.53 | | | | | |
| | 16P | 18.48 | 15.65 | 12.82 | 10.00 | 7.18 | 4.35 | 1.53 | | | | | | | |
| | 14P | 12.82 | 10.00 | 7.18 | 4.35 | 1.53 | | | | | | | | | |
| | 12P | 7.18 | 4.35 | 1.53 | | | | | | | | | | | |
| | 10P | 1.53 | | | | | | | | | | | | | |
| | 8P | | | | | | | | | | | | | | |
| | 6P | | | | | | | | | | | | | | |
| | 4P | | | | | | | | | | | | | | |
| | 2P | | | | | | | | | | | | | | |
| | 0P | | | | | | | | | | | | | | |

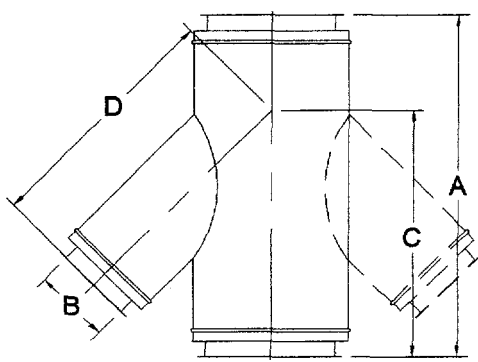
SEE NEXT PAGE FOR METRIC CHART



IPIC-2 45MT CHART IN INCHES

SECTION D - COMPONENTS

| BODY I.D. | TAP I.D. | | | | | | | | | | | | | |
|-----------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 48 | 46 | 44 | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 |
| 48P IC | 2122 | 2050 | 1978 | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 |
| 46P IC | 1888 | 1816 | 1744 | 1672 | 1600 | 1528 | 1456 | 1384 | 1312 | 1240 | 1168 | 1096 | 1024 | 952 |
| 44P IC | 1654 | 1582 | 1510 | 1438 | 1366 | 1294 | 1222 | 1150 | 1078 | 1006 | 934 | 862 | 790 | 718 |
| 42P IC | 1420 | 1348 | 1276 | 1204 | 1132 | 1060 | 988 | 916 | 844 | 772 | 700 | 628 | 556 | 484 |
| 40P IC | 1186 | 1114 | 1042 | 970 | 898 | 826 | 754 | 682 | 610 | 538 | 466 | 394 | 322 | 250 |
| 38P IC | 952 | 880 | 808 | 736 | 664 | 592 | 520 | 448 | 376 | 304 | 232 | 160 | 88 | 16 |
| 36P IC | 718 | 646 | 574 | 502 | 430 | 358 | 286 | 214 | 142 | 70 | 0 | -72 | -144 | -216 |
| 34P IC | 484 | 412 | 340 | 268 | 196 | 124 | 52 | -20 | -92 | -164 | -236 | -308 | -380 | -452 |
| 32P IC | 250 | 178 | 106 | 34 | -38 | -110 | -182 | -254 | -326 | -398 | -470 | -542 | -614 | -686 |
| 30P IC | 16 | -56 | -128 | -200 | -272 | -344 | -416 | -488 | -560 | -632 | -704 | -776 | -848 | -920 |
| 28P IC | -110 | -182 | -254 | -326 | -398 | -470 | -542 | -614 | -686 | -758 | -830 | -902 | -974 | -1046 |
| 26P IC | -244 | -316 | -388 | -460 | -532 | -604 | -676 | -748 | -820 | -892 | -964 | -1036 | -1108 | -1180 |
| 24P IC | -378 | -450 | -522 | -594 | -666 | -738 | -810 | -882 | -954 | -1026 | -1098 | -1170 | -1242 | -1314 |
| 22P IC | -512 | -584 | -656 | -728 | -800 | -872 | -944 | -1016 | -1088 | -1160 | -1232 | -1304 | -1376 | -1448 |
| 20P IC | -646 | -718 | -790 | -862 | -934 | -1006 | -1078 | -1150 | -1222 | -1294 | -1366 | -1438 | -1510 | -1582 |
| 18P IC | -780 | -852 | -924 | -996 | -1068 | -1140 | -1212 | -1284 | -1356 | -1428 | -1500 | -1572 | -1644 | -1716 |
| 16P IC | -914 | -986 | -1058 | -1130 | -1202 | -1274 | -1346 | -1418 | -1490 | -1562 | -1634 | -1706 | -1778 | -1850 |
| 14P IC | -1048 | -1120 | -1192 | -1264 | -1336 | -1408 | -1480 | -1552 | -1624 | -1696 | -1768 | -1840 | -1912 | -1984 |
| 12P IC | -1182 | -1254 | -1326 | -1398 | -1470 | -1542 | -1614 | -1686 | -1758 | -1830 | -1902 | -1974 | -2046 | -2118 |
| 10P IC | -1316 | -1388 | -1460 | -1532 | -1604 | -1676 | -1748 | -1820 | -1892 | -1964 | -2036 | -2108 | -2180 | -2252 |
| 8P IC | -1450 | -1522 | -1594 | -1666 | -1738 | -1810 | -1882 | -1954 | -2026 | -2098 | -2170 | -2242 | -2314 | -2386 |
| 6P IC | -1584 | -1656 | -1728 | -1800 | -1872 | -1944 | -2016 | -2088 | -2160 | -2232 | -2304 | -2376 | -2448 | -2520 |

