

<b>SUBURBAN SHEET METAL LTD</b>	
Mailing Address P.O. Box 739 Kennedale, TX 76060	Physical Address 528 S. Eden Rd. Kennedale, TX 76060
Phone (817)478-0801 Fax (817)483-6571	

# Duct Fabrication Specifications

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# Duct Construction

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**TABLE 1-1  
PRESSURE CLASSIFICATION  
FOR DUCTWORK**

STATIC PRESSURE CLASS (INCHES (Pa) W.G.)	+1/2"	-1/2"	+1"	-1"	+2"	-2"	+3"	-3"	+4"	-4"	+6"	-6"	+10"	-10"
<b>Rectangular Style</b>	A	A	STD	STD	STV	A	A	A	A	A	A	A	A	A
<b>Round Style</b>					STV	STD			A	A			A	A
<b>Flat Oval Style</b>			STD		STV		A		A		A			
<b>Flexible Style</b>	A	A	STD	STD	STV		A		A		A		A	

**NOTES FOR TABLE 1-1:**

1. "STD" denotes standard (nonvariable volume) air duct construction requirements (regardless of actual velocity level) for compliance with this document for all cases in which the designer does not designate the pressure classification for the duct system independent of fan static rating. "STV" denotes the standard construction classification for variable volume ducts for compliance with this document when the designer does not designate a class for this application.  
*See S1.4 on Page 1-8.*
2. "A" denotes other pressure classes for which construction or installation details are given in this document and are AVAILABLE for designation in contract documents prepared by designers.
3. *See Section S1.9 for sealing requirements related to duct pressure class.*
4. The pressure class number in Tables 1-1 and 1-1S denotes construction suitable for a maximum level not less than the maximum operating pressure in the portion of the system receiving the classification from the designer.

<b>TABLE 1-1S STATIC PRESSURE</b>		
Duct Pressure Class	Operating Pressure	
(in.)	(Pa)	
1/2" w.g.	125	Up to 1/2" w.g.
1" w.g.	250	Over 1/2" up to 1" w.g.
2" w.g.	500	Over 1" up to 2" w.g.
3" w.g.	750	Over 2" up to 3" w.g.
4" w.g.	1000	Over 3" up to 4" w.g.
6" w.g.	1500	Over 4" up to 6" w.g.
10" w.g.	2500	Over 6" up to 10" w.g.

5. Designer selection of duct construction pressure class is acknowledgment of acceptable design velocity level and pressure level including any overpressure or underpressure conditions that may occur during normal and special modes of operation.
6. The designation of a pressure class pertains to straight duct and duct fittings except for equipment and special components inserted into the ductwork systems; such items are governed by separate specifications in the contract documents.

Text references for ducts:

- a) Rectangular.....page 1-12
- b) Round.....page 3-2
- c) Flat oval.....page 3-13
- d) Flexible.....page 3-15
- e) Duct liner.....page 2-24

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**PRECAUTIONS FOR TABLE 1-1:**

1. The construction is, as indicated elsewhere in this manual, qualified by freedom from structural failure; however, accidental overpressure that could occur must be provided for at the design stage by overpressure relief (such as fail safe features, replaceable relief panels, controlled failure points, etc.)
2. Field tests (if ever used) to test structural adequacy should not exceed 125% of rated pressure. The assignment of a pressure class number less than

The numerical value of the anticipated operating pressure involves risk.

3. Leakage test pressure should not exceed duct pressure class level.
4. Short-cycle pressure changes in duct systems can cause temporary noise. This is normally acceptable at system start-up and shutdown. To reduce or eliminate this noise, the designer must specify shorter-interval bracing, diagonal bracing, lagging, or other control means.

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**Duct Sealing Requirements Table 1-2**

<b>Seal Class</b>	<b>Sealing Required</b>	<b>Static Pressure Construction Class</b>
<b>A</b>	All Transverse Joints Longitudinal Seams and Duct Wall Penetrations	4"W.G. AND UP
<b>B</b>	All Transverse Joint and Longitudinal Seams	3"W.G.
<b>C</b>	Transverse Joints	2"W.G.

IN ADDITION TO THE ABOVE, ANY VARIABLE AIR VOLUME SYSTEM DUCT OF 1½"W.G. CONSTRUCTION CLASS THAT IS UPSTREAM OF THE VAV BOXES SHALL ALSO MEET SEAL CLASS C.

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## SHEET METAL STANDARDS

<b>DUCT GAUGE AND ENFORCING FOR 1" ESS &amp; DRIVE (+/-)</b>						
<b>DUCT DIMENSIONS</b>	<b>GAUGE OF METAL</b>				<b>JOINT CONSTRUCTION</b>	<b>REINFORCING</b>
	<b>5' JOINT</b>	<b>4' JOINT</b>	<b>2.5' JOINT</b>	<b>2' JOINT</b>		
<b>0-12"</b>	26	26	26	26	FLAT ESSES & DRIVE	NONE
<b>13-30"</b>	26	26	26	26	1"st ESSES & DRIVE	NONE
<b>31-48"</b>	24	24	24	26	1"st ESSES & DRIVE	NONE
<b>49-60"</b>	22	22	24	24	1"st ESSES & DRIVE	NONE
<b>61-72"</b>	22	22	22 no Cnt. ref	22 no Cnt. ref	TDF	NONE
<b>73-96"</b>	22	22	22 no Cnt. ref	22 no Cnt. Ref	TDF CNT-JNT	NONE
<b>97-up</b>	18	18	20 no Cnt. ref	20 no Cnt. ref	TDF CNT-JNT 48" MAX SPACING	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER

- NOTES: 1. TDC DUCT CONSTRUCTED PER SMACNA STANDARDS-FIRST EDITION 1995  
2. DUCT FABRICATED USING SNAPLOCK SEAMS.  
3. ALL DUCT STIFFENED BY MACHINE FORMED BEADS SPACED AT 12" O.C.  
4. DUCT WORK TO BE SEALED PER SMACNA HVAC TABLE 1-2  
5. TDC CNT-JNT-CONDU-LOC @ TDC CONNECTOR CENTER OF DUCT & @ TDC CONNECTOR

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## SHEET METAL STANDARDS

<b>DUCT GAUGE AND ENFORCING FOR 1" ESS &amp; DRIVE (+/-) HEAVY GA METAL</b>						
<b>DUCT DIMENSIONS</b>	<b>GAUGE OF METAL</b>				<b>JOINT CONSTRUCTION</b>	<b>REINFORCING</b>
	<b>5' JOINT</b>	<b>4' JOINT</b>	<b>2.5' JOINT</b>	<b>2' JOINT</b>		
<b>0-12"</b>	26	26	26	26	FLAT ESSES & DRIVE	NONE
<b>13-30"</b>	24	24	24	24	1"st ESSES & DRIVE	NONE
<b>31-54"</b>	22	22	22	22	1"st ESSES & DRIVE	NONE
<b>55-60"</b>	20	20	20	20	1"st ESSES & DRIVE	NONE
<b>61-72"</b>	20	20	20 no Cnt. ref	20 no Cnt. ref	TDF	NONE
<b>73-84"</b>	20	20	20 no Cnt. ref	20 no Cnt. Ref	TDF	NONE
<b>85-up</b>	18	18	20 no Cnt. ref	20 no Cnt. ref	TDF CNT-JNT 48" MAX SPACING	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER

- NOTES: 1. TDC DUCT CONSTRUCTED PER SMACNA STANDARDS-FIRST EDITION 1995  
2. DUCT FABRICATED USING PITTSBURG SEAMS.  
3. ALL DUCT STIFFENED BY MACHINE FORMED BEADS SPACED AT 12" O.C.  
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## SHEET METAL STANDARDS

<b>DUCT GAUGE AND ENFORCING FOR 1" W. G. (+/-) TDF</b>						
<b>DUCT DIMENSIONS</b>	<b>GAUGE OF METAL</b>				<b>JOINT CONSTRUCTION</b>	<b>REINFORCING</b>
	<b>5' JOINT</b>	<b>4' JOINT</b>	<b>2.5' JOINT</b>	<b>2' JOINT</b>		
<b>0-12"</b>	26	26	26	26	HEMMED "S" & DRIVE	NONE
<b>12-36"</b>	26	26	26	26	TDF	NONE
<b>37-48"</b>	24	24	24	26	TDF	NONE
<b>49-60"</b>	22	22	24	24	TDF	NONE
<b>61-72"</b>	22	22	22 no Cnt. ref	22 no Cnt. ref	TDF CNT-JNT	NONE
<b>73-96"</b>	22	22	22 no Cnt. ref	22 no Cnt. Ref	TDF CNT-JNT	NONE
<b>97-up</b>	18	18	20 no Cnt. ref	20 no Cnt. ref	TDF CNT-JNT 48" MAX SPACING	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER

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DUCT GAUGE AND ENFORCING FOR 2" W. G. (+/-)						
DUCT DIMENSIONS	GAUGE OF METAL				JOINT CONSTRUCTION	REINFORCING
	5' JOINT	4' JOINT	2.5' JOINT	2' JOINT		
<b>0-12</b>	26	26	26	26	HEMMED "S" & DRIVE	NONE
<b>13-24"</b>	26	26	26	26	TDF	NONE
<b>25-30"</b>	24	24	26	26	TDF	NONE
<b>31-36"</b>	22	24	26	26	TDF	NONE
<b>37-42"</b>	20	24	24	24	TDF	NONE
<b>43-48"</b>	20	22	24	24	TDF	NONE
<b>49-54</b>	22	22	24 no Cnt. ref	24 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>55-60"</b>	22	22	22 no Cnt. ref	22 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>61-84"</b>	22	22	22 no Cnt. ref	22 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>85-96"</b>	20	20	20 no Cnt. ref	20 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>97-up</b>	18	18	18 no Cnt. ref	18 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 16GA V- TYPE STIFFENER

- NOTES: 1. TDC DUCT CONSTRUCTED PER SMACNA STANDARDS-FIRST EDITION 1995  
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3. ALL DUCT STIFFENED BY MACHINE FORMED BEADS SPACED AT 12" O.C.  
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<b>DUCT GAUGE AND ENFORCING FOR 3" W. G. (+/-)</b>						
<b>DUCT DIMENSIONS</b>	<b>GAUGE OF METAL</b>				<b>JOINT CONSTRUCTION</b>	<b>REINFORCING</b>
	<b>5' JOINT</b>	<b>4' JOINT</b>	<b>2.5' JOINT</b>	<b>2' JOINT</b>		
<b>0-12"</b>	24	24	24	24	HEMMED "S" & DRIVE	NONE
<b>13-26"</b>	24	24	24	24	TDF	NONE
<b>27-30"</b>	22	24	24	24	TDF	NONE
<b>31-42"</b>	20	22	24	24	TDF	NONE
<b>43-48"</b>	24	24	24 no Cnt. ref	24 no Cnt. ref	TDF	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>49-60"</b>	22	22	24 no Cnt. ref	24 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>61-72"</b>	22	22	22 no Cnt. ref	22 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>73-84"</b>	20	20	20 no Cnt. ref	20 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>85-96"</b>	18	18	18 no Cnt. ref	20 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>97-up</b>	18	18	18 no Cnt. ref	18 no Cnt. ref	TDF CNT-JNT 48" MAX SPACING	1 ½ WIDE X 1 ½ HIGH 16GA V- TYPE STIFFENER

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## SHEET METAL STANDARDS

DUCT GAUGE AND ENFORCING FOR 4" W. G. (+/-)						
DUCT DIMENSIONS	GAUGE OF METAL				JOINT CONSTRUCTION	REINFORCING
	5' JOINT	4' JOINT	2.5' JOINT	2' JOINT		
<b>0-8"</b>	24	24	24	24	HEMMED "S" & DRIVE	NONE
<b>9-22"</b>	24	24	24	24	TDF	NONE
<b>23-30"</b>	22	24	24	24	TDF	NONE
<b>31-36"</b>	20	22	24	24	TDF	NONE
<b>37-42"</b>	24	24	24 no Cnt. ref	24 no Cnt. ref	TDF	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>43-48"</b>	22	22	22 no Cnt. ref	22 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>49-60"</b>	22	22	22 no Cnt. ref	22 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>61-72"</b>	20	20	20 no Cnt. ref	20 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>73-84"</b>	18	18	18 no Cnt. ref	20 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>85-96"</b>	20 2 SETS Cnt. ref	20	20	20 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 16GA V- TYPE STIFFENER
<b>97-up</b>	18	18	18 no Cnt. ref	18 no Cnt. ref	TDF CNT-JNT 48" MAX SPACING	1 ½ WIDE X 1 ½ HIGH 16GA V- TYPE STIFFENER

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DUCT GAUGE AND ENFORCING FOR 6" W. G. (+/-)						
DUCT DIMENSIONS	GAUGE OF METAL				JOINT CONSTRUCTION	REINFORCING
	5' JOINT	4' JOINT	2.5' JOINT	2' JOINT		
<b>0-8"</b>	24	24	24	24	HEMMED "S" & DRIVE	NONE
<b>9-12"</b>	24	24	24	24	TDF	NONE
<b>13-22"</b>	22	24	24	24	TDF	NONE
<b>23-24"</b>	22	22	24	24	TDF	NONE
<b>25-28"</b>	20	22	24	24	TDF	NONE
<b>29-36"</b>	24	24	24 no Cnt. ref	24 no Cnt. ref	TDF	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>37-42"</b>	22	22	22 no Cnt. ref	22 no Cnt. ref	TDF	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>43-48"</b>	20	20	20 no Cnt. ref	20 no Cnt. ref	TDF	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>49-60"</b>	20	20	20 no Cnt. ref	22 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>61-72"</b>	18	18	18 no Cnt.ref	20 no Cnt. ref	TDF CNT-JNT	1 ½ WIDE X 1 ½ HIGH 18GA V- TYPE STIFFENER
<b>73-96"</b>	18 2 SETS Cnt. ref	18	18	20 no Cnt. ref	TDF CNT-JNT 48" MAX SPACING	1 ½ WIDE X 1 ½ HIGH 16GA V- TYPE STIFFENER
<b>97-up</b>	18 2 SETS Cnt.ref	18	18	18 no Cnt. Ref	TDF CNT-JNT 48" MAX SPACING	1 ½ WIDE X 1 ½ HIGH 16GA V- TYPE STIFFENER

