

## **DUCT CONSTRUCTION**

All ductwork will be built to SMACNA guidelines

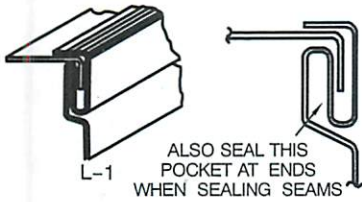
All ductwork will be built out of G-90 coated galvanized steel of lockforming grade conforming to ASTM Standards A-525 and A-527, unless otherwise specified. Duct sides that are 19" and over are 20 gauge or less, with more than 10sq. Ft. of unbraced panel area shall be beaded 12" on center as in fig. 1-8, page 1-45 of SMACNA HVAC Duct Construction.

All longitudinal seam will be Pittsburgh seam. (Type L-1) Fig. 1-5 Page 1-40 SMACNA HVAC Duct Construction.

Also on large duct we may use standing seams for stiffness and seam.

Transverse joint reinforcement will be:

Class A connection	Flat Drive Table 1-18 pg. 1-43
Class B & C connection	Standing S T-10 Table 1-11 pg. 1-24
Class D connection	TDC or Ward Flange see insert
Class E connection	TDC or Ward Flange see insert
Class F connection	TDC or Ward Flange see insert
Class G connection	TDC or Ward Flange see insert
Class H-J K connection	TDC or Ward Flange see insert



L-1  
PITTSBURGH LOCK

- Pocket depth from 1/4 in. to 5/8 in.
- Use on straight duct and fittings
- To ± 10 in. wg

*PITTSBURGH*



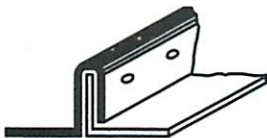
L-2  
BUTTON PUNCH SNAP LOCK

- 5/8 in. pocket depth for 20, 22, and 24 ga
- 1/2 in. pocket depth for 24 and 26 ga
- To ± 4 in. wg
- Screws must be added at the ends of all duct of 4 in. wg and at the ends of 3 in. wg when the duct is over 48 in. width



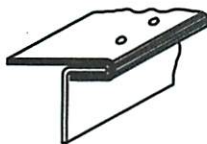
L-3  
GROOVED SEAM  
ALSO CALLED FLAT LOCK AND PIPE LOCK

- To ± 10 in. wg



SEE FIG. 2-7 ALSO  
L-4 STANDING SEAM

- To ± 10 in. wg
- 1 in. seam up to duct width of 42 in.
- 1 1/2 in. seam for larger ducts
- May be used on duct interiors
- Fasten at 2 in. maximum from ends and at 8 in. maximum intervals



L-5 SINGLE CORNER SEAM

- To ± 10 in. wg
- Fasten as per L-4



FLANGED  
(WITH GASKET)  
T-25a



FLANGED  
(WITH GASKET)  
T-25b

*TPC*

- Assemble per Figure 2-17
- Ratings may be adjusted with EI-rated bar stock or members from Tables 2-29 and 2-30
- Supplemental members may be attached to the duct wall on both sides of the joint
- Single members may be used if they are fastened through both mating flanges
- Gasket to be located to form an effective seal

FIGURE 2-2 RECTANGULAR DUCT/LONGITUDINAL SEAMS

Reinf. Class	T-2 Standing Drive Slip		T-10 Standing S		T-11 Standing S		T-12 Standing S		T-14 Standing S		
	EI*	H x T	WT LF	H x T	WT LF	H x T	WT LF	H x T	WT LF	H x T + HR	WT LF
A	0.43	Use B		Use B		1/2 x 26 ga	0.5	Use B		Use D	
B	1.0	1 1/8 x 26 ga	0.4	1 x 26 ga	0.6	1/2 x 22 ga 1 x 26 ga	0.6	1 x 26 ga	0.7	Use D	
C	1.9	1 1/8 x 22 ga	0.6	1 x 22 ga	0.8	1 x 22 ga	0.8	1 x 24 ga	0.8	Use D	
D	2.7	1 1/8 x 18 ga	0.8	1 1/8 x 20 ga 1 x 22 ga (+)	0.9	1 x 20 ga 1 x 22 ga (+)	0.9	1 1/2 x 22 ga	1.0	1 5/8 x 24 ga 1 1/2 x 1/8 Bar	1.4
E	6.5	NOT GIVEN		1 1/8 x 18 ga	1.0	1 x 18 ga (+)	1.0	1 x 18 ga 1 1/2 x 20 ga	1.2	Use F	
F	12.8			Use G				Use G		1 5/8 x 22 ga 1 1/2 x 1/8 Bar	1.5
G	15.8			1 5/8 x 18 ga	1.3			1 1/2 x 18 ga	1.3	1 5/8 x 20 ga 1 1/2 x 1/8 Bar	1.7
H	26.4									1 5/8 x 18 ga 1 1/2 x 1/8 Bar	2.0
I	69									2 1/8 x 20 ga 2 x 2 x 1/8 Angle	2.9
J	80									2 1/8 x 20 ga 2 x 2 x 3/16 Angle	3.7
K	103										
L	207										NOT GIVEN