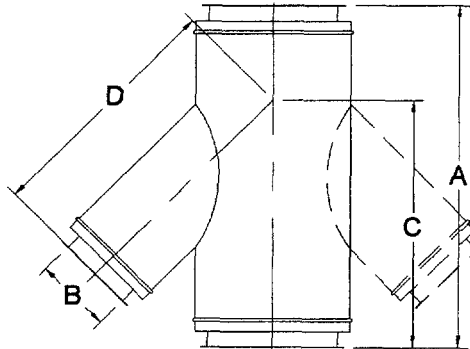


IPIC-2 45MT CHART IN METRIC

SECTION D - COMPONENTS

| BODY I.D. | IAP I.D. | | | | | | | | | | | | |
|-----------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 48 | 46 | 44 | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 24 | |
| 48PIC | "A" | 89.19 | 86.36 | 83.54 | 80.71 | 77.88 | 75.05 | 72.22 | 69.40 | 66.57 | 63.74 | 60.91 | 58.08 |
| | "B" | 48 | 46 | 44 | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 24 |
| | "C" | 72.80 | 71.18 | 69.77 | 68.35 | 66.94 | 65.53 | 64.11 | 62.70 | 61.28 | 59.87 | 58.45 | 57.04 |
| 46PIC | "A" | 86.36 | 83.54 | 80.71 | 77.88 | 75.05 | 72.22 | 69.40 | 66.57 | 63.74 | 60.91 | 58.08 | 55.25 |
| | "B" | 46 | 44 | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 24 | 22 |
| | "C" | 70.18 | 68.77 | 67.35 | 65.94 | 64.53 | 63.11 | 61.70 | 60.28 | 58.87 | 57.45 | 56.04 | 54.63 |
| 44PIC | "A" | 83.54 | 80.71 | 77.88 | 75.05 | 72.22 | 69.40 | 66.57 | 63.74 | 60.91 | 58.08 | 55.25 | 53.42 |
| | "B" | 44 | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 24 | 22 | 20 |
| | "C" | 67.77 | 66.35 | 64.94 | 63.53 | 62.11 | 60.70 | 59.28 | 57.87 | 56.45 | 55.04 | 53.63 | 52.21 |
| 42PIC | "A" | 80.71 | 77.88 | 75.05 | 72.22 | 69.40 | 66.57 | 63.74 | 60.91 | 58.08 | 55.25 | 52.42 | 50.60 |
| | "B" | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 |
| | "C" | 65.35 | 63.94 | 62.53 | 61.11 | 59.70 | 58.28 | 56.87 | 55.45 | 54.04 | 52.63 | 51.21 | 49.80 |
| 40PIC | "A" | 77.88 | 75.05 | 72.22 | 69.40 | 66.57 | 63.74 | 60.91 | 58.08 | 55.25 | 52.42 | 49.60 | 48.77 |
| | "B" | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 |
| | "C" | 62.94 | 61.53 | 60.11 | 58.70 | 57.28 | 55.87 | 54.45 | 53.04 | 51.63 | 50.21 | 48.80 | 47.38 |
| 38PIC | "A" | 75.05 | 72.22 | 69.40 | 66.57 | 63.74 | 60.91 | 58.08 | 55.25 | 52.42 | 49.60 | 47.77 | 45.94 |
| | "B" | 38 | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 14 |
| | "C" | 60.53 | 59.11 | 57.70 | 56.28 | 54.87 | 53.45 | 52.04 | 50.63 | 49.21 | 47.80 | 46.38 | 44.97 |
| 36PIC | "A" | 72.22 | 69.40 | 66.57 | 63.74 | 60.91 | 58.08 | 55.25 | 52.42 | 49.60 | 46.77 | 44.94 | 43.11 |
| | "B" | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 12 |
