



SHEET METAL CONNECTORS, INC.

FABRICATION THAT PERFORMS

SPECIFICATIONS FOR

**POLYVINYL COATED UNDERGROUND
DUCT SYSTEMS & FUME EXHAUST SYSTEMS**



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Sheet Metal Connectors, Inc. is proud to be a member or affiliated with the following associations;



YELLOW LABEL

Sheet Metal Workers' International Association
Washington, DC



Sheet Metal Air Conditioning Contractors'
National Association
Chantilly, VA



SPIDA
Spiral Duct Manufacturers Association
Irmo, SC



SMACNA Testing & Research Institute
Chantilly, VA



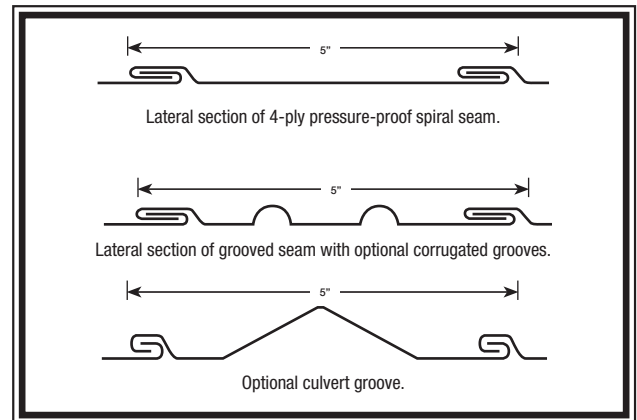
HVAC EXPERTISE
PERFORMANCE • TRAINING • STANDARDS

4x1 PVC for Underground Duct Systems

Sheet Metal Connectors, Inc. (SMC) PVC Underground Pipe and Fittings with E-Z Flange and Barrel Clamp or Standard Slip Connection

Single-Wall PVC Spiral Pipe

Sheet Metal Connectors, Inc. PVC spiral pipe is formed from a coil of metal into a rigid PVC tube with a 4-ply spiral lockseam. It has smooth interior for low friction loss with the grooved seam entirely on the outside. This pipe has a resistance to crushing approximately 2 1/2 times that of longitudinal lockseam. Optional corrugations are available which increase the rigidity of the pipe by approximately 300%. Pipe sections can be joined together by an E-Z Flange with Barrel Clamp, E-Z Flange Jr. with Barrel Clamp, or Standard Spiral Pipe Connector.



Single-Wall Materials

DIAMETER	MATERIAL	THICKNESS	ASTM	TYPE	LENGTH
3" - 96"	PVS	26 - 16 gauge	A-653	4 x 1, 4 x 4	1' - 20', 10' Standard

General

The use of PVC Ductwork eliminates the need for encasing in concrete. Because no additional concrete is required, savings can be considerable. By combining the strength of steel and the chemical inertness of plastic, PVC Ductwork is lightweight as well as corrosion and weather resistant. PVC ductwork will not rust, chip, crack, peel, corrode or produce odors. Although light in weight, PVC Ductwork is strong enough to walk on and will not collapse under concrete. PVC Ductwork is specified by more engineers and architects than any other underground HVAC duct system.

Durability

PVC ductwork is a rugged, durable material that will take ordinary shipping and handling without damage. PVC ductwork needs no protection in earth from sand, concrete or plaster. It is not affected by the minerals and salts found in normal backfilling materials. PVC ductwork has also passed thousands of accelerated salt spray and humidity cabinet tests with no loss of adhesion or corrosion resistance. It can be cut and formed with regular sheet metal equipment and tools with no harm to the coating. Even the largest diameter ducts are easily cut with portable metal-cutting saber saws or circular saws.

Connections

E-Z Flange Jr. with Barrel Clamp - 6" to 24" Diameter

The E-Z flange jr. is a 5/8" flange turned out 90° on each end of the spiral pipe and fittings. The installer applies a gasket on one flange, mates the two flanges together, and attaches the barrel clamp. For field cuts a 5/8" flanged sleeve is available, cut the spiral pipe to the measured length and apply the sleeve.

*For dimensional data please refer to the E-Z Flange Specification Manual.



E-Z Flange with Barrel Clamp - 26" to 96" Diameter

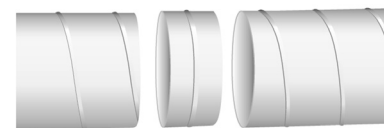
The E-Z flange with barrel clamp can be factory installed or shipped loose for field installation. A set consists of two E-Z flanges and one barrel clamp. For field installation the installer attaches the E-Z flange to the pipe and fittings. Next the installer applies the gasket to one flange, mates the two flanges together and attaches the barrel clamp. SMC also installs E-Z flanges. Flanges are fastened and internally sealed on all ends of the spiral pipe and fittings.