**Table 2-31 Transverse Joint Reinforcement**

See Section 2.1.4. \*Effective EI is number listed times 10<sup>5</sup> before adjustment for bending moment capacity. T-2 and T-10 through T-14 are restricted to 30 in. length at 4 in. wg, to 36 in. length at 3 in. wg and are not recommended for service above 4 in. wg. (+) indicates positive pressure use only.

TDC

Reinf. Class	T-22 Companion Angles			T-24 Flanged		T-24a Flanged		T-25b Flanged		Slip-On Flange	
	EI*	H x T	WT LF	T (Nom.)	WT LF	H x T (Nom.)	WT LF	H x T (Nom.)	WT LF		
B	1.0	Use E		Use D		Use D		Use D		Consult manufacturers for ratings established by performance documented to functional criteria in Chapter 11. See text S1.18 on page 2.4.	
C	1.9	Use E		Use D		Use D		Use D			
D	2.7	Use E		26 ga	0.5	1 x 22 ga	0.4	26 ga	0.5		
E	6.5	C 1 x 1/8	1.7	24 ga	0.6	Use F		24 ga	0.6		
F	12.8	H 1 x 1/8	1.7	22 ga	0.7	1 1/2 x 20 ga	0.6	22 ga	0.7		
G	15.8	1 1/4 x 1/8	2.1	22 ga (R) 20 G	1.0	1 1/2 x 18 ga	0.8	22 ga (R) 20 ga	1.0		
H	26.4	C 1 1/2 x 1/8 (+) H 1 1/2 x 1/8	2.6	18 ga	1.1	SEE TIE ROD TEXT		18 ga	1.1		
I	69	1 1/2 x 1/4	3.7	20 ga (R)	1.0				20 ga (R)		1.0
J	80	1 1/2 x 1/4 (+) 2 x 1/8	4.7	18 ga (R)	1.1				18 ga (R)		1.1
K	103	2 x 3/16	5	18 ga (R)	1.1				18 ga (R)		1.1
L	207	H 2 x 1/4	6.5	18 ga (R)	1.1				18 ga (R)	1.1	

**Table 2-32 Transverse Joint Reinforcement**

See Section 2.1.4. \*Effective EI is number listed times 10<sup>5</sup> before adjustment for bending moment capacity. For T-22, see tie rod downsize options in Tables 2-1 to 2-7; one rod for two angles. (R) means Tie Rodded. Accepted Pressure Mode for T-24a is (+) or (-) 2 in. wg maximum. See Figures 2-5 and 2-6 and tie rod text. (+) indicates positive pressure use only.



**ALTERNATE FLANGE STYLE.** The joint may be formed without the  $\frac{3}{8}$ " (9.5 mm) flange if the duct is held  $\frac{1}{8}$ " (3.2 mm) back from the vertical face of the angle and tackwelded to the flange along the edge of the duct. The angle is otherwise fastened normally. For additional tightness, place sealant between the angle and duct or seal the weld.

If the faces of flanges are flush, thick-consistency sealant may be used in lieu of gasket. Otherwise, use a gasket suitable for the specific service and fit it up uniformly to avoid its protruding inside the duct.

Joint T-24, **FORMED FLANGE:** Mating flanges are formed on the ends of the duct in double flange style to create a tee shape when assembled. A minimum of 16 gage (1.61 mm) thickness steel corner pieces with  $\frac{3}{8}$ " (9.5 mm) minimum diameter bolts shall be used to close corners.  $\frac{1}{4}$ " (6.4 mm) by  $\frac{1}{2}$ " (13 mm) minimum gaskets of suitable density and resiliency shall be continuous around the joint and shall be located to form an effective seal. Mating flanges shall be locked together by 6" (152 mm) long clips located within 6" (152 mm) of each corner. Clips shall also be spaced at centers not exceeding 15" (381 mm) for 3" wg (750 Pa) or lower static pressure, and not exceeding 12" (305 mm) for 4" (1000 Pa), 6" (1500 Pa), and 10" (2500 Pa) wg. Flanges may also be assembled per Figure 1-15.