| | "C" | 58.11 | 56.70 | 55.28 | 53.87 | 52.45 | 51.04 | 49.63 | 48.21 | 46.80 | 45.38 | 43.97 | 42.56 |
| 34PIC | "A" | 69.40 | 66.57 | 63.74 | 60.91 | 58.08 | 55.25 | 52.42 | 49.60 | 46.77 | 43.94 | 42.11 | 41.28 |
| | "B" | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 10 |
| | "C" | 55.70 | 54.28 | 52.87 | 51.45 | 50.04 | 48.63 | 47.21 | 45.80 | 44.38 | 42.97 | 41.56 | 40.14 |
| 32PIC | "A" | 66.57 | 63.74 | 60.91 | 58.08 | 55.25 | 52.42 | 49.60 | 46.77 | 43.94 | 41.11 | 40.28 | 38.46 |
| | "B" | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 8 |
| | "C" | 53.28 | 51.87 | 50.45 | 49.04 | 47.63 | 46.21 | 44.80 | 43.38 | 41.97 | 40.56 | 39.14 | 37.73 |
| 30PIC | "A" | 63.74 | 60.91 | 58.08 | 55.25 | 52.42 | 49.60 | 46.77 | 43.94 | 41.11 | 39.28 | 37.46 | 35.63 |
| | "B" | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 6 |
| | "C" | 50.87 | 49.45 | 48.04 | 46.63 | 45.21 | 43.80 | 42.38 | 40.97 | 39.56 | 38.14 | 36.73 | 35.31 |
| 28PIC | "A" | 60.91 | 58.08 | 55.25 | 52.42 | 49.60 | 46.77 | 43.94 | 41.11 | 39.28 | 36.46 | 34.63 | 33.80 |
| | "B" | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 |
| | "C" | 48.45 | 47.04 | 45.63 | 44.21 | 42.80 | 41.38 | 39.97 | 38.56 | 37.14 | 35.73 | 34.31 | 32.90 |
| 26PIC | "A" | 58.08 | 55.25 | 52.42 | 49.60 | 46.77 | 43.94 | 41.11 | 39.28 | 36.46 | 33.63 | 32.80 | 31.90 |
| | "B" | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 6 |
| | "C" | 46.04 | 44.63 | 43.21 | 41.80 | 40.38 | 38.97 | 37.56 | 36.14 | 34.73 | 33.31 | 31.90 | 30.80 |
| 24PIC | "A" | 55.25 | 52.42 | 49.60 | 46.77 | 43.94 | 41.11 | 39.28 | 36.46 | 33.63 | 31.80 | 31.00 | 30.90 |
| | "B" | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 6 | 6 |
| | "C" | 43.63 | 42.21 | 40.80 | 39.38 | 37.97 | 36.56 | 35.14 | 33.73 | 32.31 | 30.90 | 30.00 | 30.00 |
| 22PIC | "A" | 52.42 | 49.60 | 46.77 | 43.94 | 41.11 | 39.28 | 36.46 | 33.63 | 30.80 | 30.00 | 30.00 | 30.00 |
| | "B" | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 6 | 6 | 6 |
| | "C" | 41.21 | 39.80 | 38.38 | 36.97 | 35.56 | 34.14 | 32.73 | 31.31 | 29.90 | 29.90 | 29.90 | 29.90 |