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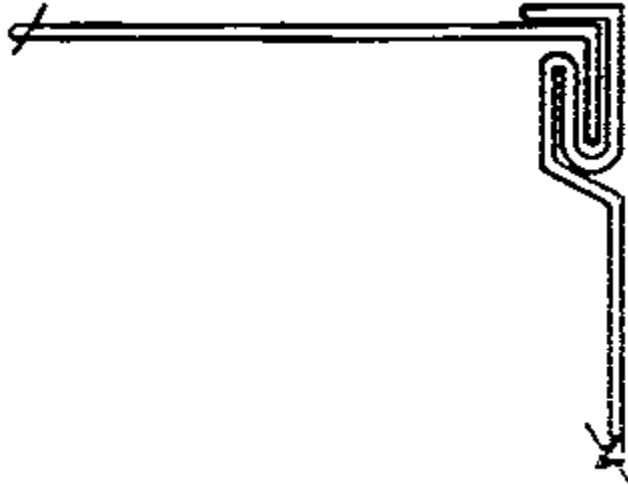
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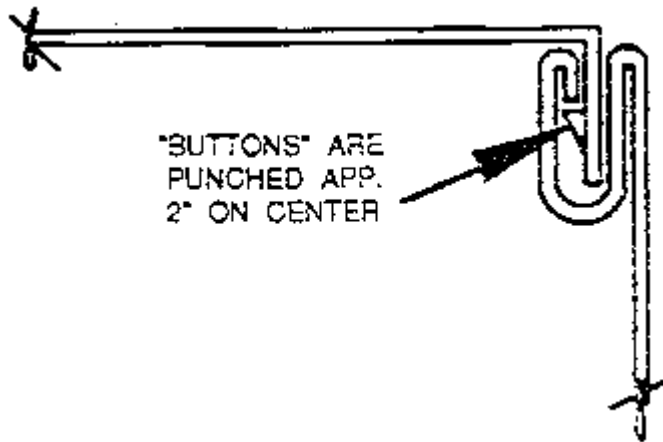
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**LONGITUDINAL SEAMS**



PITTSBURGH LOCK



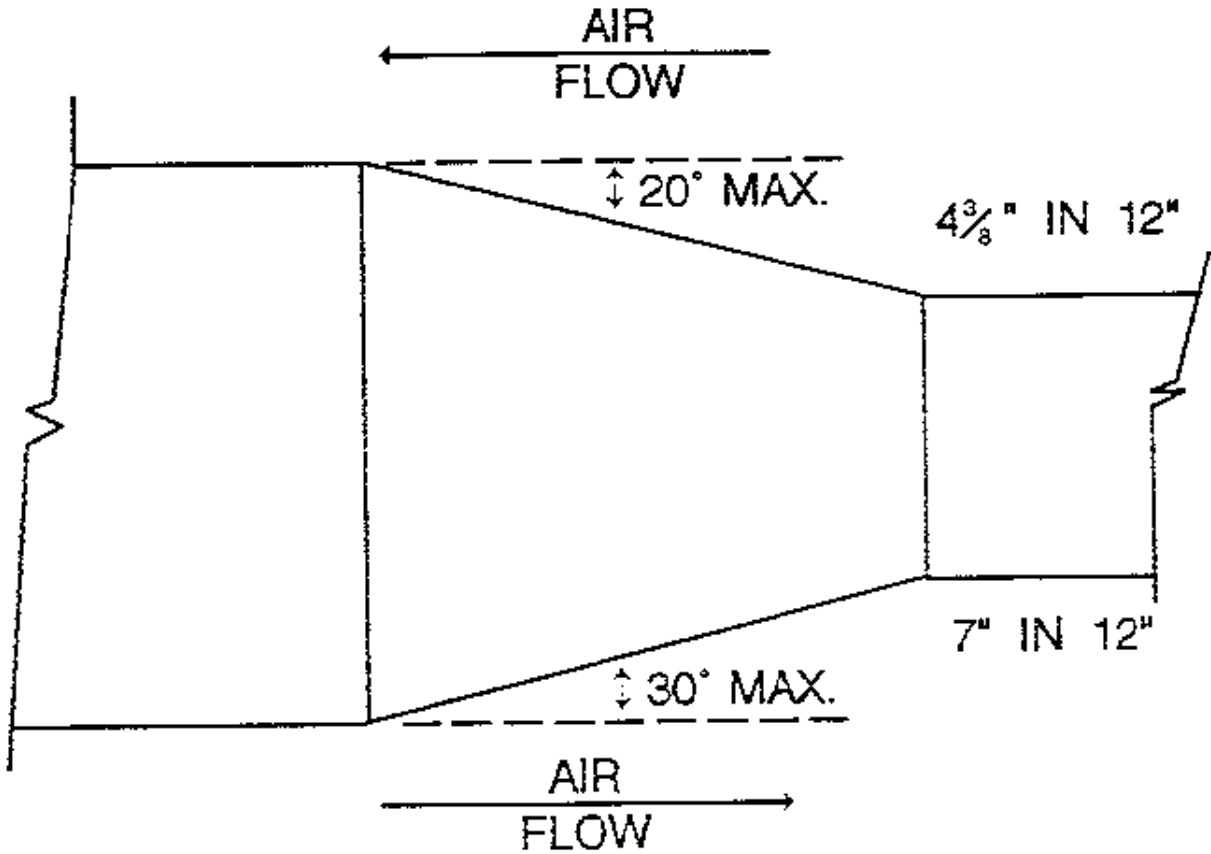
BUTTON-PUNCH SNAP-LOCK

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NOTES:

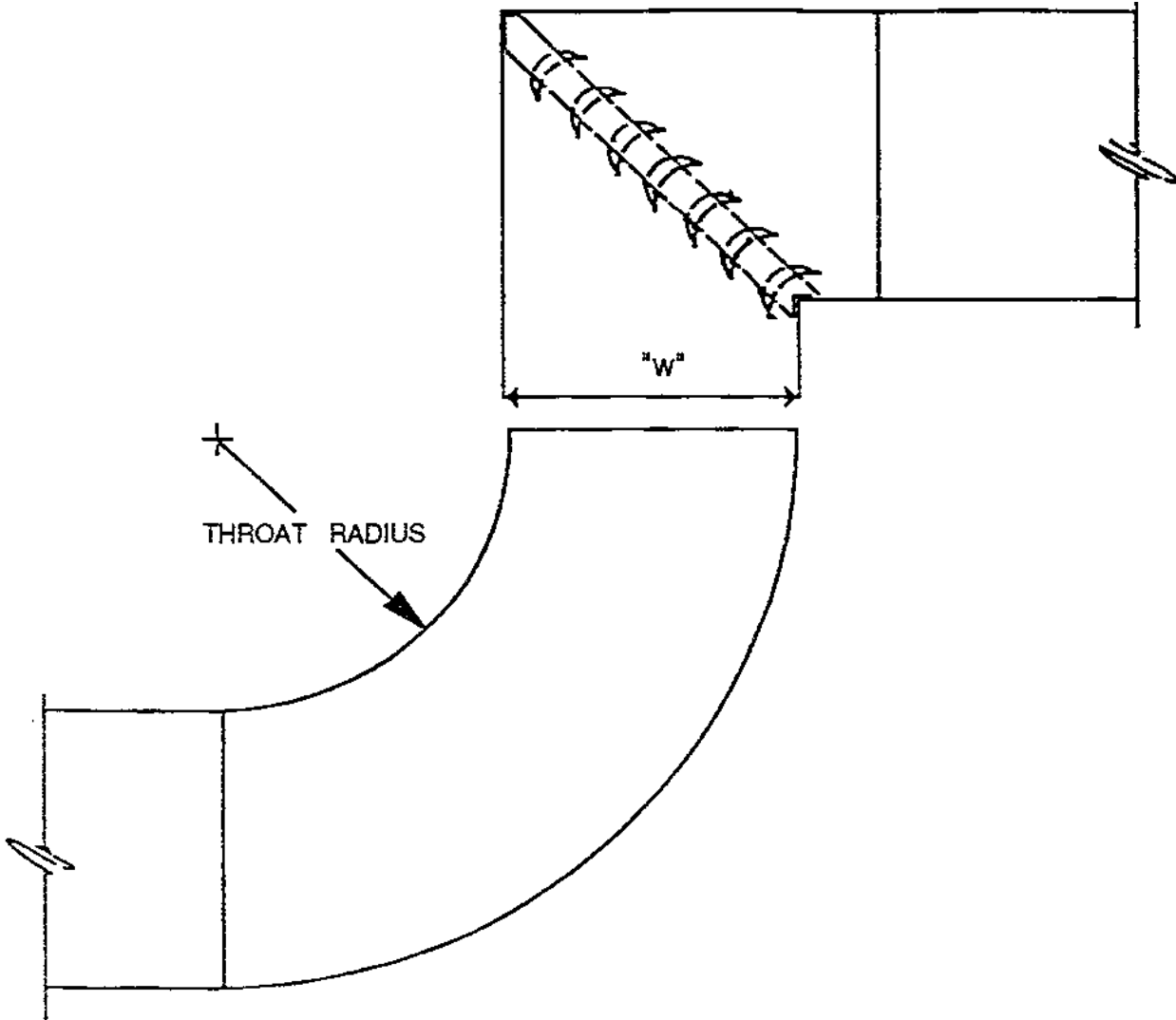
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## ELBOW CONSTRUCTION



### NOTES:

1. All square elbows will have turning vanes installed.
2. All radius elbows will have a throat-radius equal to "W".
3. Radius elbows will be used anywhere space permits.

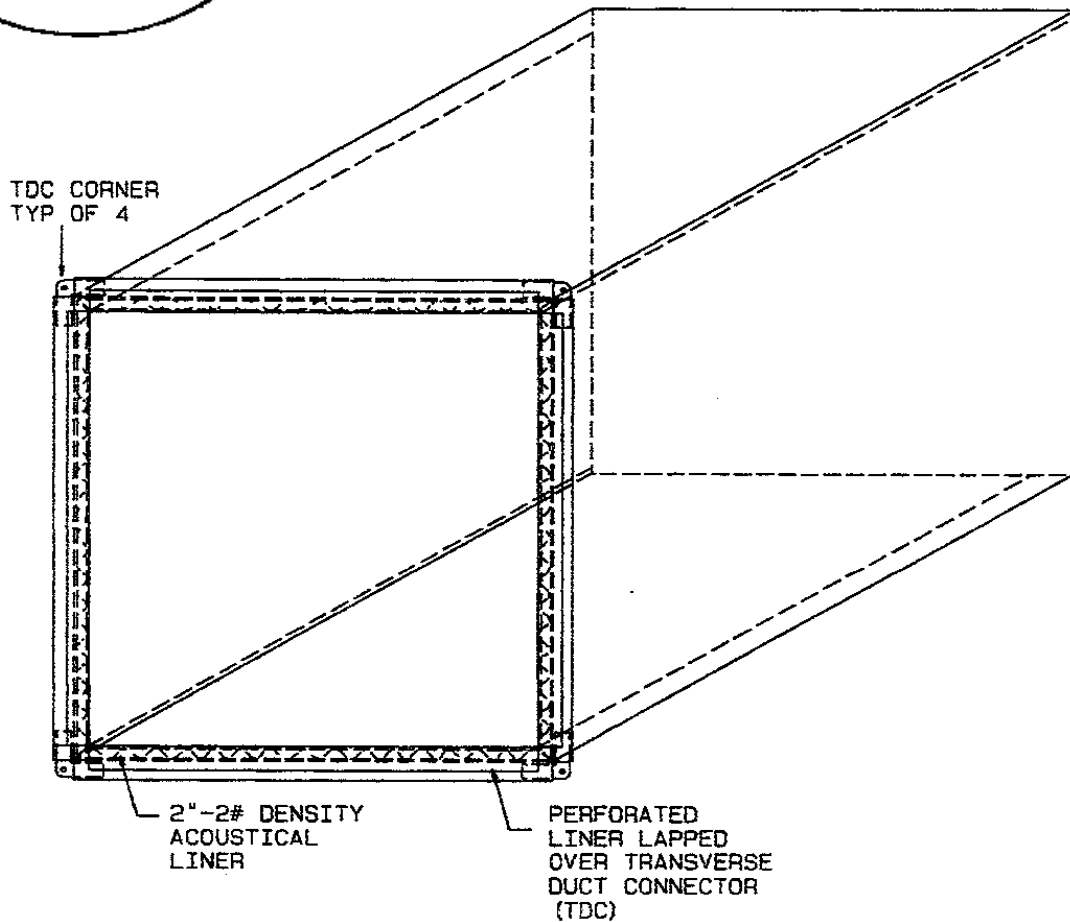
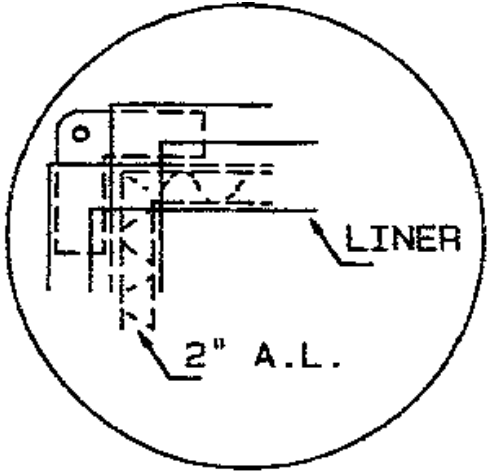
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## INTERIOR DUCT LINER (SOUND ABSORBERS)