Joint T-24a. This is a modified version of T-24 that is assembled per Figure 1-15. Unless supplemental reinforcements are incorporated it is limited to 2" wg (500 Pa) maximum service.

Joints T-25a and T-25b. These systems are also known by the trade names TDC® and TDF®, respectively. Assembly specifications are given in Figure

1-15. Ratings in Table 1-12 may be adjusted when combined with E1 rated flat bar stock or members from Table 1-10. The supplemental reinforcements may be attached to the duct wall on both sides of the joint or use single members if such are fastened through both mating flanges.

See Figure 1-4A for a commentary on proprietary joint systems, and see Chapter VII for joint performance evaluation.

See Tables 1-11, 1-12, and T-13 for additional joint specifications.

See Figure 1-11 for attachment of joint backup reinforcements to the duct.

See Figures 1-2 and 1-3 for use of tie rods.

See Figures 1-13 through 1-16 for corner closures at joints.

## 1.15 COMMENTS

There are several proprietary duct connection systems available and in use. Because such systems are proprietary or have proprietary elements, SMACNA does not evaluate or grade them. However, SMACNA does encourage the development and use of new technology and it invites authorities to consider alternative constructions. Authorities may evaluate alternatives using analyses and tests such as those described in Section VII of the standards or using other means they deem appropriate. Consult the manufacturers of alternative systems for ratings, assembly requirements and recommendations.

Note that joints previously shown in earlier editions can still be used. T-4, 9, 17, 18, 19, 20, and 23, omitted due to infrequent use, may still be used per the first edition if acceptable to the specifying authority.

## Flange

- Available in specialty metals
- Provides a large butyl-filled integrated sealant pocket to ensure proper sealing
- Offers a metal shoulder to protect gasket
- Available in 10' and 20' lengths
- Recommended for 14-gauge through 26-gauge ductwork



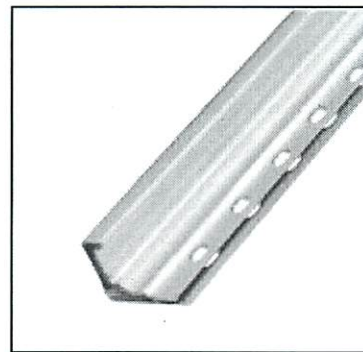
Model FLG J  
 •J-rated Flange  
 •20-gauge galvanized steel  
 •Meets SMACNA rigidity Class J for transverse joints (steel)  
 •Meets SMACNA rigidity Class H for transverse joints (aluminum)



Model FLG H  
 •H-rated Flange  
 •22-gauge galvanized steel  
 •Meets SMACNA rigidity Class H for transverse joints (steel)



Model Q FLG J QUICK FLANGE™  
 •J-rated Flange  
 •20-gauge galvanized steel  
 •Meets SMACNA rigidity Class J for transverse joints (steel)  
 •Meets SMACNA rigidity Class H for transverse joints (aluminum)

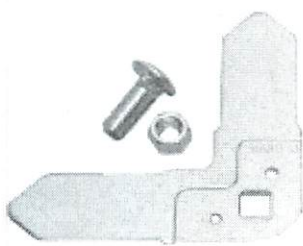


Model Q FLG H QUICK FLANGE™  
 •H-rated Flange  
 •22-gauge galvanized steel  
 •Meets SMACNA rigidity Class H for transverse joints (steel)



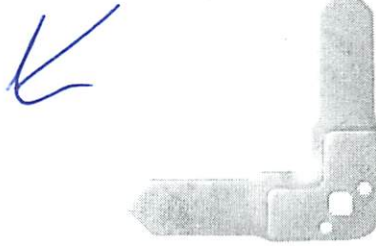
## Corner

- Formed galvanized steel
- Available in specialty metals to match flange material



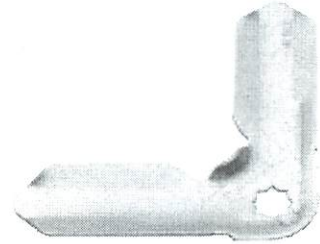
**Model CNR J**

- J Flange Corner
- Nuts and bolts included (galvanized)