*For dimensional data please refer to the E-Z Flange Specification Manual.



Standard Spiral Pipe Connector

Pipe to Pipe connections are made by using a fitting size coupling that slips inside the mating pipe sections, as shown. A stop bead runs around the middle of the coupling to center the coupling in the connection. Secure the connection by installing sheet metal screws through the outer shell of the duct, 1/2 inch from the stop bead.



PVC Fittings

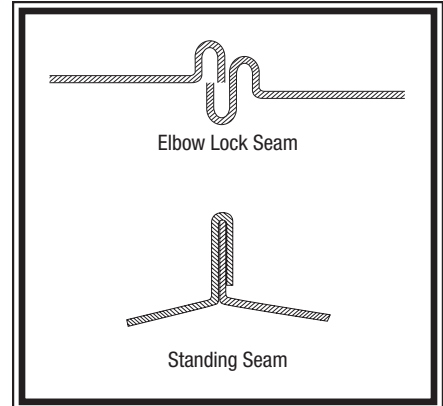
PVC Underground Fittings

Sheet Metal Connectors, Inc. PVC fittings and connections are fabricated in 1 x 4 or 4 x 4 material to protect against corrosion from soil. SMC PVC fittings are manufactured with an elbow lock seam or standing seam. SMC fabricates PVC fittings in most sizes and configurations using our state of the art equipment. All joints and connections should be sealed in accordance with SMC's recommendations to assure an air tight system.

*The PVC fitting dimensional data listed in the PVC Specification Manual is for slip fit type connections only. For E-Z Flange PVC fitting dimensional data refer to the E-Z Flange Specification Manual.

All PVC fittings can be manufactured with:

- E-Z Flange with Barrel Clamp - 26" to 96" Diameter
- E-Z Flange Jr. with Barrel Clamp - 6" to 24" Diameter
- Standard Spiral Slip Connector



Sealing

Spiral pipe and fitting slip connector joints must be sealed to prevent air leakage and to keep dirt and sand out of the duct system. PVC Tape is recommended as it is ideal for this usage. It has superior adhesive qualities, even in extremely hot or extremely cold weather. Also as an insurance factor, PVC Duct Sealer No. 8 is available. This is a flexible and self-curing air pressure sealant. This can be applied from one-gallon cans by brush application. It provides a positive sealing of joints and screw holes. PVC Duct Sealer No. 8 may also be obtained in a cartridge package. Approximate coverage is 375 linear feet per gallon at a 1/4" bead.

*PVC tape is not required for the PVC Spiral Pipe System.



Note: SMACNA Testing and Research Institute verified that Sheet Metal Connectors, Inc. shop standards comply with the 2005-3rd edition of the SMACNA HVAC Duct Construction Standards.

CLOSE CELL NEOPRENE GASKET

Neoprene	1/4" x 1/2"	(50' rolls - 1500' per box)	E-Z Flange Jr.
Neoprene	1/4" x 3/4"	(50' rolls - 1500' per box)	E-Z Flange & TDC



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PVC Installation Guide - Underground Ducts

Install Above Water Table

The PVC duct system is not designed to be waterproof. Installation must be made safely above the water table. Ducts should not be placed where water infiltration may occur.

Depth

The top of the duct can extend into the cement, leaving a minimum of 2 1/2" of cement above the top, or the duct can be placed well below the cement. However, the duct should not be placed so deep that the weight on it will exceed the load capacities. The depth should not be more than 2 1/2 times the diameter of the duct.

Trenching and Backfill

After the excavation has been completed, no special bedding is needed for the PVC Duct. It can rest right on the ground, can be set in sand or light aggregate. Trenches should be pitched to prevent water buildup around the ductwork. Pea gravel or sand (or the material taken from the trench, if equivalent) can be used to backfill. Spread the backfill material evenly around the duct making sure there are no gaps, and tamping in place is a recommended practice.

No cement is needed to fill in around the duct since the tamped fill hold the duct in place and the plastic coating prevents ground corrosion of the galvanized steel. This plastic coating is resistant to any minerals or salts that may be in the backfill soil.

Large Diameter Ducts

Use E-Z Flange with Barrel Clamp for strength, rigidity and a virtual airtight system. Special care should be taken with large diameter ducts. Backfilling and tamping should be done without damage to the ducts. Temporary bracing can be used inside the ducts. Consult an engineer for the reinforcement schedule on large diameter ducts.