REFERENCE SPECIFICATION SECTION 15895-2.4F

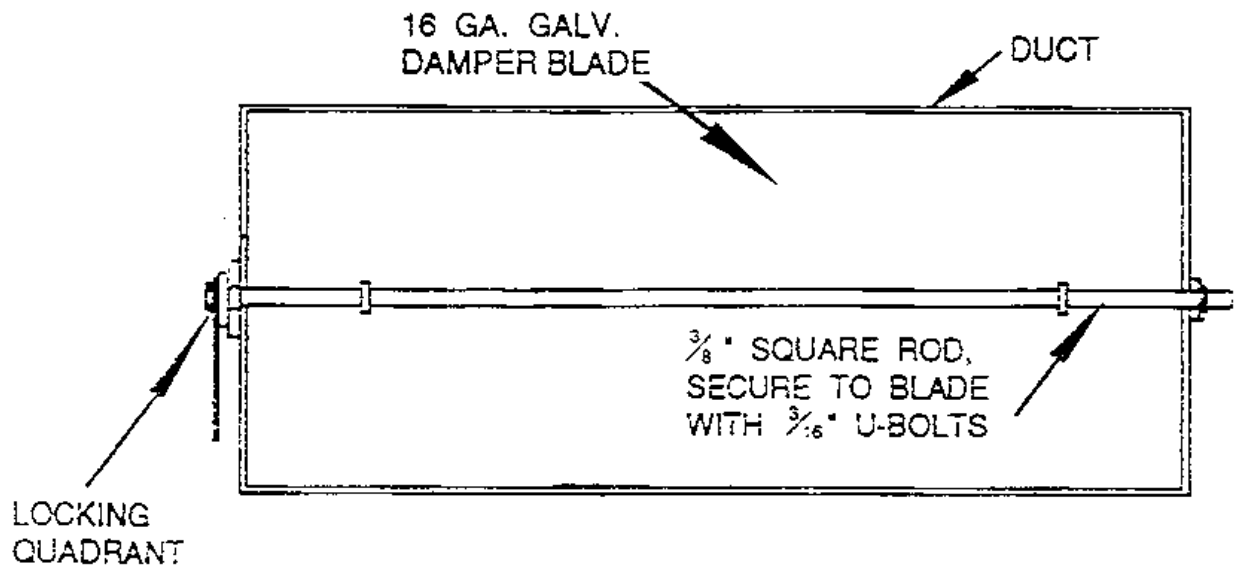
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## SINGLE-BLADE VOLUME DAMPER



### NOTES:

1. Over 12" High use multiple Blade Dampers.
2. Quadrant to be Ventfabric No. 635.



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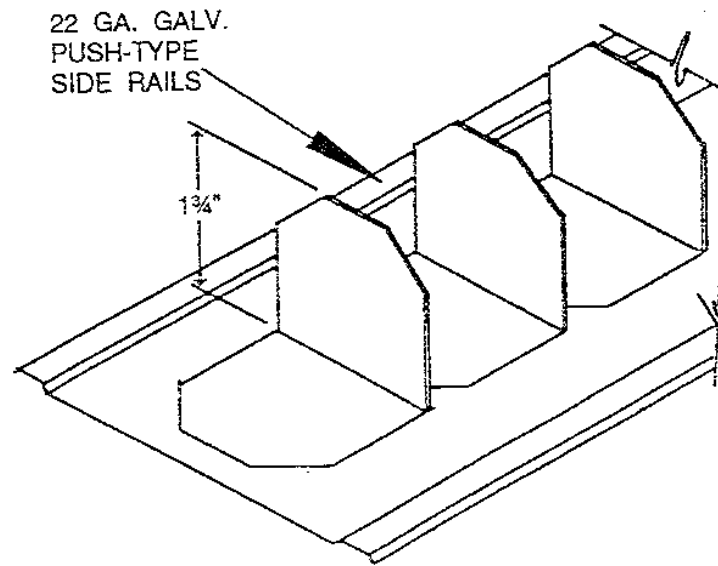
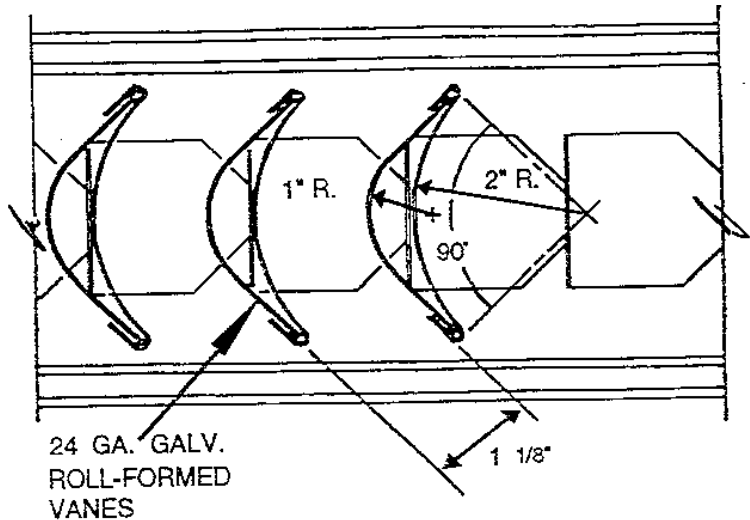
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### 2" ROLL-FORMED AIR TURNING VANES

Turning Vanes are non-adjustable 90° air turns designed to reduce the pressure loss in square duct elbows. The galvanized steel blades are double walled and formed to assure that any point on one blade is equidistant from the same point on an adjacent blade. This precise blade shape maintains constant duct area and assures constant air velocity around the ell, eliminates loss due to velocity changes and results in low friction loss. The blade is rigid and eliminates the need for cross bracing or reinforcing rods. Roll-formed from coils of sheet metal, surfaces and edges are smooth and free from edge friction and blade turbulence. Blades assemble over precision-formed tenons on the runners, which insures precise blade alignment, and proper spacing, and predictable engineering performance. The complete unit is screwed or riveted into the duct ell.

NOTE-TURNING VANES WILL BE TACK-WELDED TO RUNNERS FOR H.P. APPLICATIONS



TYPE OF ELL	DUCT VELOCITY IN FPM					
	500	1000	1500	2000	2500	3000
DUCTURNS	.01	.02	.04	.07	.11	.16
NO VANES	.02	.08	.19	.35	.52	.75

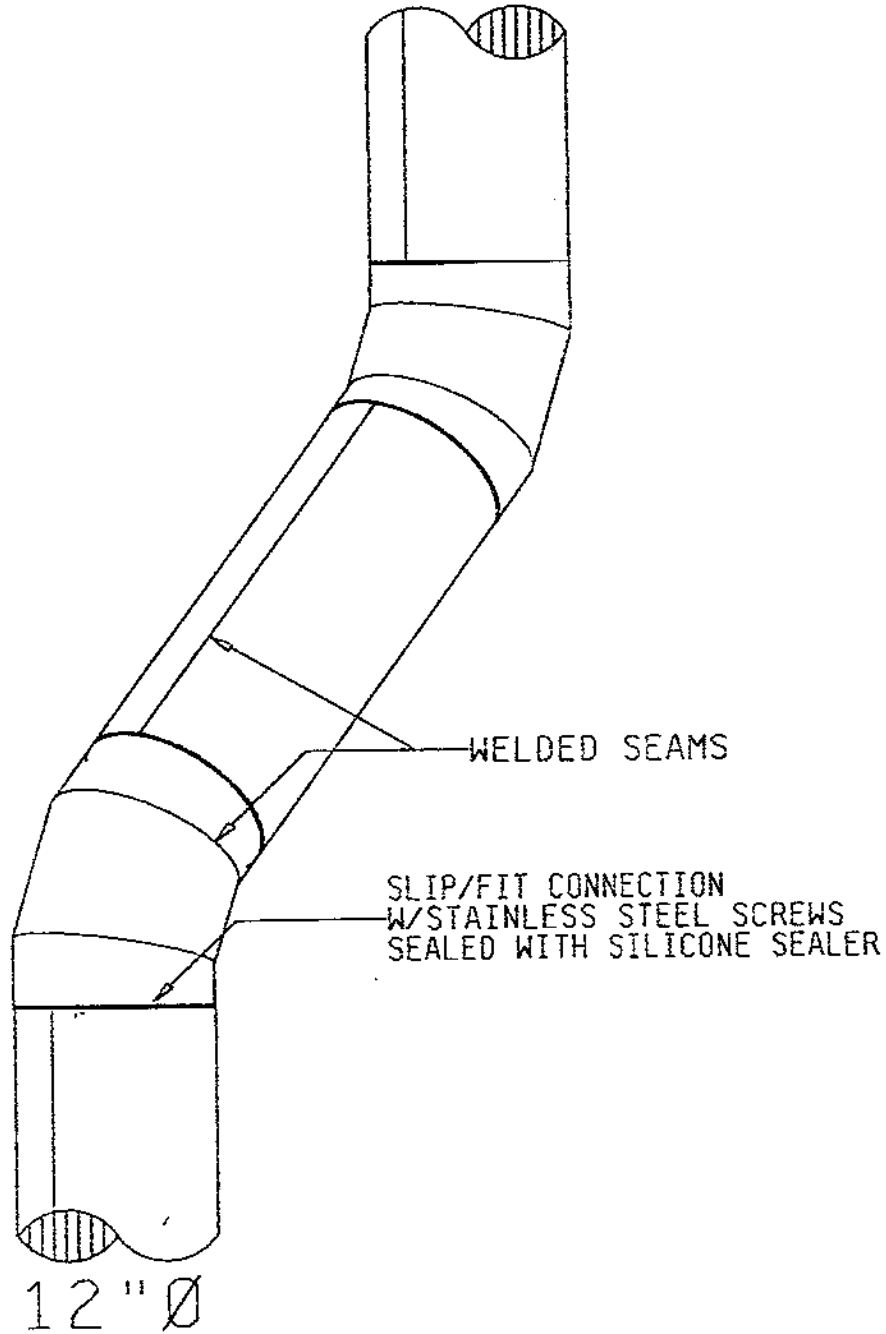
SUBURBAN SHEET METAL LTD

Mailing Address  
P.O. Box 739  
Kennedale, TX 76060

Physical Address  
528 S. Eden Rd.  
Kennedale, TX 76060

Phone (817)478-0801  
Fax (817)483-6571

SINGLE-BLADE VOLUME DAMPER



**SUBURBAN SHEET METAL LTD**

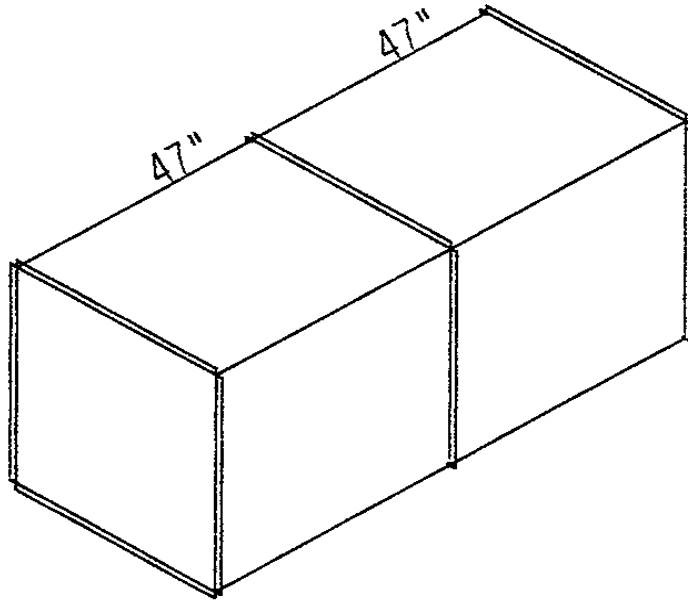
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Fax (817)483-6571

**18 GA WELDED STAINLESS STEEL DISHWASHER EXHAUST DUCT**

ALL SEAMS, JOINTS, AND  
PENETRATIONS TO HAVE  
CONTINUOUS EXTERNAL  
WELDS. (TYPICAL)

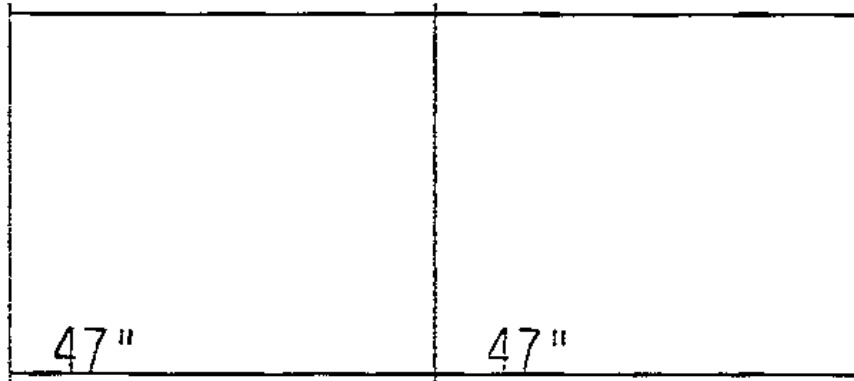
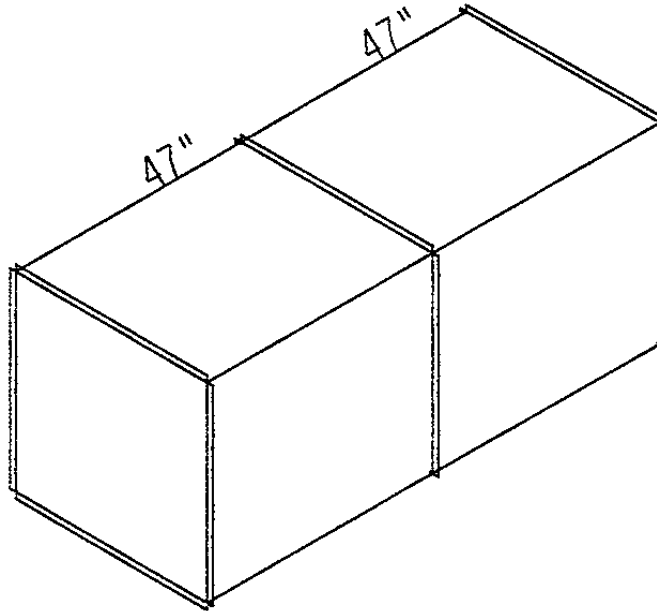