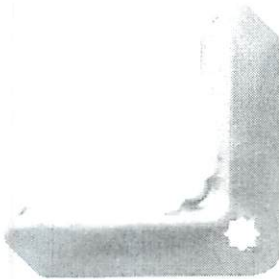
**Model CNR H**

- H Flange Corner
- Nuts and bolts included (galvanized)



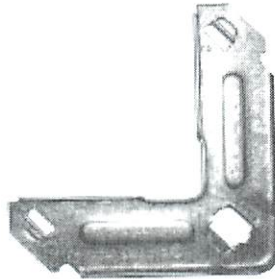
**Model CNR TC**

- TDC Flange Corner
- Use with TDC-formed flange



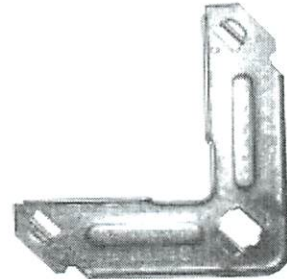
**Model CNR TF**

- TDF Flange Corner
- Use with TDF-formed flange



**Model CNR CC**

- Cornermatic TDC Flange Corner
- 16-gauge
- Use with Cornermatic corner injection machines

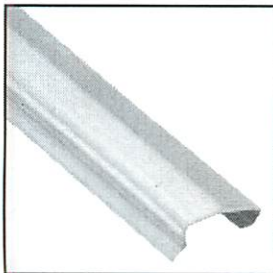


**Model CNR CF**

- Cornermatic TDF Flange Corner
- 16-gauge
- Use with Cornermatic corner injection machines

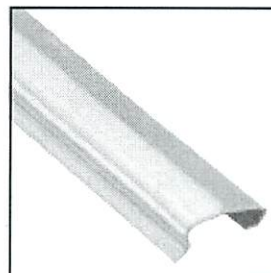
## Cleat

- Formed galvanized steel
- Available in specialty metals to match flange material
- Available in 10' or 6" lengths
- Available in .070" thick extruded PVC for breakaway connections (6" only)



**Model CLT W**

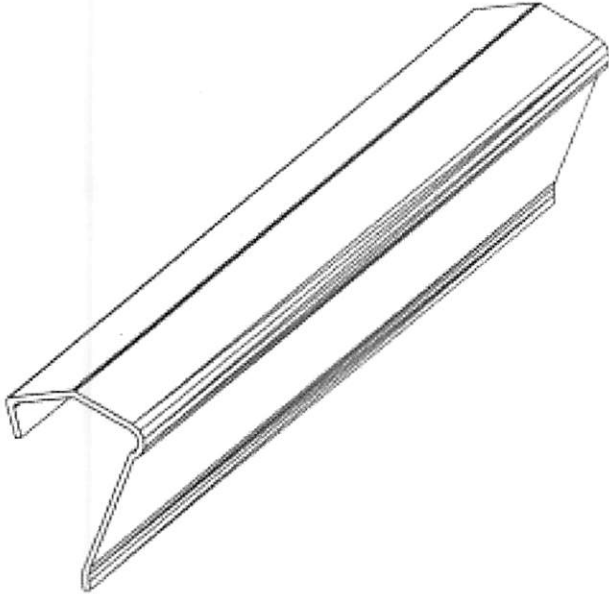
- W Cleat
- Use with Ward J and H flange, as well as TDC-formed flange



**Model CLT F**

- F Cleat
- Use with TDF-formed flange

# VERSA-CLEAT



## DESCRIPTION

Snap-On Cleat

## BASIC USE

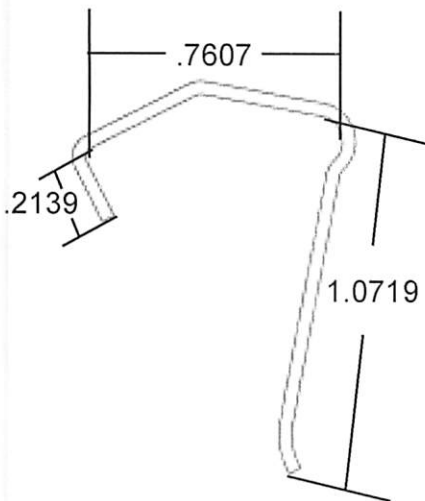
Can be used in conjunction with a variety of TDC connections along with Ductmate 45i.