| 20PIC | "A" | 49.60 | 46.77 | 43.94 | 41.11 | 39.28 | 36.46 | 33.63 | 30.80 | 29.80 | 29.80 | 29.80 | 29.80 |
| | "B" | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 6 | 6 | 6 | 6 |
| | "C" | 38.80 | 37.38 | 35.97 | 34.56 | 33.14 | 31.73 | 30.31 | 28.90 | 28.90 | 28.90 | 28.90 | 28.90 |
| 18PIC | "A" | 46.77 | 43.94 | 41.11 | 39.28 | 36.46 | 33.63 | 30.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 |
| | "B" | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 6 | 6 | 6 | 6 | 6 |
| | "C" | 36.38 | 34.97 | 33.56 | 32.14 | 30.73 | 29.31 | 27.90 | 27.90 | 27.90 | 27.90 | 27.90 | 27.90 |
| 16PIC | "A" | 43.94 | 41.11 | 39.28 | 36.46 | 33.63 | 30.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 |
| | "B" | 16 | 14 | 12 | 10 | 8 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| | "C" | 33.97 | 32.56 | 31.14 | 29.73 | 28.31 | 26.90 | 26.90 | 26.90 | 26.90 | 26.90 | 26.90 | 26.90 |
| 14PIC | "A" | 41.11 | 39.28 | 36.46 | 33.63 | 30.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 |
| | "B" | 14 | 12 | 10 | 8 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| | "C" | 31.56 | 30.14 | 28.73 | 27.31 | 25.90 | 25.90 | 25.90 | 25.90 | 25.90 | 25.90 | 25.90 | 25.90 |
| 12PIC | "A" | 38.28 | 35.46 | 32.63 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 |
| | "B" | 12 | 10 | 8 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| | "C" | 28.14 | 27.73 | 26.31 | 24.90 | 24.90 | 24.90 | 24.90 | 24.90 | 24.90 | 24.90 | 24.90 | 24.90 |
| 10PIC | "A" | 35.46 | 32.63 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 |
| | "B" | 10 | 8 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| | "C" | 26.73 | 25.31 | 23.90 | 23.90 | 23.90 | 23.90 | 23.90 | 23.90 | 23.90 | 23.90 | 23.90 | 23.90 |
| 8PIC | "A" | 32.63 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 |
| | "B" | 8 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| | "C" | 24.31 | 22.90 | 23.31 | 23.31 | 23.31 | 23.31 | 23.31 | 23.31 | 23.31 | 23.31 | 23.31 | 23.31 |
| 6PIC | "A" | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 | 29.80 |
| | "B" | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| | "C" | 21.90 | 21.90 | 21.90 | 21.90 | 21.90 | 21.90 | 21.90 | 21.90 | 21.90 | 21.90 | 21.90 | 21.90 |