REFERENCE SPECIFICATION SECTION 15890

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Phone (817)478-0801 Fax (817)483-6571	

16 GA WELDED BLACK IRON KITCHEN EXHAUST DUCT

ALL SEAMS, JOINTS, AND PENETRATIONS TO HAVE CONTINUOUS EXTERNAL WELDS. (TYPICAL)



SLOPE TOWARDS EXHAUST CONNECTION

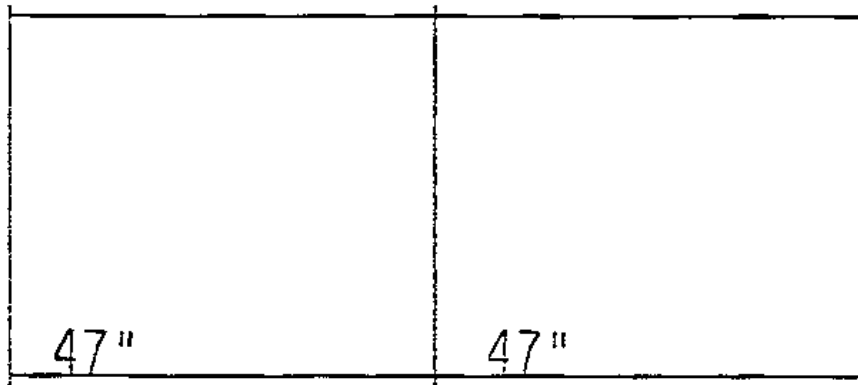
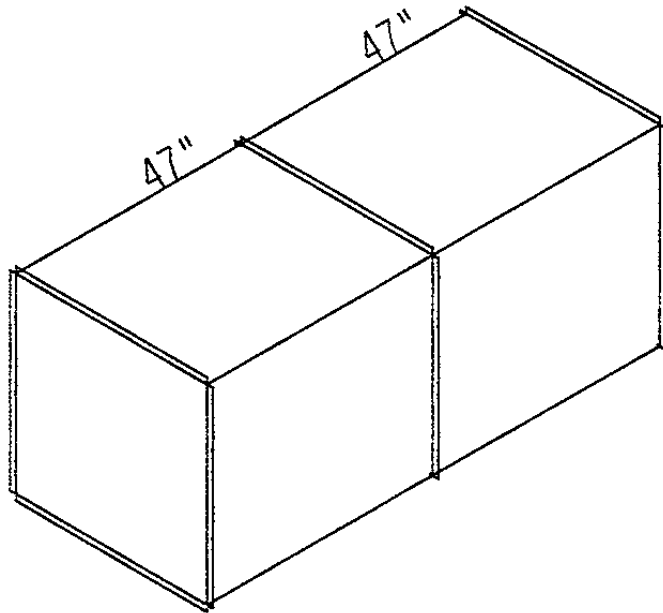


REFERENCE SPECIFICATION SECTION 15872

SUBURBAN SHEET METAL LTD	
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Phone (817)478-0801 Fax (817)483-6571	

16 GA WELDED STAINLESS STEEL KITCHEN & DISHWASHER DUCT

ALL SEAMS, JOINTS, AND PENETRATIONS TO HAVE CONTINUOUS EXTERNAL WELDS. (TYPICAL)



SLOPE TOWARDS EXHAUST CONNECTION



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## FLEXIBLE CONNECTIONS

### VENTGLAS®

VENTGLAS® is a heavy glass fabric, double coated with Neoprene. The fabric is non-combustible, and the coating fire-retardant. The fabric is absolutely waterproof and air-tight, and resistant to more acids, alkalis and to gasoline and grease.

**RECOMMENDED USES** - VENTGLAS®, because it is water-proof and air-tight, can be used in high pressure systems, and because of its resistance to most acids, alkalis, gasoline and grease, on fume hoods. In fact, it can be used satisfactorily in practically every type of installation except on induced draft fans and in connections exposed to the weather.

**APPROVALS** – Classified by UNDERWRITERS’ LABORATORIES, INC. as to flammability only. (Under new procedures adopted by UL, effective January 1972, products included in the Building Materials List are “classified” rather than “listed” to prevent erroneous impressions concerning characteristics of products or nature of tests conducted on them.) Registered with California State Fire Marshall. Approved by the City of Denver. Conforms with National Fire Protection Association Pamphlet 90A (1968), Paragraph 304, outlining standards for vibration isolation connectors in duct systems.

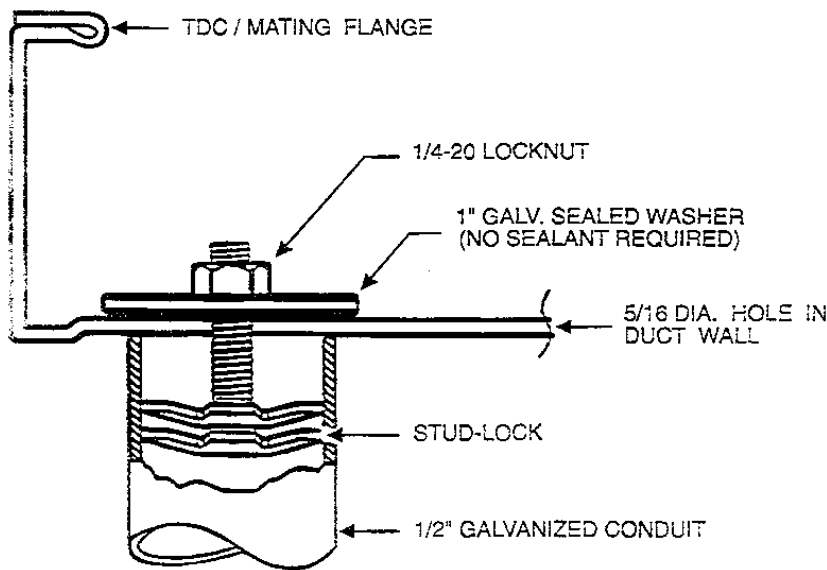
**SPECIFICATIONS** – *Weight*: Approximately 30 ounces per square yard. **Strength**: 540 pounds per square inch in the warp, 440 pounds per inch in the filling. *Fire-Resistance*: Basic fabric non-combustible, coating fire-retardant. Complies with UNDERWRITERS’ LABORATORIES Standard #214. *Heat-Resistance*: Will withstand 300° F, for short periods, 250°F, continuously. *Waterproof Qualities*: Will support a column of water 4 ½ “ in diameter and 48” high for 10 minutes with no leakage. *Mildew-Resistance*: Neoprene is not affected by mildew. *Chemical-Resistance*: Is resistance to most acids and alkalis, and to gasoline, oil, and grease.

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Phone (817)478-0801 Fax (817)483-6571	

## Labor Saving Tie Rod Construction Hardware

### New **STUD-LOCK®**

**New** **STUD-LOCK®** is the result of combining our field tested **Condu-Lock®** and a threaded stud. The one piece component will allow one person to reinforce duct without assistance. Once **STUD-LOCK®** is driven in, the threaded stud extended out of each of conduit, will allow the installer to easily find pre-drilled holes in both insulated and non-insulated duct.



Once in place, **STUD-LOCK®** keeps the conduit in place for fastening the sealed washer and locknut outside the duct wall.



SOLD IN SETS  
TO ORDER CALL  
1-800-231-8040 FAX 301-475-1665  
E-mail: PPINC@EROLS.COM

# SUBURBAN SHEET METAL LTD

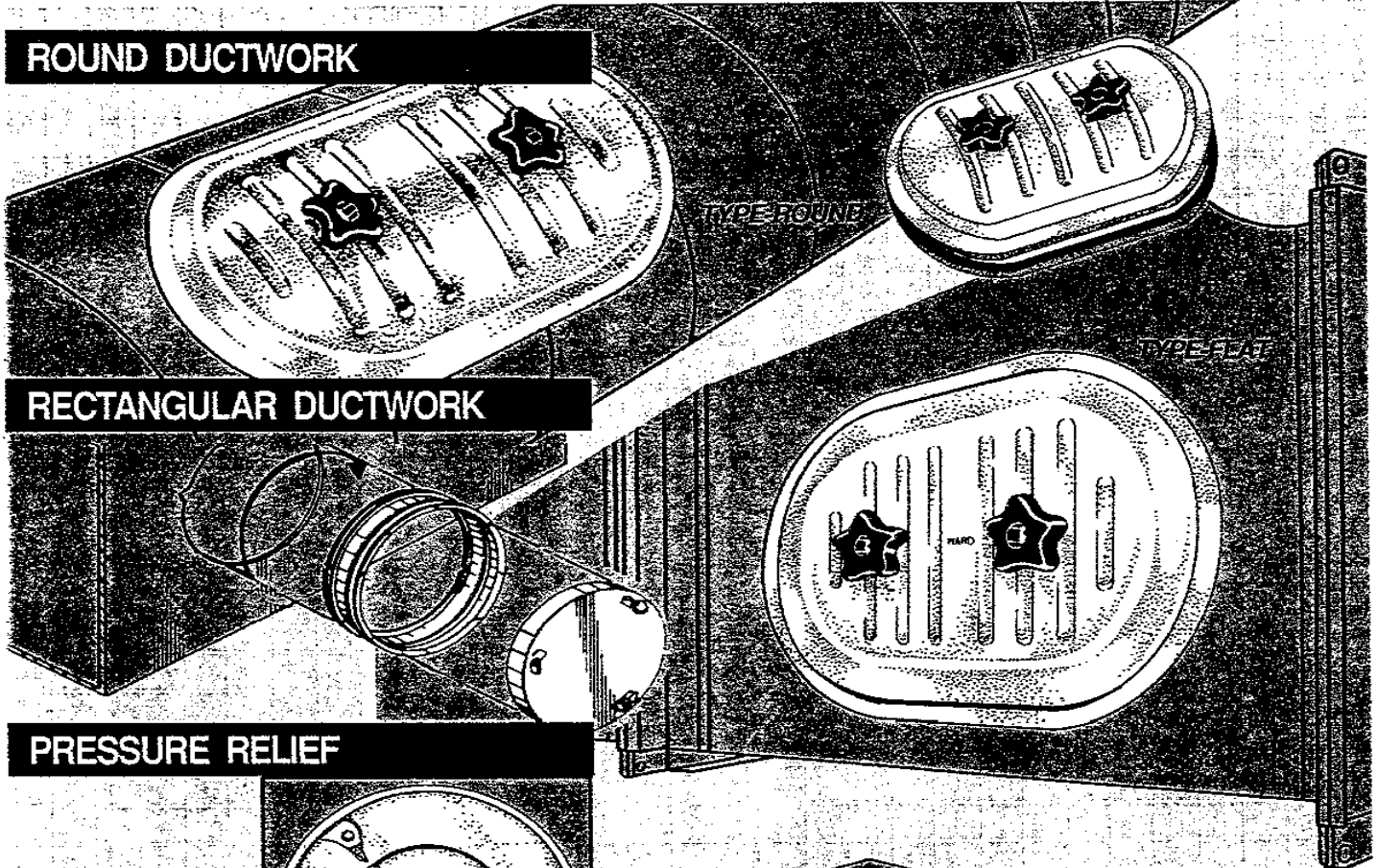
Mailing Address  
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528 S. Eden Rd.  
Kennedale, TX 76060