## AVAILABLE SIZES

Part No.	Description	Quantity	Linear Feet	Weight
DV6CGA	6" Snap-On TDC Cleat	250 Pcs. / Box	125' / Box	29 lbs. / Box
DV10CGA	10' Snap-On TDC Cleat	10 Lengths	100' / Bundle	23 lbs. / Bundle

## AVAILABLE MATERIALS

Galvanized  
Galvanneal  
PVC Coated  
316 Stainless  
Aluminized



*All measurements are inside dimensions  
Manufactured from 22 Gauge*

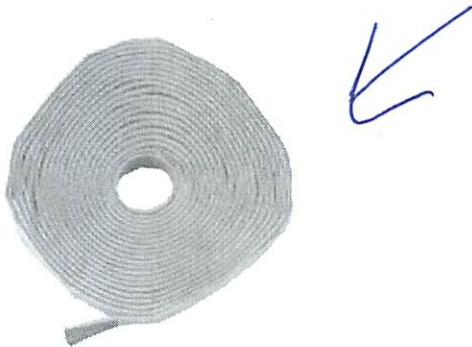
**MANUFACTURED BY:**

**DUCTMATE**  
Industries, Inc.



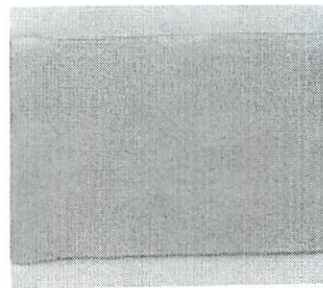
## Butyl Gasket

- Provides a nondrying, permanently flexible gasket
- Adheres to a variety of clean, dry surfaces
- Contains high percentage of virgin butyl rubber to enhance its sealing and aging characteristics
- Formulated to retain handling properties through a wide temperature range
- Will not crack or separate while being applied at low temperatures
- Product is UL-listed



**Model GSK-BT Butyl Tape Gasket**

- Product is 3/16" x 5/8" and is available in 30' rolls
- Product is 3/16" x 5/8" and is available in 25' rolls



**Model GSK-BP Butyl Patch Gasket**

- Product is 3/16" thick, and is available in 1" x 2" and 2" x 3" patch sizes

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## Neoprene Tape Gasket

- Closed-cell foam comprised of neoprene, PVC, and nitrile
- Has good chemical resistance and is flame-rated
- Product is 5/16" x 3/4", and is available in 50' rolls
- Product is UL-listed



**Model GSK-NT**

½ in. wg Static Pos. or Neg.	No Reinforcement Required	Reinforcement Code for Duct Gage Number							
		Reinforcement Spacing Options							
		10 ft	8 ft	6 ft	5 ft	4 ft	3 ft	2½ ft	2 ft
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
10 in. and under	26 ga.	<b>Not Required</b>							
11 – 12 in.	26 ga.								
13 – 14 in.	26 ga.								
15 – 16 in.	26 ga.								
17 – 18 in.	26 ga.								
19 – 20 in.	24 ga.	B-26	B-26	B-26	B-26	B-26	B-26	A-26	A-26
21 – 22 in.	22 ga.	B-26	B-26	B-26	B-26	B-26	B-26	B-26	A-26
23 – 24 in.	22 ga.	C-26	C-26	C-26	B-26	B-26	B-26	B-26	B-26
25 – 26 in.	20 ga.	C-26	C-26	C-26	C-26	B-26	B-26	B-26	B-26
27 – 28 in.	18 ga.	C-24	C-26	C-26	C-26	C-26	B-26	B-26	B-26
29 – 30 in.	18 ga.	C-24	C-26	C-26	C-26	C-26	B-26	B-26	B-26
31 – 36 in.	18 ga.	D-22	D-24	C-26	C-26	C-26	C-26	C-26	B-26
37 – 42 in.	16 ga.	E-20	E-24	D-24	D-26	C-26	C-26	C-26	C-26
43 – 48 in.	16 ga.	E-20	E-22	E-24	E-26	D-26	D-26	C-26	C-26
49 – 54 in.	<b>Not Designed</b>	F-18	F-20	E-22	E-26	E-26	E-26	D-26	C-26
55 – 60 in.		G-18	F-20	F-22	E-24	E-24	E-26	E-26	D-26
61 – 72 in.		H-16	H-18	F-20	F-22	F-24	E-24	E-24	E-24
73 – 84 in.		I-16G	H-18G	H-22G	G-24	F-24	F-24	F-24	
85 – 96 in.		I-16G	I-18G	H-20G	H-22G	G-22	F-22	F-22	
97 – 108 in.		I-16G	I-18G	I-18G	H-18G	H-18G	G-18		
109 – 120 in.		I-16G	I-16G	I-18G	H-18G	H-18G			