Load Specifications

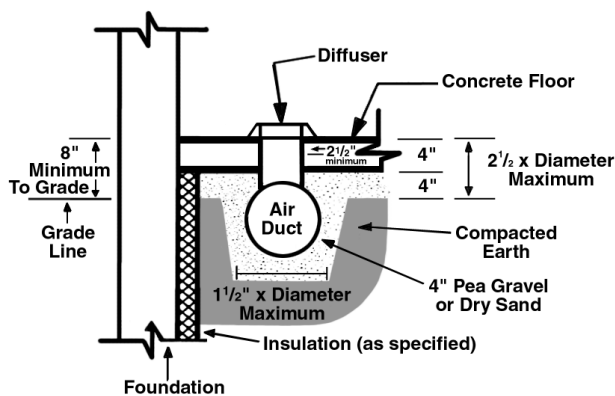
- #1 Standard 4" -8" 400 lbs./Linear Ft.
- 10" -12" 600 lbs./Linear Ft.
- #2 Corrugated 14" -36" 1800 lbs./Linear Ft.*

*All ducts 14" or more in diameter are corrugated for extra strength.

Where deeper burial or heavier loading is required duct gauges can be increased. Also angle rings and/or special bracing can be used.

PVC Underground Ducts Size, Gauge and Weight Table					
Duct Diameter	Nominal Gauge	Nominal Weight Lbs./Ft.	Duct Diameter	Nominal Gauge	Nominal Weight Lbs./Ft.
4"	26	1.1	30"	20	14.8
5"	26	1.4	32"	20	15.8
6"	26	1.6	34"	18	22.3
7"	26	1.9	36"	18	23.8
8"	26	2.2	38"	18	25.0
9"	24	2.5	40"	18	26.2
10"	24	3.4	42"	16	33.3
12"	24	4.2	44"	16	34.9
14"	24	4.9	46"	16	36.5
16"	24	5.6	48"	16	38.0
18"	22	7.6	50"	16	39.6
20"	22	8.5	52"	16	41.3
22"	22	9.3	54"	16	42.9
24"	22	10.1	56"	16	44.5
26"	20	12.9	58"	16	46.0
28"	20	13.9	60"	16	47.3

Typical Underslab Duct



CAUTION: When backfilling or grading, care should be taken not to dump or push heavy loads directly on the duct, nor should heavy equipment be allowed to run over the duct. It can be crushed under thoughtless abuse.



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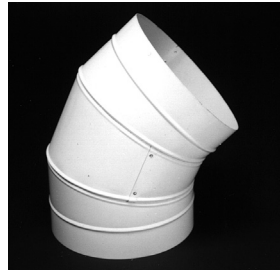
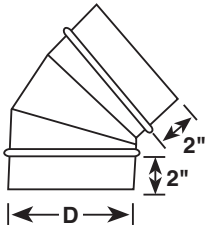
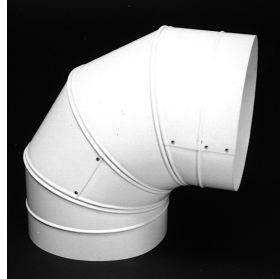
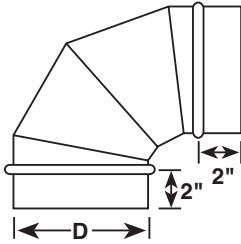
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Adjustable Elbows & Angles

The throat radiuses are SMC's standard for low pressure systems.

Full sweep (C.L. Radius = 1.5 x D) are available up to 16" diameter.



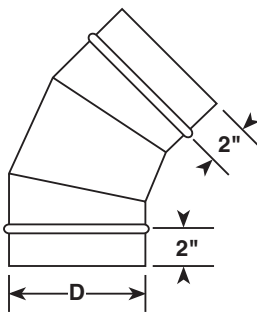
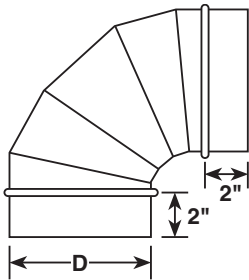
90° Throat and Gauge Chart

Diam.	24 Gauge	22 Gauge	Diam.	24 Gauge	22 Gauge
3"	1"	N/A	13"	3"	3"
4"	1½"	1½"	14"	1½"	1½"
5"	1½"	1½"	15"	3"	3"
6"	1½"	1½"	16"	3"	3"
7"	1½"	1½"	18"	3"	3"
8"	2"	2"	20"	3"	3"
9"	2"	2"	22"	N/A	5"
10"	2"	2"	24"	N/A	5"
11"	3"	3"	26"	N/A	5"
12"	2½"	2½"	28"	N/A	5"

45° Throat and Gauge Chart

Diam.	24 Gauge	22 Gauge	Diam.	24 Gauge	22 Gauge
3"	3"	N/A	13"	5"	5"
4"	3"	3"	14"	5"	5"
5"	4"	4"	15"	5"	5"
6"	4"	4"	16"	5"	5"
7"	5"	5"	18"	5"	5"
8"	5"	5"	20"	5"	5"
9"	5"	5"	22"	N/A	5"
10"	5"	5"	24"	N/A	5"
11"	5"	5"	26"	N/A	5"
12"	5"	5"	28"	N/A	5"

Standing Seam Elbows



Standing Seam Elbows and Angles

Standing Seam fittings work well for medium pressure applications and offer an alternative to riveted elbows and angles. These are available from 8" through 60" diameters and fabricated as heavy as 16 gauge. Other diameters and throat radiuses are available.