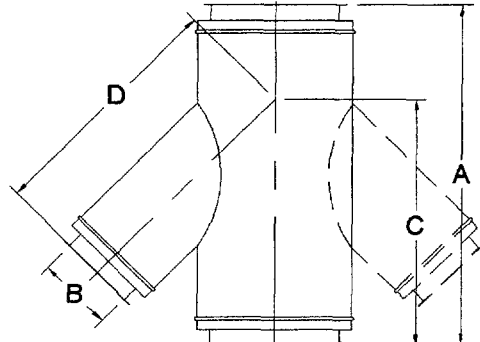
SEE NEXT PAGE FOR METRIC CHART



IPIC-4 AND IPIC-4G 45MT CHART IN INCHES

SECTION D - COMPONENTS

| | | TAP I.D. | | | | | | | | | | | |
|--------|---|----------|------|------|------|------|------|------|------|------|------|------|------|
| | | 48 | 48 | 44 | 42 | 40 | 38 | 36 | 34 | 32 | 30 | 28 | 26 |
| 48P IC | A | 2285 | 2184 | 2122 | 2050 | 1978 | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 |
| | B | 1219 | 1168 | 1118 | 1067 | 1016 | 965 | 914 | 864 | 813 | 762 | 711 | 660 |
| | C | 1844 | 1808 | 1772 | 1736 | 1700 | 1664 | 1628 | 1593 | 1557 | 1521 | 1485 | 1440 |
| | D | 1844 | 1811 | 1783 | 1758 | 1732 | 1707 | 1682 | 1658 | 1634 | 1610 | 1586 | 1563 |
| 44P C | A | 2194 | 2122 | 2050 | 1978 | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 |
| | B | 1168 | 1118 | 1067 | 1016 | 965 | 914 | 864 | 813 | 762 | 711 | 660 | 610 |
| | C | 1783 | 1747 | 1711 | 1675 | 1639 | 1603 | 1567 | 1531 | 1495 | 1459 | 1423 | 1387 |
| | D | 1783 | 1757 | 1732 | 1706 | 1681 | 1656 | 1630 | 1605 | 1579 | 1554 | 1529 | 1503 |
| 42P C | A | 2122 | 2050 | 1978 | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 | 1331 |
| | B | 1118 | 1067 | 1016 | 965 | 914 | 864 | 813 | 762 | 711 | 660 | 610 | 558 |
| | C | 1721 | 1685 | 1649 | 1614 | 1578 | 1542 | 1506 | 1470 | 1434 | 1398 | 1362 | 1326 |
| | D | 1721 | 1696 | 1671 | 1645 | 1620 | 1594 | 1569 | 1544 | 1518 | 1493 | 1467 | 1442 |
| 40P IC | A | 1978 | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 |
| | B | 1016 | 965 | 914 | 864 | 813 | 762 | 711 | 660 | 610 | 558 | 508 | 457 |
| | C | 1599 | 1563 | 1527 | 1491 | 1455 | 1419 | 1383 | 1347 | 1311 | 1275 | 1238 | 1204 |
| | D | 1599 | 1573 | 1548 | 1522 | 1497 | 1472 | 1446 | 1421 | 1395 | 1370 | 1345 | 1319 |
| 38P IC | A | 1906 | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 | 1116 |
| | B | 965 | 914 | 864 | 813 | 762 | 711 | 660 | 610 | 559 | 508 | 457 | 406 |
| | C | 1537 | 1501 | 1466 | 1430 | 1394 | 1358 | 1322 | 1286 | 1250 | 1214 | 1178 | 1142 |
| | D | 1537 | 1512 | 1487 | 1461 | 1436 | 1410 | 1385 | 1360 | 1334 | 1309 | 1283 | 1258 |
| 36P IC | A | 1834 | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 | 1116 | 1045 |
| | B | 914 | 864 | 813 | 762 | 711 | 660 | 610 | 559 | 508 | 457 | 406 | 356 |
| | C | 1476 | 1440 | 1404 | 1368 | 1332 | 1296 | 1260 | 1225 | 1189 | 1153 | 1117 | 1081 |
| | D | 1476 | 1451 | 1425 | 1400 | 1374 | 1349 | 1324 | 1298 | 1273 | 1247 | 1222 | 1197 |