**Table 2-1 Rectangular Duct Reinforcement**



1 in. wg Static Pos. or Neg.	No Reinforcement Required	Reinforcement Code for Duct Gage Number							
		Reinforcement Spacing Options							
10 ft		8 ft	6 ft	5 ft	4 ft	3 ft	2½ ft	2 ft	
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
10 in. and under	26 ga.	Not Required							
11 – 12 in.	26 ga.								
13 – 14 in.	26 ga.								
15 – 16 in.	26 ga.								
17 – 18 in.	24 ga.		B-26	B-26	B-26	B-26	B-26	B-26	B-26
19 – 20 in.	24 ga.		C-26	C-26	C-26	C-26	B-26	B-26	B-26
21 – 22 in.	22 ga.	C-24	C-24	C-26	C-26	C-26	B-26	B-26	B-26
23 – 24 in.	22 ga.	C-24	C-24	C-26	C-26	C-26	C-26	B-26	B-26
25 – 26 in.	20 ga.	D-22	D-24	C-26	C-26	C-26	C-26	C-26	B-26
27 – 28 in.	18 ga.	D-22	D-24	D-26	C-26	C-26	C-26	C-26	C-26
29 – 30 in.	18 ga.	E-22	D-24	D-26	D-26	C-26	C-26	C-26	C-26
31 – 36 in.	18 ga.	E-20	E-22	E-24	D-24	D-26	C-26	C-26	C-26
37 – 42 in.	16 ga.	F-18	F-20	E-22	E-24	E-26	D-26	D-26	C-26
43 – 48 in.	16 ga.	G-18	G-18	F-20	F-22	E-24	E-26	E-26	D-26
49 – 54 in.	Not Designed	H-18	H-18	G-20	F-22	F-24	E-24	E-24	E-24
55 – 60 in.		I-16	H-18	G-20	G-22	F-24	F-24	E-24	E-24
61 – 72 in.		I-16G	H-18G	H-18G	H-22G	F-24	F-24	F-24	
73 – 84 in.		I-18G	I-18G	I-20G	H-22G	H-22G	G-22		
85 – 96 in.		J-16H	I-18H	I-18H	I-20G	H-20G	H-22G		
97 – 108 in.		J-16H	I-18H	I-18G	I-18G	I-18G			
109 – 120 in.		J-16H	I-18H	I-18H	I-18H				
		I-18H	I-18H	I-18H					

**Table 2-2 Rectangular Duct Reinforcement**

2 in. wg Static Pos. or Neg.	No Reinforcement Required	Reinforcement Code for Duct Gage Number							
		Reinforcement Spacing Options							
Duct Dimension		10 ft	8 ft	6 ft	5 ft	4 ft	3 ft	2½ ft	2 ft
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
10 in. and under	26 ga.	Not Required							
11 – 12 in.	26 ga.								
13 – 14 in.	24 ga.		B-26	B-26	B-26	B-26	B-26	B-26	B-26
15 – 16 in.	24 ga.		C-26	C-26	C-26	C-26	C-26	B-26	B-26
17 – 18 in.	22 ga.		C-26	C-26	C-26	C-26	C-26	C-26	B-26
19 – 20 in.	20 ga.	C-22	C-24	C-26	C-26	C-26	C-26	C-26	C-26
21 – 22 in.	18 ga.	D-22	D-24	D-26	D-26	C-26	C-26	C-26	C-26
23 – 24 in.	18 ga.	E-22	E-24	D-26	D-26	D-26	C-26	C-26	C-26
25 – 26 in.	18 ga.	E-22	E-22	E-24	D-26	D-26	C-26	C-26	C-26
27 – 28 in.	18 ga.	F-20	E-20	E-22	E-24	D-26	D-26	C-26	C-26
29 – 30 in.	18 ga.	F-20	F-20	E-22	E-24	E-26	D-26	D-26	C-26
31 – 36 in.	16 ga.	G-18	G-20	F-22	F-24	E-24	E-26	D-26	D-26
37 – 42 in.		H-16	H-18	G-20	G-22	F-24	E-24	E-26	E-26
43 – 48 in.			I-18	H-20	H-22	G-22	F-24	F-24	E-24
49 – 54 in.			I-16G	I-18G	H-20G	H-20G	G-24	F-24	F-24
55 – 60 in.				I-18G	I-20G	H-20G	G-22	G-24	F-24
61 – 72 in.	Not Designed			J-16H	J-18H	I-20G	H-22G	H-22G	H-24
73 – 84 in.				J-16H		I-20G	I-20G	I-22G	I-22G
85 – 96 in.						J-18H	I-18H	I-20H	I-22H
97 – 108 in.						K-16I	K-18H	J-18H	I-18H
109 – 120 in.							K-16I	K-18I	J-18I