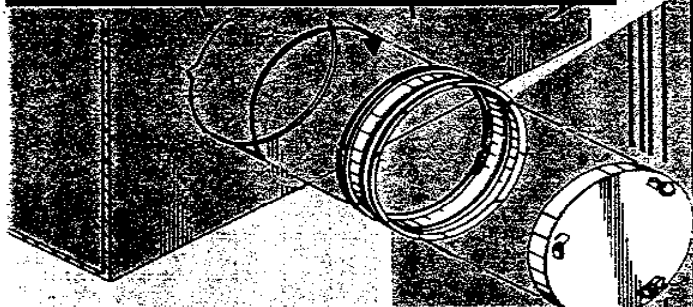
Phone (817)478-0801  
Fax (817)483-6571

## **WARD** ACCESS DOORS FOR... INDUSTRIES, INC.

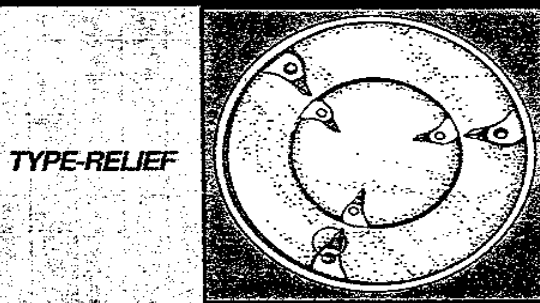
### ROUND DUCTWORK



### RECTANGULAR DUCTWORK

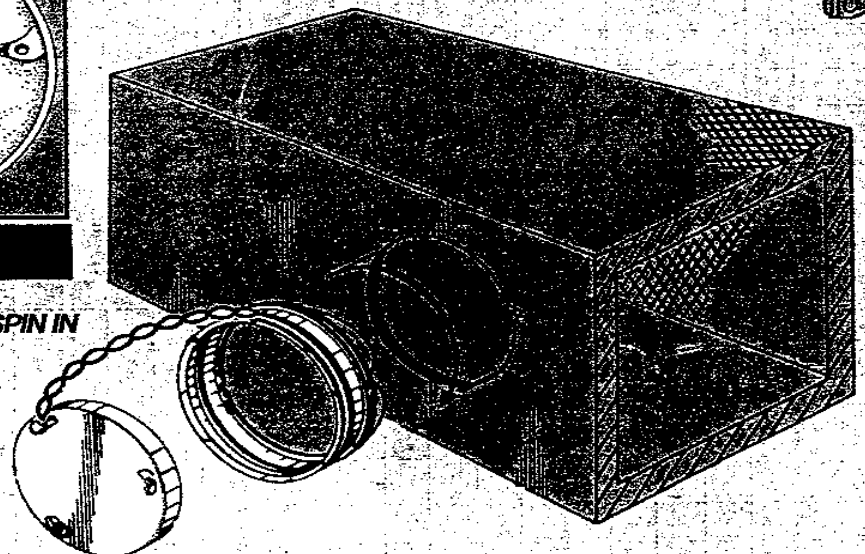


### PRESSURE RELIEF



### FIBERGLASS DUCT BOARD

TYPE-SPIN IN





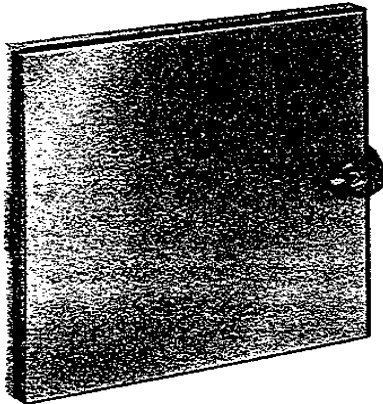
<b>SUBURBAN SHEET METAL LTD</b>	
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Phone (817)478-0801 Fax (817)483-6571	



FOR "LOW PRESSURE" APPLICATIONS

# FROM VENTFABRICS

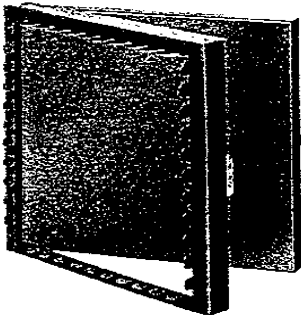
## GALVANIZED SHEET METAL ACCESS DOORS



HINGED DOOR

Ventfabrics takes pride in introducing our new line of galvanized sheet metal access doors. These 1" thick fiber-glass (75 lb. density), insulated doors are of double wall construction and double gasketed.

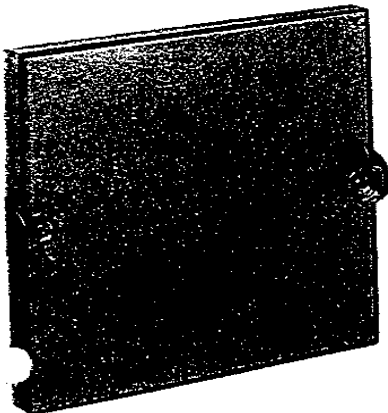
The doors are available for immediate shipment from stock in two styles.



REAR VIEW

1. Hinged Door — Equipped with a zinc-plated continuous hinge and one or two zinc-plated cam latches.
2. Sash Door — (not hinged). Equipped with two or four zinc-plated cam latches.

These are union labeled doors that comply with SMACNA's low pressure duct standards. The door frames are made with 22 ga. galvanized steel and the door panels from 24 ga. steel. Special sizes and types can be furnished on request including walk-in doors.



SASH DOOR

#### DIMENSIONS

6" x 6"	.....
8" x 8"	.....
10" x 10"	.....
12" x 12"	.....
14" x 14"	.....
16" x 16"	.....
18" x 18"	.....
20" x 20"	.....
24" x 24"	.....

Sizes 6"x6" through 12"x12" packed 10 per carton, 14"x14" and above packed 5 per carton. No minimum required.

**DOORS TO BE STENCILED WITH DAMPER IDENTIFICATION**

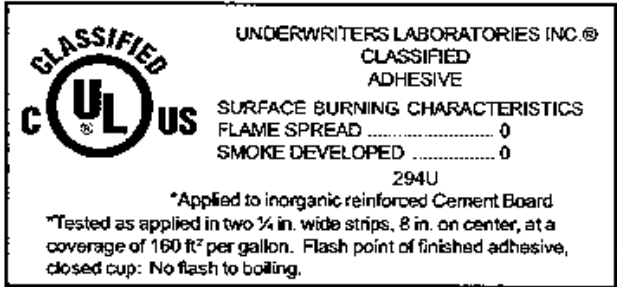


**5520 N. LYNCH AVE. • CHICAGO, IL 60630-148**  
**(800) 621-1207 • (312) 775-4477 • FAX (312) 775-506**

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Phone (817)478-0801 Fax (817)483-6571	

## Dyn-O-Seal II™ Indoor/Outdoor water based duct sealant

Dyn-O-Seal II™ is an **all purpose industrial grade duct sealant** for all types of metal duct, glass fiber duct board, and flex duct, as well as duct fabric and flexible tubing runouts. Dyn-O-Seal II™ includes UV inhibitors for **extended outdoor exposure** and built-in **fiber reinforcement** for **exceptional strength**. This *non-toxic* water based product is solvent free and is suitable for residential use.

TECHNICAL DATA	
Color .....	Gray
Consistency .....	Smooth creamy texture
Base .....	Fiber reinforced resins
Solvent .....	Water Based
Weight per Gallon .....	10.4 lbs.
Solids Content .....	64%
Viscosity .....	Thixotropic
Coverage (per gal) .....	Up to 320 lin. ft. at 3" width 20 mil thickness.
Shore A Hardness .....	>20
Flexibility .....	Passes ¼ inch mandrel bend
Time to Test .....	48 hours*
Service Temperature .....	-20°F to 200°F (-20°C to 94°C)
Weather Resistance .....	Weather resistant
Mildew Resistance .....	Mold & Mildew Resistance
VOC .....	< 20 GPL
Pressure Classes .....	SMACNA ½, 1, 2, 3, 4, 6 and 10 inches w.g.
Seal Classes .....	SMACNA A, B, C
Packaging .....	1/12 US gal. cartridge 1 US gal. pail (3.78 Ltr.), 2 US gal. pail (7.56 Ltr.), 5 US gal. pail (18.9 Ltr.)
Freeze/Throw Stability .....	Passes 5 Cycles
Specifications	
Compliance ...	Passes ASTM C731, ASTM C732, ASTM 02202
	
* May vary according to temperature and functionality	
<ul style="list-style-type: none"> <li>• <b>INDUSTRIAL GRADE USE</b></li> <li>• <b>INDOOR/OUTDOOR</b></li> <li>• <b>FIBER REINFORCEMENT</b></li> <li>• <b>NON SAG FORMULATION</b></li> <li>• <b>PROVEN RELIABILITY</b></li> <li>• <b>SUITABLE FOR RESIDENTIAL USE</b></li> </ul>	
APPLICATION	
<i>Apply to outer surface of duct joint only</i>	
Temperature .....	35°F to 110°F (12°C to 44°C)
Method .....	Brush, putty knife, caulk gun, Pump
Preparation .....	Surface must be dry, dirt, oil, and grease free.
Rate .....	Apply at joints and fasteners to 20 mil thick wet film <b>after duct work is installed</b>
Clean Up Wet .....	Soap and water
Clean Up Dry .....	CG-658 or Solvent. (Use safe Handling practices.)
Painting .....	Only latex or epoxy paints
STORAGE	
Temperature .....	35°F to 110°F (12°C to 44°C)
Shelf Life .....	One year (unopened)
Flammability .....	Non-flammable



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Phone (817)478-0801 Fax (817)483-6571	

**PRECAUTIONS**

**Surface must be clean and free of moisture, contamination and foreign matter. Do not allow this product to freeze. Do not apply this when rain or freezing temperatures will occur within 36 hours. Do not apply this product where temperatures will exceed 200°F. Keep out of the reach of children. Review MSDS for complete safety information prior to use. DO NOT use where acidic or alkaline chemicals are present (ie. lab fume hood, vents, etc.)**

**For Industrial Professional Use Only.**

Printed in U.S.A.      02/01 supercedes 07/00      ©The Carlisle Corporation

DynAir Inc.  
2100 Rememberance  
Lachine (Quebec) H8S 1X3  
**Phone: (514) 639-1616**  
**Fax: (514) 639-5252**

Carlisle Coatings &  
Waterproofing Incorporated  
P.O. Box 1239  
Wylie, Texas 75098  
**Phone: (800) 527-7092**  
**Fax: (800) 285-7430**

# SUBURBAN SHEET METAL LTD

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Physical Address  
528 S. Eden Rd.  
Kennedale, TX 76060

Phone (817)478-0801  
Fax (817)483-6571

PRODUCT  
DATA

# Miracle®



## PF 96, PF 97 Duct Liner Adhesives Spray Grade/Flammable

PF 96, PF 97 is designed for application by spray equipment when BONDING LOW DENSITY FIBERGLASS INSULATION to the interior and exterior of all types of painted or unpainted metal duct work. PF 96, PF 97 offers fast tacking and excellent sprayability without cob webbing.

**COLORS:** Red or black

**ODOR:** Mild when wet. None when dry.

**BASE:** Synthetic elastomer.

**VOLATILE MATERIAL:** Aliphatic hydrocarbon.

**DENSITY:** 6.3 ± 0.5 lbs./gal.

**SOLIDS CONTENT:** 33% ± 2%

**VISCOSITY:** 1,800 – 3,000 CPS (Brookfield)

**COVERAGE:** 450-600 sq. ft./gal.

**APPLICATION TEMPERATURE RANGE:**  
30°F to 110°F.

**SERVICE TEMPERATURE RANGE:**  
-20°F to 200°F.

**BONDING RANGE:** Immediate to 5 minutes

**STORAGE:** Store between 60°F & 90°F.

**SHELF LIFE:** One year in unopened container.

**CLEANUP:** Mineral spirits

**ASTM C-916:** Meets type IV criteria for insulation adhesives.

**PHYSICAL AND CHEMICAL RESISTANCE:**  
Excellent resistance to moisture and aging.

**PRECAUTIONS:** Danger! Extremely flammable! Keep away from sparks and open flame. Avoid prolonged breathing of vapors. Use only in well ventilated areas.

**APPLICATION SUGGESTIONS:** Spray, brush or roll coat to the metal surface. Embed into wet adhesive duct liner fiberglass.

### UNDERWRITERS LABORATORIES INC.

Classified: Caulkings and Sealants R-6891  
Surface Burning Characteristic Applied To:  
Inorganic Reinforced Cement Board  
Flame Spread 5  
Smoke Developed 0

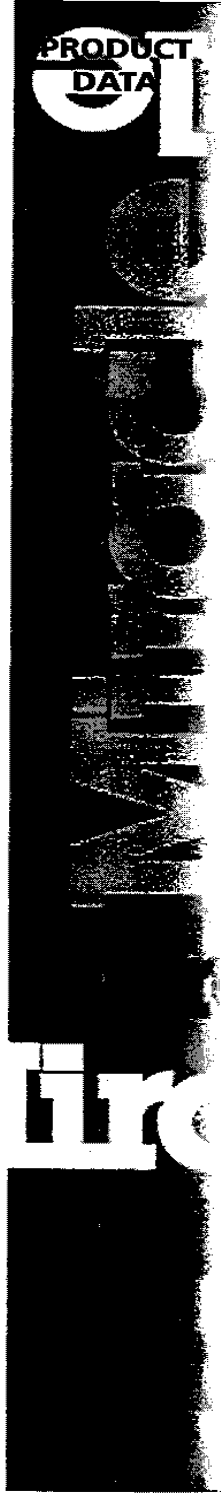
Tested as applied at a coverage of 500 sq. ft. per gallon. Flash point of finished adhesive (closed cup), less than -20°F.



### MEETS REQUIREMENTS OF NFPA 90A AND 90B

**NOTICE TO PURCHASER:**  
Please see the product label for important limited warranty information.

Revision date 08/02



## ITW TACC

56 Air Station Industrial Park  
Rockland, MA 02370

Phone 1-800-503-6991 Fax 1-800-231-8222  
www.itwtacc.com info@itwtacc.com

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## Air Handling Systems

### Permacote® Linacoustic® Standard/HP *Fiber Glass Duct Liners*

#### Description

Permacote Linacoustic Standard and HP are flexible duct liner insulations made from strong, glass fibers bonded with a thermosetting resin. The airstream surface is protected with Permacote®, a state-of-the-art acrylic surface coating system.

#### Factory-Applied Edge Coating\*

Edge coating is factory applied to the edges of the liner core, assuring coverage of the leading edges per NAIMA/SMACNA requirements. Shop fabrication cuts may be coated with the SuperSeal® Duct Butter and Edge Treatment products (refer to publication AHS-202).

#### Uses

Permacote Linacoustic Standard and HP are specifically designed for lining sheet metal ducts in air conditioning, heating and ventilating systems. The exclusive Permacote II coating system offers exceptional durability in exposure to air velocity, as well as superior acoustical and thermal performance in systems operating at velocities up to 6,000 fpm (30.5 m/sec) and operating temperatures up to 250°F (121°C).

**Permacote Linacoustic HP** offers more performance per inch of thickness than other liners, making it a clear choice for special performance specifications.