Standard Throats	
8" thru 18"	8" Throat
20" thru 60"	10" Throat

Full Sweep Standing Seam Elbows

8"-30" will be a 5 gore one piece standard throat construction. 32" and larger in diameter (1.5 x CL) 90 degree full sweep elbows are fabricated using two 45 degree angles connected with an E-Z flange and barrel clamp.



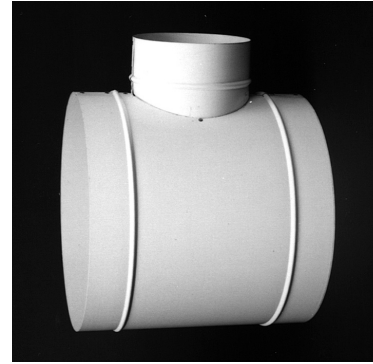
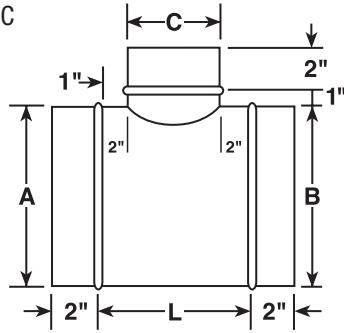
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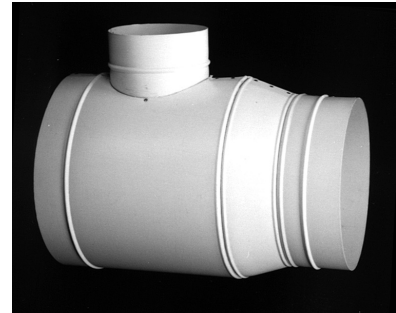
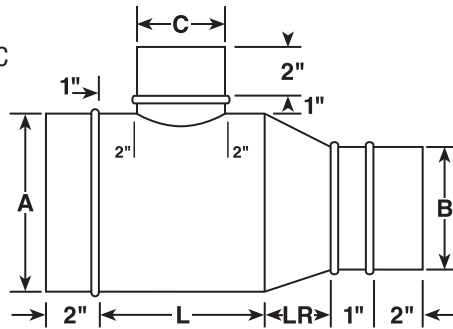
90° Tee

Dimensions to be listed as follows: A, B, C
 L = "C" + 4"



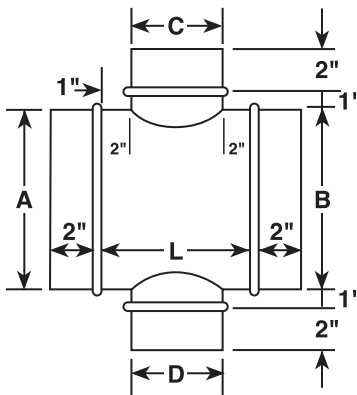
Tee with Reducer

Dimensions to be listed as follows: A, B, C
 L = "C" + 4"
 L.R.: Refer to page 7



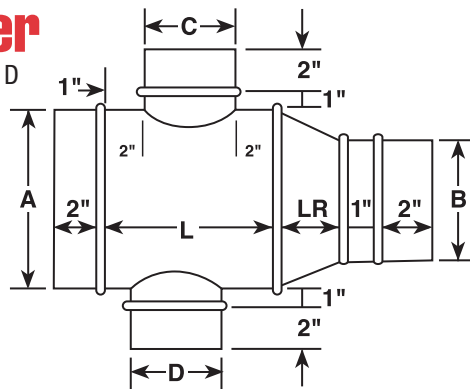
Cross

Dimensions to be listed as follows: A, B, C, D
 L = Largest of "C" or "D" + 4"



Cross with Reducer

Dimensions to be listed as follows: A, B, C, D
 L = Largest of "C" or "D" + 4"
 L.R.: Refer to page 7