| 34P IC | A | 1763 | 1691 | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 | 1116 | 1044 | 972 |
| | B | 864 | 813 | 762 | 711 | 660 | 610 | 559 | 508 | 457 | 406 | 356 | 305 |
| | C | 1415 | 1379 | 1343 | 1307 | 1271 | 1235 | 1199 | 1163 | 1127 | 1091 | 1055 | 1020 |
| | D | 1415 | 1389 | 1364 | 1339 | 1313 | 1288 | 1262 | 1237 | 1212 | 1186 | 1161 | 1135 |
| 32P IC | A | 1691 | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 | 1116 | 1044 | 972 | 900 |
| | B | 813 | 762 | 711 | 660 | 610 | 559 | 508 | 457 | 406 | 356 | 305 | 254 |
| | C | 1353 | 1317 | 1282 | 1246 | 1210 | 1174 | 1138 | 1102 | 1066 | 1030 | 994 | 958 |
| | D | 1353 | 1328 | 1303 | 1277 | 1252 | 1226 | 1201 | 1176 | 1150 | 1125 | 1099 | 1074 |
| 30P IC | A | 1619 | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 | 1116 | 1044 | 972 | 900 | 828 |
| | B | 762 | 711 | 660 | 610 | 559 | 508 | 457 | 406 | 356 | 305 | 254 | 203 |
| | C | 1292 | 1256 | 1220 | 1184 | 1148 | 1112 | 1077 | 1041 | 1005 | 969 | 933 | 897 |
| | D | 1292 | 1267 | 1241 | 1216 | 1190 | 1165 | 1140 | 1114 | 1089 | 1063 | 1038 | 1013 |
| 28P IC | A | 1547 | 1475 | 1403 | 1332 | 1260 | 1188 | 1116 | 1044 | 972 | 900 | 828 | 756 |
| | B | 711 | 660 | 610 | 559 | 508 | 457 | 406 | 356 | 305 | 254 | 203 | 152 |
| | C | 1231 | 1195 | 1158 | 1123 | 1087 | 1051 | 1015 | 979 | 943 | 907 | 872 | 836 |
| | D | 1231 | 1205 | 1180 | 1155 | 1128 | 1104 | 1078 | 1053 | 1028 | 1002 | 977 | 951 |
| 26P IC | A | 1475 | 1403 | 1332 | 1260 | 1188 | 1116 | 1044 | 972 | 900 | 828 | 756 | 684 |
| | B | 660 | 610 | 559 | 508 | 457 | 406 | 356 | 305 | 254 | 203 | 152 | 101 |
| | C | 1169 | 1133 | 1098 | 1062 | 1026 | 990 | 954 | 918 | 882 | 846 | 810 | 774 |
| | D | 1169 | 1144 | 1119 | 1093 | 1068 | 1042 | 1017 | 992 | 967 | 942 | 917 | 891 |
| 24P IC | A | 1403 | 1332 | 1260 | 1188 | 1116 | 1044 | 972 | 900 | 828 | 756 | 684 | 612 |
| | B | 610 | 559 | 508 | 457 | 406 | 356 | 305 | 254 | 203 | 152 | 101 | 50 |
| | C | 1108 | 1072 | 1036 | 1000 | 964 | 928 | 893 | 857 | 821 | 785 | 750 | 714 |
| | D | 1108 | 1083 | 1057 | 1032 | 1006 | 981 | 956 | 930 | 905 | 879 | 854 | 829 |
| 22P IC | A | 1332 | 1260 | 1188 | 1116 | 1044 | 972 | 900 | 828 | 756 | 684 | 612 | 540 |
| | B | 559 | 508 | 457 | 406 | 356 | 305 | 254 | 203 | 152 | 101 | 50 | 0 |
| | C | 1047 | 1011 | 975 | 939 | 903 | 867 | 831 | 795 | 759 | 723 | 687 | 651 |
| | D | 1047 | 1021 | 996 | 971 | 945 | 920 | 894 | 869 | 844 | 819 | 793 | 768 |
| 20P IC | A | 1260 | 1188 | 1116 | 1044 | 972 | 900 | 828 | 756 | 684 | 612 | 540 | 468 |