#### Advantages

**Improves Indoor Building Environment.** Permacote Linacoustic improves indoor environmental quality by helping to control both temperature and sound.

**Withstands High Velocity.** Permacote Linacoustic products have been tested to the recommended maximum velocity of 6,000 fpm (30.5 m/sec). Fiber erosion test results were determined using the Isokinetic Sampling Method described in JM Fiber Erosion Testing Fact Sheet HSE-133FS.

**Absorbs Disturbing Sound.** Permacote Linacoustic has exceptional sound-absorbing properties far exceeding the requirements of ASTM C 1071. Duct-transmitted noise, such as crosstalk and sound energy from air movement and mechanical equipment is noticeably reduced.

**Conserves Energy.** The unique glass fiberization process used in the manufacture of Permacote Linacoustic provides very good thermal properties.

**Resistant to Dust and Dirt.** The tough, acrylic polymer Permacote coating helps guard against the incursion of dust or dirt into the substrate, minimizing the potential for biological growth.

**Will Not Support Microbial Growth.** Permacote coating is formulated with a protective agent to protect the coating against potential growth of fungus and bacteria. The protective agent is EPA registered for use in HVAC applications, and designed to last the life of the system.

Permacote Linacoustic duct liner meets all requirements of ASTM C 1071 for fungi and bacterial resistance. Tests were conducted in accordance with ASTM C 1338 and ASTM G 21 (fungi testing) and ASTM G 22 (bacteria resistance testing). Detailed information is available in Johns Manville fact sheet HSE-103FS.



**Operating Temperature Limit:** 250°F (121°C)

**Note:** As with any type of surface, microbial growth may occur in accumulated duct system dirt, given certain conditions. This risk is minimized with proper design, filtration, maintenance and operation of the HVAC system.

**Cleanability.** If HVAC system cleaning is required, the Permacote airstream surface may be cleaned with industry-recognized dry methods. See the North American Insulation Manufacturers Association (NAIMA) "Cleaning Fibrous Glass Insulated Air Duct Systems."

**Minimizes Pre-Installation Damage.** The Permacote II coating system has more than twice the toughness of the original Permacote. It effectively doubles the resistance to damage that can occur from in-shop handling, fabrication, jobsite shipping, and installation.

**Increased Resistance to Water.** The Permacote airstream coating resists penetration of incidental water into the fiber glass wool core.

**Easy to Fabricate.** Permacote Linacoustic is light in weight and easy to handle. Clean, even edges can be accurately cut with regular shop tools.

#### Available Forms

Permacote Linacoustic Standard		Permacote Linacoustic HP	
Thickness	(in) (mm)	(in) (mm)	(in) (mm)
	1/2 13	1 25	
	1 25		
	1 1/2 38		
	2 51		
Roll Width*	(in) (mm)	(in) (mm)	(in) (mm)
	34 to 36 864 to 914	34 to 36 864 to 914	
	44 to 48 1118 to 1219	44 to 48 1118 to 1219	
	56 to 60 1422 to 1524	56 to 60 1422 to 1524	
	66 to 72 1676 to 1829	66 to 72 1676 to 1829	
Roll Length**	(lineal feet) (lineal meters)	(lineal feet) (lineal meters)	(lineal feet) (lineal meters)
	50 15	100 30.5	
	100 31		
	150 46		
	200 61		

\*Available in 1/4" (6.4 mm) increments. \*\*Check with plant for availability.

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## Specification Data

### Fiber Glass Duct Liners

#### Thermal Performance

Thickness (in)	(mm)	R-Value (hr·ft <sup>2</sup> ·°F)/Btu	m <sup>2</sup> ·°C/W	Conductance Btu/(hr·ft <sup>2</sup> ·°F)	W/m <sup>2</sup> ·°C
<b>Permacote Linacoustic Standard</b>					
1/2	13	2.2	0.38	.46	2.61
1	25	4.2	0.74	.24	1.36
1 1/2	38	6.3	1.11	.16	0.91
2	51	8.0	1.41	.13	0.74
<b>Permacote Linacoustic HP</b>					
1	25	4.3	0.77	.23	1.31

R-Value and Conductance are calculated from the material thermal conductivity tested in accordance with ASTM C 518 at 75°F (24°C) mean temperature.

#### ISO 9000 Certification

Johns Manville mechanical insulation products are designed, manufactured and tested in our own facilities, which are certified and registered to stringent ISO 9000 (ANSI/ASQC 90) series quality standards. This certification, along with regular, independent third-party auditing for compliance, is your assurance that Johns Manville products deliver consistent high quality.

#### Sound Absorption Coefficients (Type "A" Mounting)

Thickness (in)	(mm)	Sound Absorption Coefficient at Frequency (Cycles per Second) of						
		125	250	500	1000	2000	4000	NRC
<b>Permacote Linacoustic Standard</b>								
1/2	13	.03	.21	0.45	0.72	0.87	0.94	0.55
1	25	.09	.31	0.67	0.91	1.01	0.98	0.70
1 1/2	38	.21	.53	0.90	1.03	1.01	1.00	0.85
2	51	.20	.57	1.02	1.03	1.02	1.03	0.90
<b>Permacote Linacoustic HP</b>								
1	25	.04	.24	0.69	0.96	1.05	1.01	0.75

Coefficients were tested in accordance with Test Method ASTM C 423-90 and ASTM E 795.

#### Surface Burning Characteristics

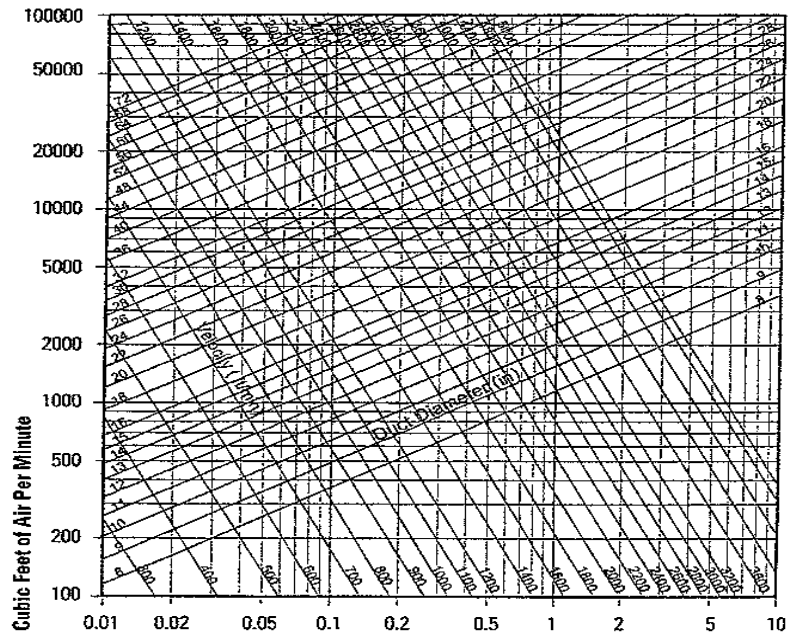
Flame Spread not over 25  
Smoke Developed not over 50

Per UL 723, ASTM E 84 and CAN/ULC S102-M88 test methods. If UL labels are required, they may be requested at time of order.

#### Specification Compliance

- ASTM C 1071, Type I, Flexible (Replaced HH-I-545B and NAIMA AHC 101)
- ASTM G 21 and G 22
- California Title 24
- SMACNA Application Standards for Duct Liners
- NAIMA Fibrous Glass Duct Liner Installation Standard
- NFPA 90A and 90B, FHC 25/50 and Limited Combustibility
- Conforms to ASHRAE 62-89
- NYC MEA 353-93-M
- State of Washington Building Services Department requirements for emissions of total volatile organic compounds (TVOC) and formaldehyde (CHOH) in accordance with ASTM D 5116-90
- Canada: CGSB 51-GP-11M  
CAN/ULC S102-M88

#### Permacote Linacoustic Friction of Air in Straight Duct\*



#### Friction Loss in Inches of Water Per 100 Feet

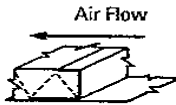
\* Permacote Linacoustic Standard and HP Liner air flow properties were tested with the material applied to galvanized sheet metal duct with mechanical fasteners in accordance to the SMACNA "Duct Liner Application Standard".

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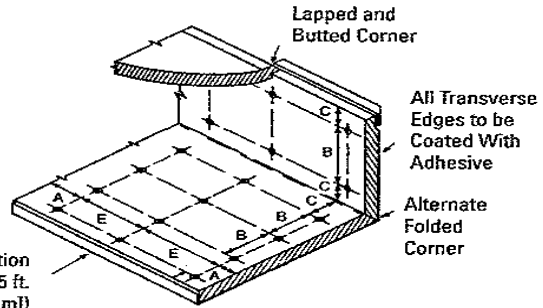
## Permacote® Linacoustic® Standard/HP Fiber Glass Duct Liners

### Duct Liner Installation

When velocity exceeds 4000 fpm (20.3 m/sec), use metal nosing on every leading edge. Nosing may be formed on duct or be channel or zee attached by screws, rivets or welds. A metal nosing shall also be installed at the fan discharge and at any point where lined duct is preceded by unlined duct.



The velocity-rated side of liner must face the air flow



Duct Section  
(Typically 4 ft. or 5 ft.  
[1.22 m or 1.52 m])

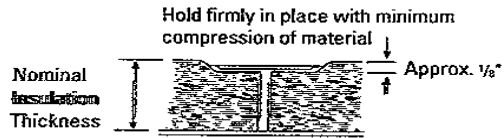
Liner adhered to the duct with 90% min. area coverage of adhesive. Adhesive shall conform to ASTM C 916.

Shop or field cuts shall be liberally coated with SuperSeal® Edge Treatment or approved adhesive.

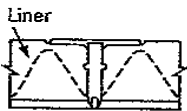
Maximum spacing for fasteners. Actual intervals are approximate.

Velocity*	Dimensions			
	A (in) (mm)	B (in) (mm)	C (in) (mm)	E (in) (mm)
0-2500 fpm (0-12.7 m/sec)	3 76	12 305	4 102	18 457
2501-6000 fpm (12.7-30.5 m/sec)	3 76	6 152	4 102	16 406

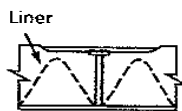
\*Unless a lower level is set by the listing agency.



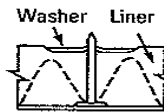
### Liner Fasteners



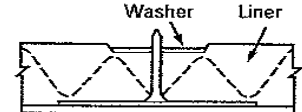
Type 1  
Clinched Pin: Integral  
Head-Impact Applied



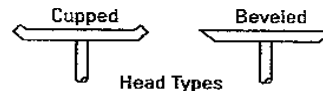
Type 2  
Welded Pin: Integral Head



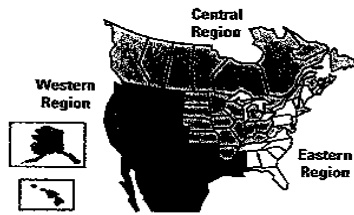
Type 3  
Washed Pin: Press-On Head



Type 4  
Adhered Pin: Press-On Head



Head Types



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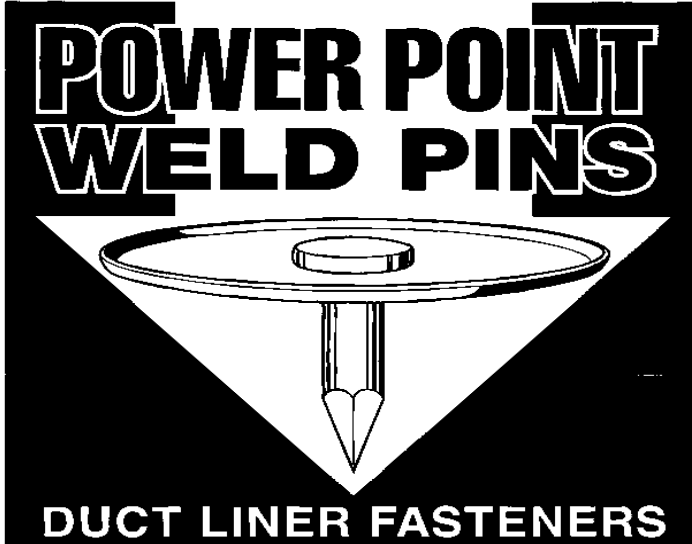


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## BETTER BY DESIGN...