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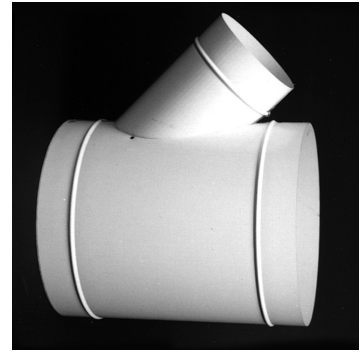
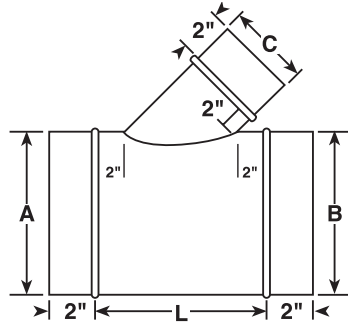
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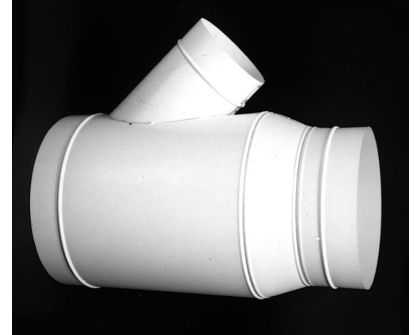
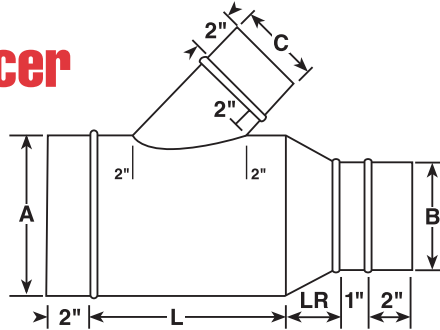
Lateral

Dimensions to be listed as follows: A, B, C
 $L = (1.414 \times C) + 4"$



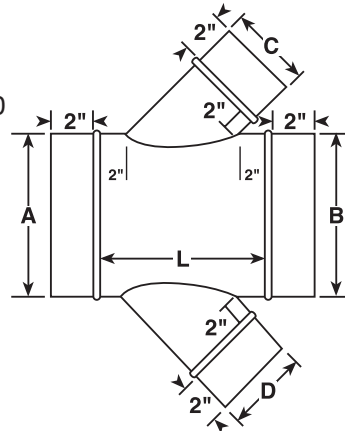
Lateral with Reducer

Dimensions to be listed as follows: A, B, C
 $L = (1.414 \times C) + 2"$
L.R.: Refer to page 7



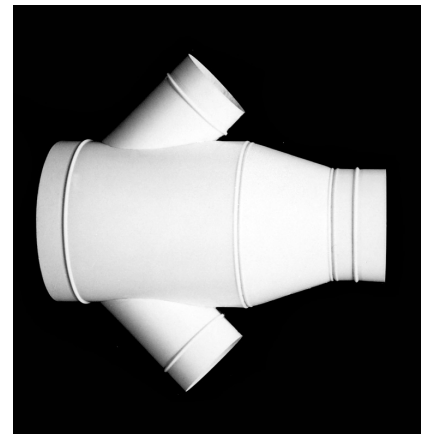
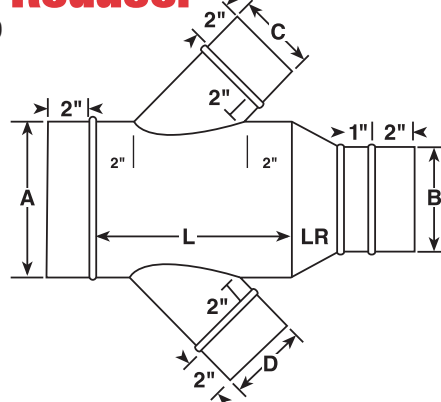
Lateral Cross

Dimensions to be listed as follows: A, B, C, D
 $L = 1.414 \times (\text{Larger of "C" or "D"}) + 4"$



Lateral Cross with Reducer

Dimensions to be listed as follows: A, B, C, D
 $L = 1.414 \times (\text{Larger of "C" or "D"}) + 4"$
L.R.: Refer to page 7



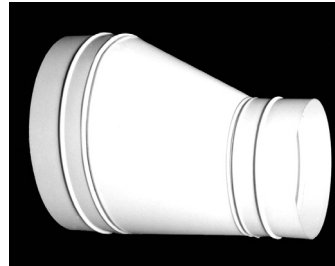
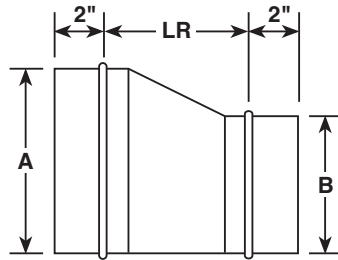
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Eccentric Reducer