**Table 2-3 Rectangular Duct Reinforcement**



3 in. wg Static Pos. or Neg.	No Reinforcement Required	Reinforcement Code for Duct Gage Number							
		Reinforcement Spacing Options							
		10 ft	8 ft	6 ft	5 ft	4 ft	3 ft	2½ ft	2 ft
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
10 in. and under	24 ga.	Not Required		B-26	B-26	B-26	B-26	B-26	B-26
11 – 12 in.	24 ga.			B-26	B-26	B-26	B-26	B-26	B-26
13 – 14 in.	22 ga.			C-24	C-24	C-26	C-26	B-26	B-26
15 – 16 in.	22 ga.			C-24	C-24	C-26	C-26	C-26	C-26
17 – 18 in.	20 ga.		D-24	D-24	C-24	C-26	C-26	C-26	C-26
19 – 20 in.	18 ga.		D-22	D-22	D-24	D-24	C-26	C-26	C-26
21 – 22 in.	18 ga.		E-22	E-22	D-24	D-24	D-26	C-26	C-26
23 – 24 in.	18 ga.		E-20	E-22	E-24	E-24	D-26	D-26	C-26
25 – 26 in.	18 ga.		F-20	E-22	E-24	E-24	D-26	D-26	C-26
27 – 28 in.	18 ga.		F-20	F-20	F-22	E-24	E-26	D-26	D-26
29 – 30 in.	18 ga.		G-20	F-20	F-22	E-24	E-26	E-26	D-26
31 – 36 in.	16 ga.	H-18G	H-18G	H-18G	G-20	F-22	F-24	E-26	E-26
37 – 42 in.	Not Designed		I-16G	H-18G	H-20G	G-22	F-24	F-24	E-26
43 – 48 in.			J-16H	I-18G	I-18G	H-20	G-22	G-24	F-24
49 – 54 in.				J-16H	I-18G	I-18G	H-22G	G-24	G-24
55 – 60 in.				J-16H	I-18G	I-18G	H-20G	H-22G	G-24
61 – 72 in.					J-16I	J-18H	I-20G	I-22G	I-24G
73 – 84 in.					L-16I	K-16H	J-18H	I-20H	I-22G
85 – 96 in.						L-16I	K-18I	J-18I	I-20H
97 – 108 in.							L-16I	L-18I	K-18I
109 – 120 in.							L-16I	L-18I	K-18I

**Table 2-4 Rectangular Duct Reinforcement**

4 in. wg Static Pos. or Neg.	No Reinforcement Required	Reinforcement Code for Duct Gage Number										
		Reinforcement Spacing Options										
		10 ft	8 ft	6 ft	5 ft	4 ft	3 ft	2½ ft	2 ft			
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩			
8 in. and under	24 ga.	Not Required		B-26	B-26	B-26	B-26	B-26	B-26			
9 – 10 in.	22 ga.			B-24	B-26	B-26	B-26	B-26	B-26			
11 – 12 in.	22 ga.		B-24	C-24	C-26	C-26	C-26	B-26	B-26			
13 – 14 in.	20 ga.		C-22	C-22	C-24	C-26	C-26	C-26	C-26			
15 – 16 in.	20 ga.		D-22	D-22	C-24	C-26	C-26	C-26	C-26			
17 – 18 in.	18 ga.		D-22	D-22	D-24	D-26	C-26	C-26	C-26			
19 – 20 in.	18 ga.		E-20	E-22	E-24	D-24	D-26	C-26	C-26			
21 – 22 in.	18 ga.		E-20	E-20	E-24	E-24	D-26	D-26	C-26			
23 – 24 in.	18 ga.		F-20	F-20	E-22	E-24	E-26	D-26	D-26			
25 – 26 in.	16 ga.	G-18	G-18	F-20	F-22	E-24	E-26	E-26	D-26			
27 – 28 in.	16 ga.	H-18G	G-18	G-20	F-22	F-24	E-26	E-26	D-26			
29 – 30 in.	16 ga.	H-18G	H-18G	G-18	G-22	F-24	E-26	E-26	E-26			
31 – 36 in.		J-16H	I-16G	H-18G	H-20	G-22	F-24	F-26	E-26			
37 – 42 in.			J-16H	I-16G	I-18G	H-20G	G-22	G-24	F-26			
43 – 48 in.				J-16H	I-18G	I-18G	H-22G	H-24G	G-24			
49 – 54 in.				J-16H	I-18H	I-18G	I-20G	H-22G	H-24G			
55 – 60 in.					J-16I	I-18H	I-20G	I-22G	H-24G			
61 – 72 in.		Not Designed					K-16H	J-18H	I-20H	I-22G		
73 – 84 in.										K-16I	J-18I	I-20H
85 – 96 in.										L-16I	K-18I	J-20I
97 – 108 in.										L-16I	L-18I	L-18I
109 – 120 in.										L-16I	L-18J	L-18J