### BEVELED EDGE CAP

Prevents tearing of duct liner

### FASTER WELDS

Forged diamond point design creates more electrical resistance for faster welds

### SUPER SHARP POINT

22 degree point is the sharpest in the industry and cleanly pierces the toughest duct liner

### BETTER PLATING

Zinc and Chromate plating exceeds SMACNA standards and gives a more professional appearance

### REDUCED DOWN TIME

Consistent point quality reduces frequency of machine adjustments

### MORE CONSISTENT FEEDING

Precise assembly of shanks and caps along with a smoother plating reduces feeding problems in tracks of automatic equipment

### STRONGER WELDS

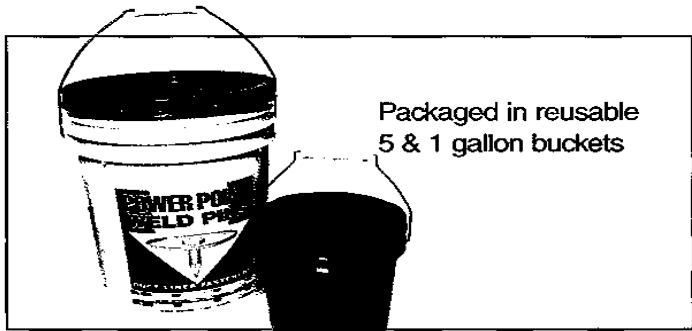
Hardened steel point assures positive electrical contact for complete sheet to pin fusion

### APPLIED WITH STANDARD EQUIPMENT

Easily applied with most standard hand held or hopper fed resistance welders

### MANUFACTURED WITH PRIDE IN THE USA

To the highest possible quality control standards



### ORDERING INFORMATION

PRODUCT NUMBER	RECOMMENDED FOR	PACKAGING
#057	1/2" All Densities	Bulk or Standard
#107	1" 1 1/2 lb.	Bulk or Standard
#127	1" 3 lb.	Bulk or Standard
#137	1-1/2" All Densities	Bulk (2,500 pcs. per bucket)
#157	2" 1 1/2 & 2 lb.	Bulk (2,500 pcs. per bucket)
#207	2" 3 lb.	Bulk (2,500 pcs. per bucket)

### PACKAGING INFORMATION

**Bulk** packaging is 5,000 pieces per 5 gallon bucket. (except as noted)

**Standard** packaging is 1,000 pieces per 1 gallon bucket. (4 buckets per carton)



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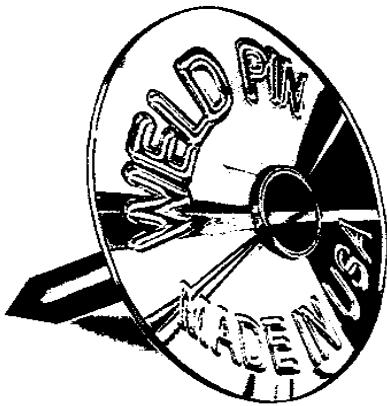
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## Power Point Weld Pins Specification Data For Architects and Engineers

### PRODUCT DESCRIPTION

Power Point weld pins permanently attach insulation to galvanized steel in the fabrication of ductwork.



Power Point weld pins withstand a tensile pull of at least 120 pounds in sheet metal and can be used in conjunction with adhesives on any galvanized sheet metal with lockforming qualities of 26 gauge and heavier.

#### Composition and materials

The fastener head, shank and point are manufactured from a special carbon alloy steel. A 1" diameter retaining cap fabricated from cold rolled steel is mechanically affixed to the driven end of the fastener.

#### Industry standards

Power Point weld pins meet and exceed the latest SMACNA (Sheet Metal and Air Conditioning Contractors National Association) standards, published in their HVAC DUCT CONSTRUCTION STANDARDS 1995, for low and high velocity ductwork. They are used by leading air-conditioning, sheet metal and mechanical contractors for ductwork in commercial buildings.

#### Technical services

Engineering and technical services are available through manufacturer upon request.

### TECHNICAL DATA

**CORROSION RESISTANCE:** Power Point weld pins are plated with .0002" to .0003" of zinc and receive a final chromate dip. This plating exceeds current SMACNA standards for corrosion resistance.

**RETAINING CAP:** The beveled edge retaining cap is sufficient in size and design to depress the surface of the insulation without tearing or cutting it. The cap does not protrude into the air stream to create noise or interfere with air movement in the duct.

**TEMPERATURE RANGE:** Power Point weld pins function properly over normally accepted operating range of temperatures of 32 degrees F to 250 degrees F and are not adversely affected at temperatures of 0 degrees F to 550 degrees F.

**VIBRATIONS:** Power Point weld pins will not fatigue or be physically affected by vibrations normally found in high velocity air handling system.

**ENVIRONMENTALLY SAFE:** When used as intended, Power Points are non-toxic and safe as defined by current Federal Standards.

Safety glasses must be worn when applying fasteners at all times.

#### POWER POINT SIZES:

Approximate Pin Lengths from point to underside of cap

Weld Pin Part #	Length Before Weld	Recommended For: Insulation Thickness & Density	
#57	0.501"	1/2"	All Densities
#107	0.695"	1"	1 1/2 lb.
#127	0.936"	1"	3 lb.
#137	1.118"	1-1/2"	All Densities
#157	1.490"	2"	1 1/2 & 2 lb.
#207	1.916"	2"	3 lb.

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## ROUND, OVAL, AND FLEXIBLE DUCT

### 3.1 ROUND DUCT CONSTRUCTION STANDARDS

Fitting classes available for designer use in project specifications or contractor selection as being fit for the project specifications that adopt these standards are as follows. Category listings are not intended to preclude different selections for fittings that function as area change, direction change, converging flow, diverging flow, or special purpose. Category listings also do not necessarily apply to their end connections to other fittings, straight duct sections or equipment.

1. All continuously welded or brazed.
2. Tack or spot welded (and sealed or unsealed).
3. Seam locked (and sealed or unsealed).
4. Rivet, screw, or punched-die-stamp locked (and sealed or unsealed).

The preceding categories may have additional forming prescriptions such as rolled, stamped, gored, spun, pleated, semi-pleated, or other methods. For purposes of distinction, openings in sections of straight ducts to receive taps of any connection method are not deemed to be fittings; but connection thereto may be specified by a prescribed method.

S3.0 Round ducts shall be constructed in accordance with Tables 3.2 and 3-3. Table 3-2 is based on G-60 coated galvanized steel of ASTM Standards A653 and A924 grades. Uncoated, polyvinyl coated, aluminum alloy coated or aluminum-zinc alloy coated steel or stainless steel may be used if a minimum corresponding base metal thickness and material strength is provided. Lockforming quality is required. The use of an alternative material requires specification or approval by a designer.

S3.1 Fittings shall have a wall thickness not less than that specified for longitudinal-seam straight duct in Table 3-2 and 3-3. The diameter of fittings shall be appropriated for mating with sections of the straight duct, equipment, and air terminals to which they connect.

S3.2 Sleeves, collars, and fittings to connect a round duct to a rectangular duct or to flexible ducts shall conform to S3.1 unless a different practice is supported by test data or affidavits confirming suitability for the service.

S3.3 Nothing in this specification is meant to imply that the designer cannot by project specification designate acceptable construction methods.

S3.4 The use of a saddle or a direct connection of a branch into a larger duct is acceptable. Where they are used, the diameter of the branch shall not exceed two-thirds of the diameter of the main and protrusions into the interior of the main, are not allowed. Direct connection of a branch into a main shall include mechanical attachments sufficient to maintain the integrity of the assembly. All saddle fittings shall be sealed at all pressures.

S3.5 Where other limitations are not stated, mitered elbows shall be based on the velocity of slow and shall be constructed to comply with Table 3-1.

S3.6 The illustration of 90 elbows in Figure 3-3 does not preclude shapes of less than 90 degrees.

S3.8 Volume damper construction is provided on **page16**.

S3.10 The requirements of Table 1-2 for sealing are applicable.

**TABLE 3-1 MITERED ELBOWS**

Duct Velocity	R/D Ratio Centerline Radius to Duct Diameter	Number of Mitered Pieces		
		90 deg.	60 deg.	45 deg.
Up to 1000 fpm	0.6	3	2	2
1001 to 1500 fpm	1.0	4	3	2
Above 1500 fpm	1.5	5	4	3

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### 3.2 COMMENTARY

Round duct has a high strength to weight ratio, uses the least material

To convey air at a given friction loss, and is comparatively easy to seal. The wall thickness suitable for positive pressure application is generally less than that for negative pressure. For positive pressure (and low negative pressure), girth ring reinforcement is not necessary. However, rings may be used to maintain the round shape to facilitate handling, shipment, or connection.

The tables indicate that a 10" W.G. (2500 Pa) negative pressure is the maximum classification. Some of the constructions in the tables will qualify at higher negative levels. For spiral ducts, higher negative pressure service information (and bursting pressure in positive mode) is available from industry sources.

Designers should consult SMACNA's *Round Industrial Duct Construction* manual for:

- a) construction of any system carrying particulate or corrosive fumes (i.e., systems for other than clean air),
- b) use of high negative pressure construction or (conservatively) for higher positive pressure than this document provides for,
- c) extended hanger spacing,
- d) engineering design of bolted flanged joints,
- e) negative pressure construction alternatives, and
- f) negative pressure service levels over 10: W.G. (2500 Pa)

This manual also does not indicate preference for any one type of longitudinal seam. The length of straight longitudinal seam duct will generally be determined by the size of the fabricator's rolling equipment. The length in Table 3-2 and 3-3. The diameter of fittings shall be appropriated for mating with sections of the straight duct, equipment, and air terminals to which they connect. Of spiral seam duct is limited by considerations such as in-line fitting frequency, potential for damage in shipment, maneuverability of the sections on the job, the number of support points needed to place the duct in its final location, and other factors.

The most popular transverse joints are the slip or lap types. The flanged joint is used in ducts over 60" (1524 mm) in diameter because of its advantage in retaining the circular shape.

Access to joints for makeup and orientation in vertical or horizontal positions will influence the choice of connection.

The SMACNA *HVAC Duct System Design* manual and the ASHRAE *Fundamentals Handbook* chapter on duct design contain far more configurations of round fittings than this manual. Friction loss data is provided in these design manuals. Where fittings of comparable or better performance are illustrated in duct design handbooks, designers are encouraged to consider allowing a substitution. Omissions from this document are not intended as prohibitions against using other constructions.

Double-wall rigid round duct is available from several industry sources. It is used for its acoustical value, and the perforated (typically metal) inner wall provides resistance to erosion of the duct liner.

Round spiral seam ducts with thinner than traditional wall thickness and with one or more corrugations (ribs) formed between the lock seams have been introduced in industry. Some of these forms have been tested for compliance with UL Standard 181 and have qualified for Class) listing. As the industry develops more experience with these in installation and service, and as more functional performance criteria are identified, it is anticipated that such forms will be added to SMACNA construction standards. Authorities and contractors are invited to evaluate them by information currently available.

**Precautions:** Small differences occur in the diameter of ducts and fittings. Proper clearances are necessary. Verify suitability of fit, particularly when procurement is from outside sources.

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<b>TABLE 3-2A ROUND DUCT GAGE UNREINFORCED POSITIVE PRESSURE</b>						
MAX. DIA.	+2" w.g.		+4" w.g.		+10" w.g.	
	Spiral Seam	Long. Seam	Spiral Seam	Long. Seam	Spiral Seam	Long. Seam
6"	28	28	28	28	28	28
8"	28	28	28	28	28	26
10"	28	26	28	26	28	26
12"	28	26	28	26	26	24
14"	28	26	26	24	26	24
16"	26	24	26	24	24	22
18"	26	24	24	24	24	22
19-26"	26	24	24	22	24	22
27-36"	24	22	22	20	22	20
37-50"	22	20	20	20	20	20
51-60"	20	18	18	18	18	18
61-84"	18	16	18	16	18	16

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**TABLE 3-2B  
ROUND DUCT GAGE  
NEGATIVE PRESSURE**

MAX. DIA.	-2" w.g.		-4" w.g.		-10" w.g.	
	Spiral Seam	Long. Seam	Spiral Seam	Long. Seam	Spiral Seam	Long. Seam
6"	28	28	28	28	28	28
7"	28	28	28	28	26	26
8"	28	28	28	28	28	26
9"	28	28	28	26	26	24
10"	28	26	28	26	28	26
11"	28	26	26	24	26	22
12"	28	26	28	26	26	24
13"	28	26	26	24	24	20
14"	28	26	26	24	26	24
15"	28	24	24	22	22	20
16"	26	24	26	24	24	22
17"	26	24	24	20	22	18
18"	26	24	24	24	24	22
19"	24	22	24	20	22	18
20"	24	22	22	20	22	18
21"	24	20	22	18	22	18
22"	24	20	22	18	22	18
23"	24	20	22	18	20	16
24"	22	20	22	18	20	16
25-26"	22	20	20	18	20	18 A4
27-29"	22	18	20	16	18	16 A4
30"	22	18	20	16	18	16 B4
31-33"	20	18	20	16	18	16 B4
34"	20	18	20	20 A6	18	16 B4
35-36"	20	16	20	20 A6	18	16 B4
37-42"	20	16	18	18 B6	18 F12	
43-48"	20	18 A6	18	18 B6	18 F6	
49-60"	18	18 B4	18 F6	16 B4	18 F6	
61-72"	16		18 F6		16 F4	

An alphabet letter in the table means that reinforcement angles or their equivalent must be used at the foot interval following the letter. The angle sizes are:

A = 1" x 1" x 1/8"; B = 1-1/4" x 1-1/4" x 3/16"; C = 1-1/2" x 1-1/2" x 3/16"; D = 1-1/2" x 1-1/2" x 1-1/4"; E = 2" x 2" x 3/16"; F = 2" x 2" x 1/4"

If companion flange joints are used as reinforcements, those for 25" to 36" diameter shall be 1-1/2" x 1-1/2" x 3/16"; for 37" to 48" diameter 2" x 2" x 3/16"; for 40" to 60" diameter 2-1/2" x 2-1/2" x 3/16"; for 61" to 72" diameter 3" x 3" x 1/4".

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**TABLE 3-3  
ALUMINUM ROUND DUCT GAGE SHCEDULE**

Duct Diameter in Inches	Maximum 2" w.g. Static Positive		Maximum 2" w.g. Static Negative	
	Spiral Seam Gage	Longitudinal Seam Gage	Spiral Seam Gage	Longitudinal Seam Gage
3 thru 8	.025"	.032"	.025"	.040"
9 thru 14	.025"	.032"	.032"	.040"
15 thru 26	.032"	.040"	.040"	.050"
27 thru 36	.040"	.050"	.050"	.063"
37 thru 50	.050"	.063"	.063"	.071"
51 thru 60	.063"	.071"	N.A.	.090"
61 thru 84	N.A.	.090"	N.A.	N.A.

**NOTES:**

Construction of aluminum duct and fittings shall otherwise correspond in the same relationship as for steel duct.

Sheet material shall be alloy 3003-H14 unless otherwise specified. Aluminum fasteners shall be used. Structural members (if used) shall be alloy 6061-T6 or galvanized steel. Hangers in contact with the duct shall be galvanized steel or aluminum.