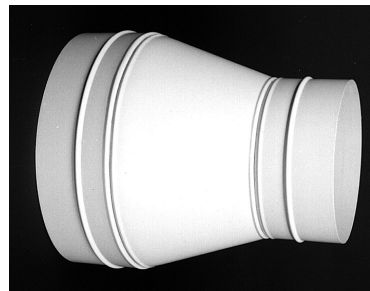
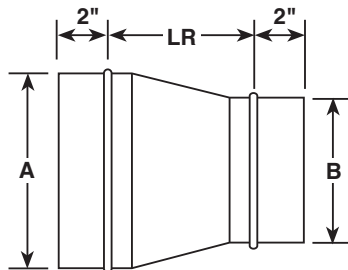
Dimensions to be listed as follows: A, B
LR = (See Chart)



Size Reduction	LR
1	6
2	8.5
3	11
4	13.5
5	16
6	18.5
7	21
8	23.5
9	26
10	28.5
11	31
12	33.5
14	38.5
16	43.5
18	48.5
20	53.5

Concentric Reducer

Dimensions to be listed as follows: A, B
LR = (See Chart)



Size Reduction	LR
1	6.5
2 & 3	7.5
4	9.5
5	10.5
6	11.5
7	13.5
8	14.5
9	16.5
10	17.5
11	18.5
12	20.5
13	21.5
14	22.5
15 & 16	25.5
17 & 18	28.5
19	29.5
20	31.5
21	32.5
22	33.5

LR Value for Tees and Crosses

Size Reduction	LR	Size Reduction	LR
1	4.75	12	20.25
2	5.75	13	21.25
3	5.75	14	22.25
4	7.75	15	25.25
5	8.75	16	25.25
6	9.75	17	28.25
7	13.25	18	28.25
8	14.25	19	29.25
9	16.25	20	31.25
10	17.25	21	32.25
11	18.25	22	33.25

* Add 1.5" to LR value for Diameters over 18"



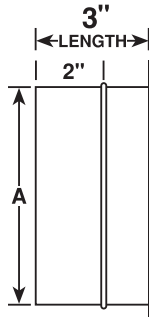
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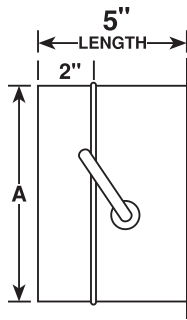
E-Z Tap Collar

Order as follows: A equals diameter



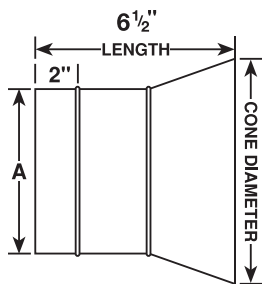
E-Z Tap Collar with Damper

Order as follows: A equals diameter



E-Z Tap Conical Takeoff Collar

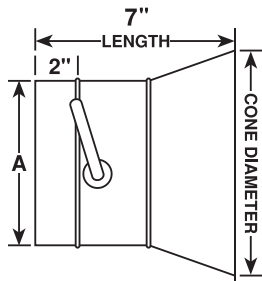
Order as follows: A equals diameter



A	Cone Diameter
4"	5"
5"	6"
6"	8"
7"	9"
8"	10"
9"	11"
10"	12"
12"	14"
14"	16"
16"	18"
18"	20"

E-Z Tap Conical Takeoff Collar with Damper

Order as follows: A equals diameter



A	Cone Diameter
4"	5"
5"	6"
6"	8"
7"	9"
8"	10"
9"	11"
10"	12"
12"	14"
14"	16"
16"	18"
18"	20"



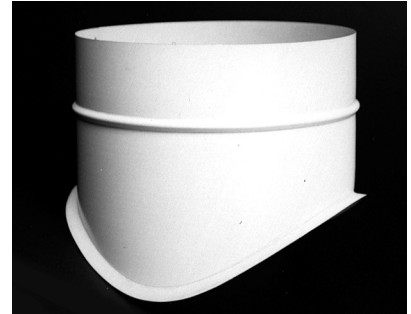
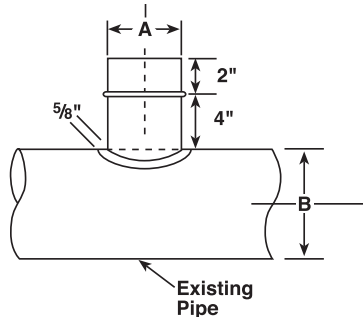
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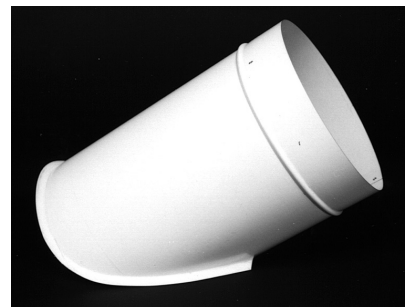
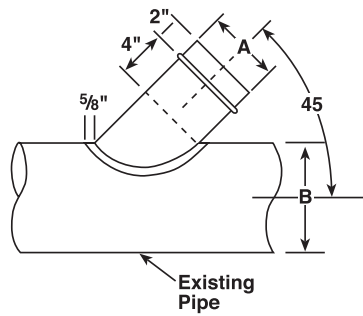
90° Swedged Saddle