| | B | 508 | 457 | 406 | 356 | 305 | 254 | 203 | 152 | 101 | 50 | 0 | 0 |
| | C | 985 | 950 | 914 | 878 | 842 | 806 | 770 | 734 | 698 | 662 | 626 | 590 |
| | D | 985 | 960 | 935 | 909 | 884 | 858 | 833 | 808 | 782 | 757 | 731 | 706 |
| 18P IC | A | 1188 | 1116 | 1044 | 972 | 900 | 828 | 756 | 684 | 612 | 540 | 468 | 396 |
| | B | 457 | 406 | 356 | 305 | 254 | 203 | 152 | 101 | 50 | 0 | 0 | 0 |
| | C | 924 | 888 | 852 | 816 | 780 | 744 | 708 | 672 | 636 | 600 | 564 | 528 |
| | D | 924 | 899 | 873 | 848 | 823 | 797 | 772 | 747 | 722 | 697 | 672 | 647 |
| 16P C | A | 1116 | 1044 | 972 | 900 | 828 | 756 | 684 | 612 | 540 | 468 | 396 | 324 |
| | B | 406 | 356 | 305 | 254 | 203 | 152 | 101 | 50 | 0 | 0 | 0 | 0 |
| | C | 863 | 827 | 791 | 755 | 719 | 683 | 647 | 611 | 575 | 539 | 503 | 467 |
| | D | 863 | 837 | 812 | 787 | 761 | 736 | 711 | 686 | 661 | 636 | 611 | 586 |
| 14P IC | A | 1044 | 972 | 900 | 828 | 756 | 684 | 612 | 540 | 468 | 396 | 324 | 252 |
| | B | 356 | 306 | 256 | 206 | 156 | 106 | 56 | 0 | 0 | 0 | 0 | 0 |
| | C | 771 | 735 | 699 | 663 | 627 | 591 | 555 | 519 | 483 | 447 | 411 | 375 |
| | D | 771 | 746 | 721 | 696 | 671 | 646 | 621 | 596 | 571 | 546 | 521 | 496 |
| 12P IC | A | 872 | 801 | 730 | 659 | 588 | 517 | 446 | 375 | 304 | 233 | 162 | 91 |
| | B | 305 | 254 | 203 | 152 | 101 | 50 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 740 | 704 | 668 | 632 | 596 | 560 | 524 | 488 | 452 | 416 | 380 | 344 |
| | D | 740 | 715 | 689 | 664 | 639 | 614 | 589 | 564 | 539 | 514 | 489 | 464 |
| 10P IC | A | 801 | 730 | 659 | 588 | 517 | 446 | 375 | 304 | 233 | 162 | 91 | 20 |
| | B | 254 | 203 | 152 | 101 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 678 | 643 | 608 | 573 | 538 | 503 | 468 | 433 | 398 | 363 | 328 | 293 |
| | D | 678 | 653 | 628 | 603 | 578 | 553 | 528 | 503 | 478 | 453 | 428 | 403 |
| 8P IC | A | 730 | 659 | 588 | 517 | 446 | 375 | 304 | 233 | 162 | 91 | 20 | 0 |
| | B | 203 | 152 | 101 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 618 | 582 | 546 | 510 | 474 | 438 | 402 | 366 | 330 | 294 | 258 | 222 |
| | D | 618 | 592 | 566 | 540 | 514 | 488 | 462 | 436 | 410 | 384 | 358 | 332 |
| 6P IC | A | 659 | 588 | 517 | 446 | 375 | 304 | 233 | 162 | 91 | 20 | 0 | 0 |
| | B | 152 | 101 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 556 | 520 | 484 | 448 | 412 | 376 | 340 | 304 | 268 | 232 | 196 | 160 |
| | D | 556 | 530 | 504 | 478 | 452 | 426 | 400 | 374 | 348 | 322 | 296 | 270 |



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