N.A. means not readily available or not assigned.

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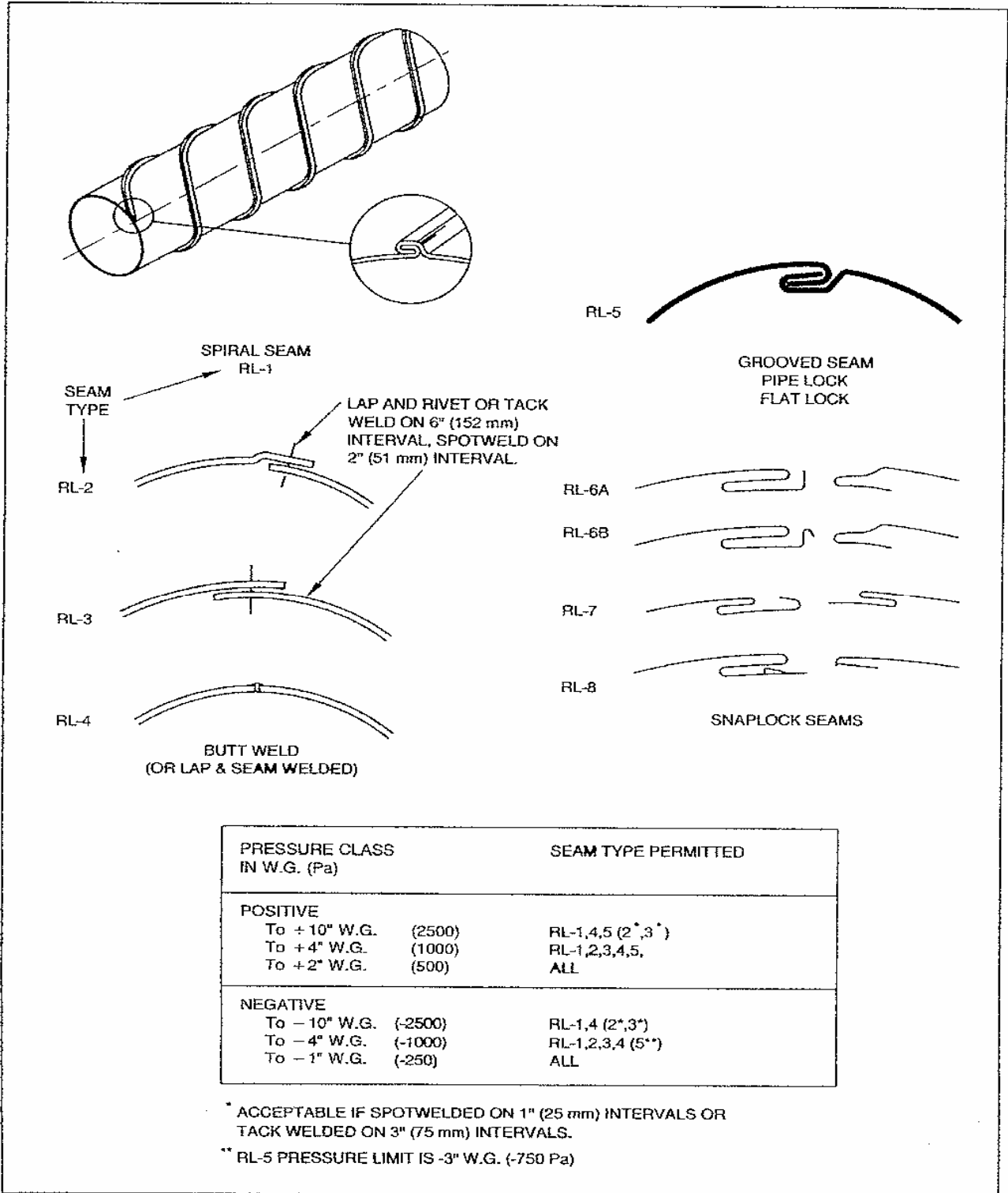
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## SEAMS – ROUND DUCT AND FITTINGS

**FIG. 3-1**



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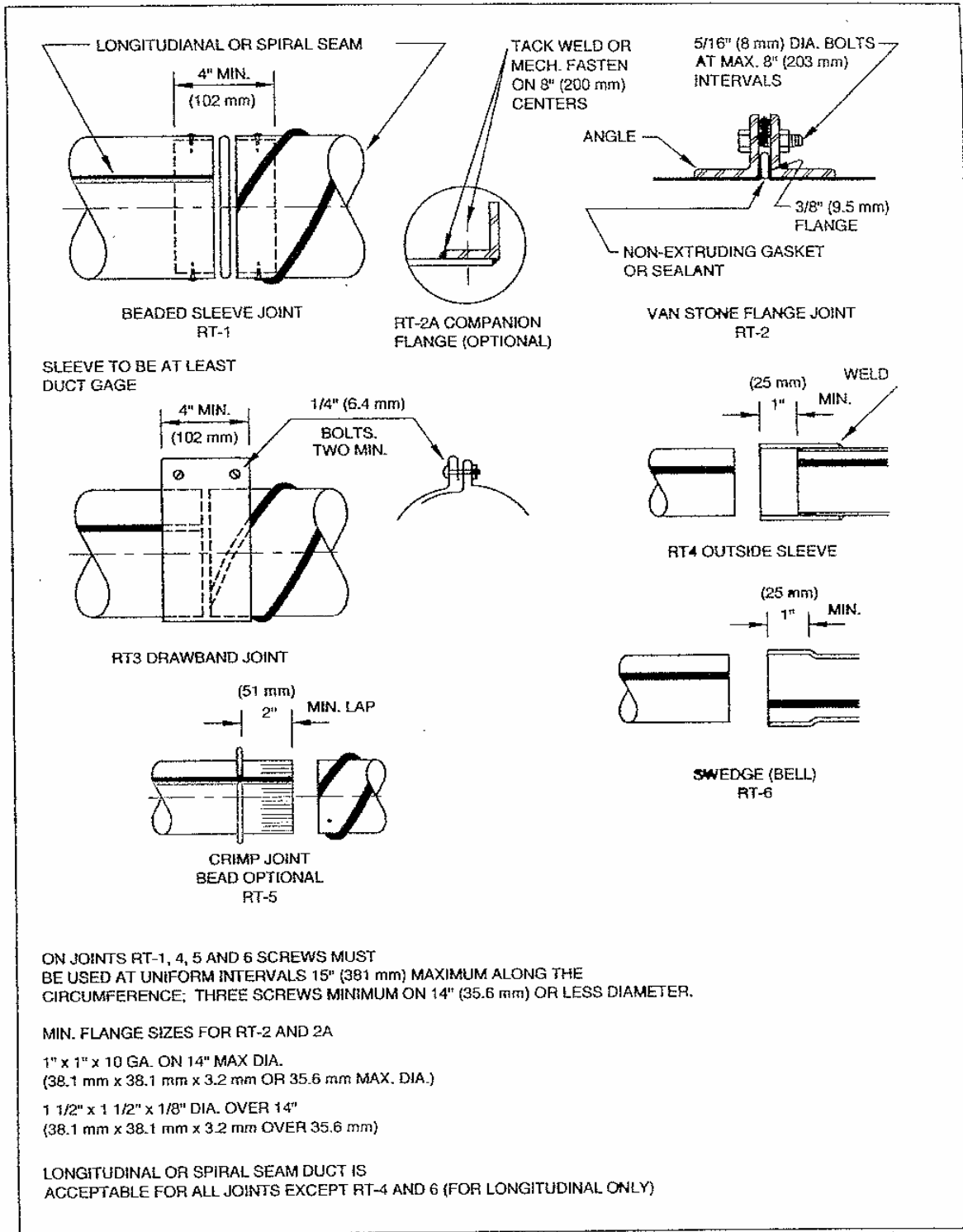
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## TRANSVERSE JOINTS – ROUND DUCT

**FIG. 3-2**

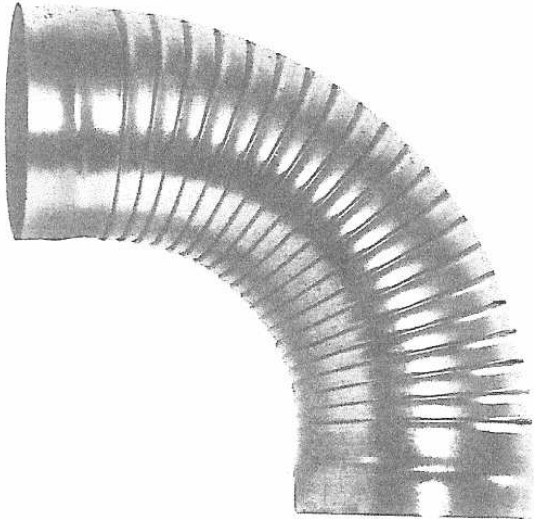




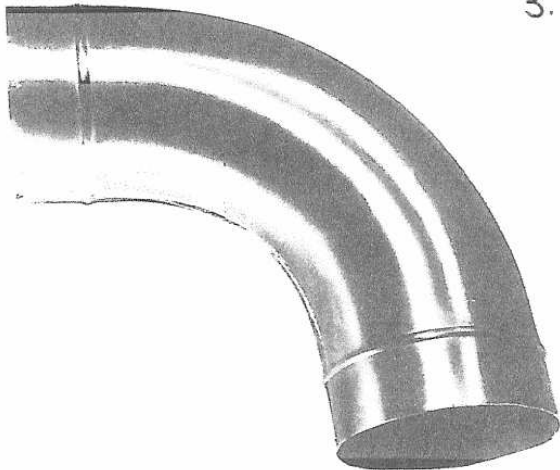
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**ROUND DUCT ELBOWS**

**FIG. 3-3**



PLEATED



STAMPED



ADJUSTABLE



SEGMENTED



SEGMENTED  
STANDING SEAM

3.

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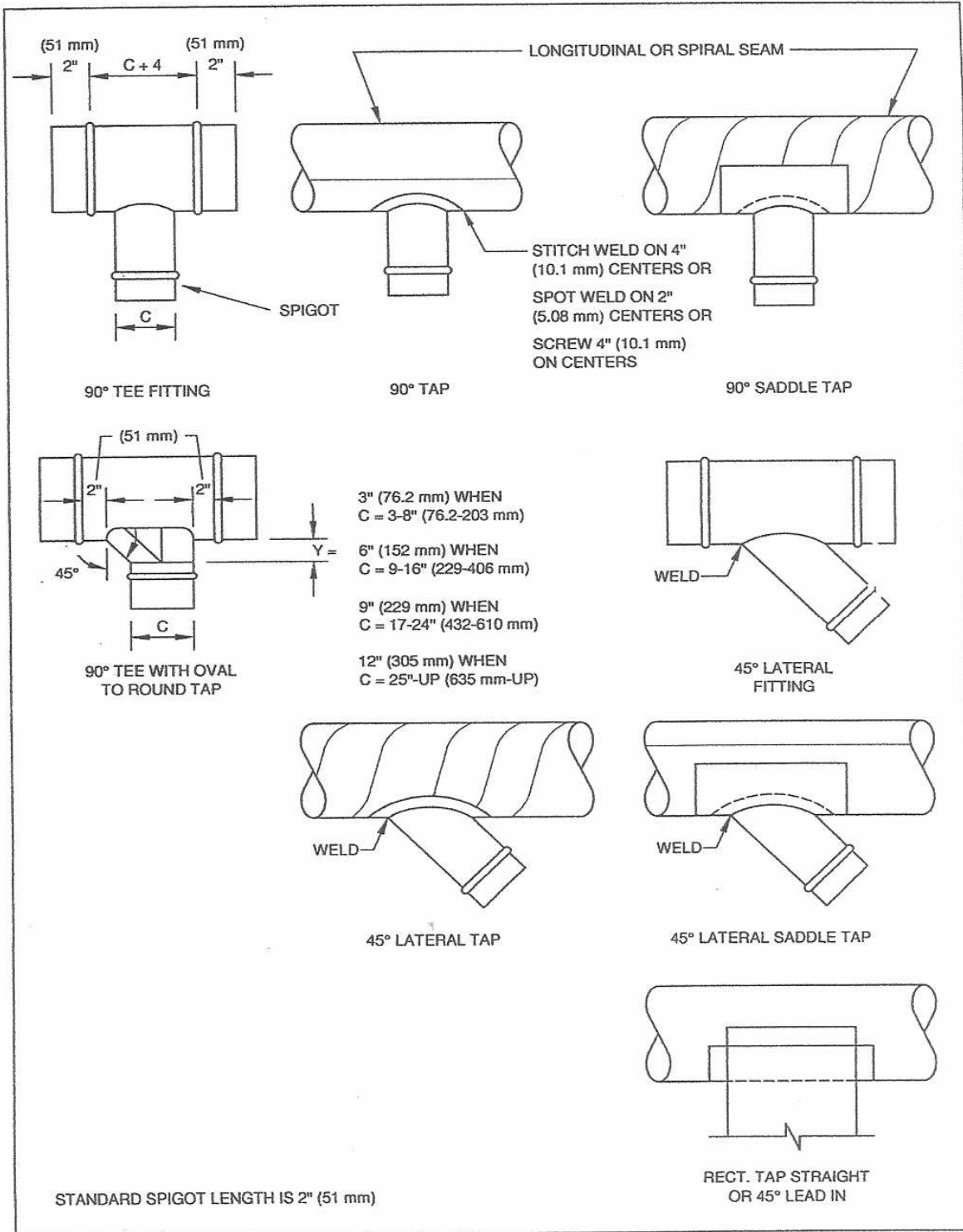
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## 90 °TEES AND LATERALS

**FIG. 3-4**



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## CONICAL TEES

**FIG. 3-5**