Dimensions to be listed as follows: A on B



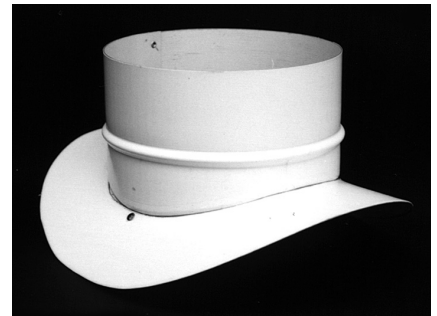
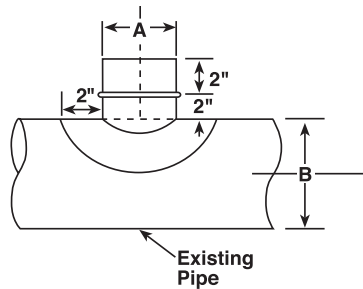
45° Swedged Saddle

Dimensions to be listed as follows: A on B



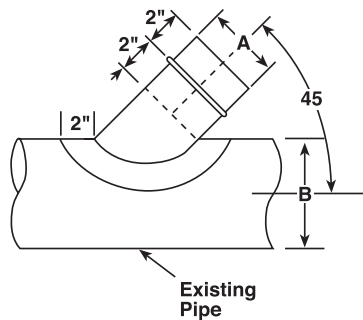
90° Full Saddle

Dimensions to be listed as follows: A on B



45° Full Saddle

Dimensions to be listed as follows: A on B



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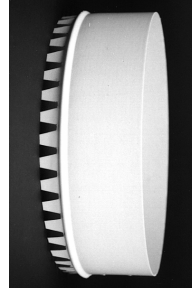
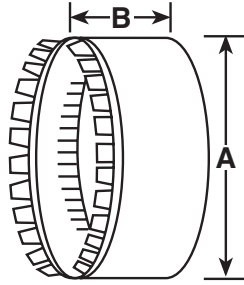
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10

Notched Collars

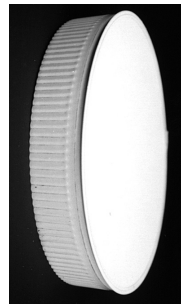
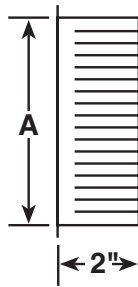
Order as follows: A equals diameter



A	B	Cut Hole
4"	2 ³ / ₄ "	3 ⁷ / ₈ "
5"	2 ³ / ₄ "	4 ⁷ / ₈ "
6"	2 ³ / ₄ "	5 ⁷ / ₈ "
7"	2 ³ / ₄ "	6 ⁷ / ₈ "
8"	2 ³ / ₄ "	7 ⁷ / ₈ "
9"	2 ³ / ₄ "	8 ⁷ / ₈ "
10"	2 ³ / ₄ "	9 ⁷ / ₈ "
12"	2 ³ / ₄ "	11 ⁷ / ₈ "
14"	2 ³ / ₄ "	13 ⁷ / ₈ "
16"	2 ³ / ₄ "	15 ⁷ / ₈ "
18"	2 ³ / ₄ "	17 ⁷ / ₈ "
20"	2 ³ / ₄ "	19 ⁷ / ₈ "

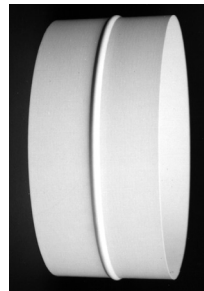
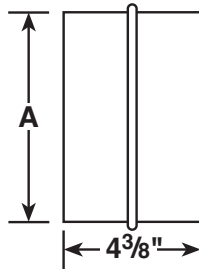
End Cap (Plug)

Dimensions to be listed as follows:
A, equal diameter



Connector (Coupling)

Dimensions to be listed as follows:
A, equals diameter



PVC Accessories

P.C.D. Touch-Up

A special formula of poly-vinyl chloride for air drying for quick scratch repair. Spray Can (6per case)

P.C.D. Tape

Normally all that is needed to complete an installation are sheet metal screws and P.C.D. Tape. Tape is strong, permanent; ideal for use underground. Has superior adhesive quality even in hot or cold weather. 2" x 108 ft. (24 rolls per case)



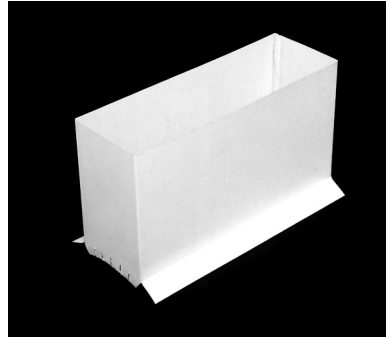
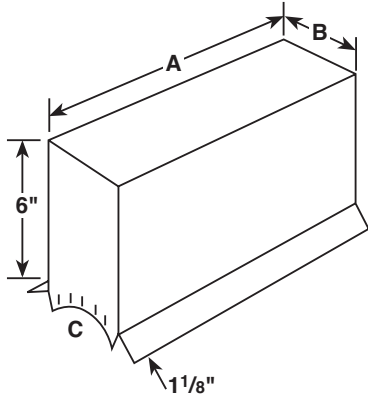
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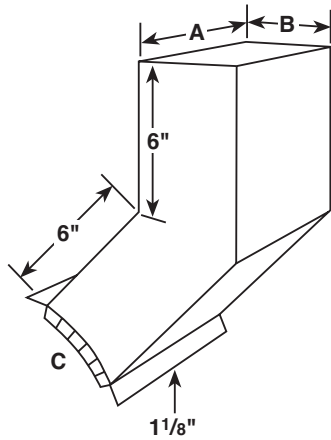
90° Register Saddle

Dimensions to be listed as follows: A, B, C



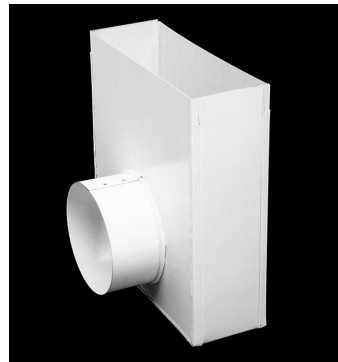
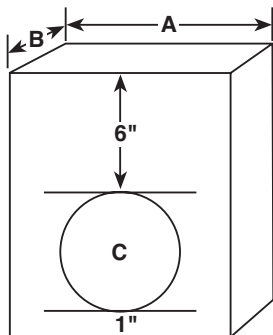
45° Register Saddle

Dimensions to be listed as follows: A, B, C



Register Boot

Dimensions to be listed as follows: A, B, C



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PVC Fume Exhaust Systems

PVC is an ideal material for many fume exhaust applications. Combining the strength of steel with the chemical inertness of plastic PVC offers completely integrated systems with diameters from 4" to 86" spiral pipe and all standard and special fittings that may be required. The assembly of the system is completed by the use of PVC No. 8 duct sealer and PVC tape.

Two Types Available

PVC for fume exhaust is available in two styles, 4x4 and 4x1 REVERSE.

4x4 has a 4 mill coating of polyvinyl chloride on both sides. It gives maximum interior and exterior protection.

4x1 REVERSE, a more economical system, has the 4 mil coating on the inside and a grey wash coat on the outside for jobs where extra protection is not needed for the outside of the duct system.

Flat Sheets Available

also available in gauges from 26 ga. to 16 ga. are flat sheets for making hoods or forming rectangular duct systems.

Limitations

The practical temperature range is -30° F to 200° F.

PVC duct has been used successfully in many exhaust systems, although it is not suitable for all applications. Type 304 or 316 stainless steel can be used as an alternative material in more corrosive applications, but it is up to the user to determine the suitability of the material used. Samples of materials used in Sheet Metal Connector's products can be provided upon request to determine their corrosion resistance characteristics.

SMACNA Gauges for Low Pressure Duct Systems - Above Ground*

Gauges	Spiral Pipe Diameters	Fitting Diameters
26 Ga.	4"-12"	4"-12"
24 Ga.	13"-24"	13"-20"
22 Ga.	26"-36"	22"-36"
20 Ga.	38"-50"	38"-50"
18 Ga.	52"-60"	52"-60"
16 Ga.	62"-84"	62"-84"

*When 4x4 PVC is used underground specify gauges as shown in table on Page 2.

Specifications for PVC Fume Exhaust Duct Systems

Fume exhaust system shall be PVC type 4x4 or 4x1 reverse as manufactured by Sheet Metal Connectors, Inc., Minneapolis, Minnesota. Gauges shall be standard SMACNA gauges for low pressure systems.

Round ducts shall be roll-formed spiral pipes. Fittings shall be factory fabricated with stainless steel rivets. All fitting seams shall be caulked on the inside with PVC No. 8 duct sealer.

All connecting joints are slip-fit. Apply No. 8 sealer to all raw edges and male ends. Secure joint connection by installing sheet metal screws with a minimum spacing around of 6". Apply No. 8 sealer over screws and seam of joint and wrap with PVC tape. Repair any damage to the coating with PVC touch-up paint.



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