**Table 2-5 Rectangular Duct Reinforcement**

6 in. wg Static Pos. or Neg.	No Reinforcement Required	Reinforcement Code for Duct Gage Number								
		Reinforcement Spacing Options								
		10 ft	8 ft	6 ft	5 ft	4 ft	3 ft	2½ ft	2 ft	
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	
8 in. and under	24 ga.	Not Required			C-26	C-26	B-26	B-26	B-26	
9 – 10 in.	24 ga.			B-24	C-24	C-24	B-26	B-26	B-26	
11 – 12 in.	20 ga.			C-22	C-22	C-24	C-24	C-26	C-26	
13 – 14 in.	20 ga.			C-22	D-20	D-22	C-24	C-26	C-26	
15 – 16 in.	18 ga.			D-20	D-20	D-22	D-24	D-26	C-26	
17 – 18 in.	18 ga.			E-20	E-20	E-22	E-24	D-26	D-26	
19 – 20 in.	16 ga.	F-18	F-20	F-20	E-22	E-24	D-24	D-26	D-26	
21 – 22 in.	16 ga.	F-18	F-18	F-20	F-22	F-24	E-24	E-26	D-26	
23 – 24 in.	16 ga.	G-18	G-18	G-20	F-22	F-22	E-24	E-26	E-26	
25 – 26 in.		H-16G	H-16G	G-18	G-20	F-22	F-24	E-24	E-24	
27 – 28 in.			H-16G	H-18G	H-20G	G-22	F-24	F-24	E-24	
29 – 30 in.			I-16G	H-18G	H-18G	G-22	F-24	F-24	E-24	
31 – 36 in.				I-16H	I-18H	H-20G	H-22G	G-24	F-24	
37 – 42 in.				J-16H	I-16H	I-18G	H-20G	H-22G	G-22	
43 – 48 in.					J-16H	I-18H	I-20H	I-22G	I-22G	
49 – 54 in.						J-16H	I-18H	I-20G	I-22G	
55 – 60 in.		Not Designed					J-16H	J-18H	I-20H	I-22G
61 – 72 in.							K-16I	J-18I	J-20H	
73 – 84 in.							L-16J	L-18J	K-18I	
85 – 96 in.							It-16	It-16	L-18J	
97 – 108 in.							Jt-16	Jt-16	L-18J	
109 – 120 in.							Kt-16	Kt-16	Kt-18	

**Table 2-6 Rectangular Duct Reinforcement**

*NOTE:* t following Reinforcement Class letter code indicates tie rod required.

10 in. wg Static Pos. or Neg.	No Reinforcement Required	Reinforcement Code for Duct Gage Number							
		Reinforcement Spacing Options							
		10 ft	8 ft	6 ft	5 ft	4 ft	3 ft	2½ ft	2 ft
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
8 in. and under	22 ga.	Not Required		C-20	C-24	C-26	C-26	C-26	C-26
9 – 10 in.	20 ga.			C-20	C-22	C-24	C-26	C-26	C-26
11 – 12 in.	18 ga.		C-20	D-20	D-22	D-24	C-26	C-26	C-26
13 – 14 in.	18 ga.		D-20	E-20	E-20	D-22	D-24	D-26	C-26
15 – 16 in.	16 ga.	E-18	E-18	E-18	E-20	E-20	E-24	D-24	D-26
17 – 18 in.	16 ga.	F-18	F-18	F-18	F-20	F-20	E-24	E-24	D-26
19 – 20 in.	Not Designed	G-16	G-18	G-18	G-18	F-20	F-22	E-24	E-24
21 – 22 in.		H-16G	H-18G	H-18G	G-18	G-20	F-22	F-24	E-24
23 – 24 in.		I-16G	I-18G	H-18G	H-18G	H-20G	G-22	F-24	F-24
25 – 26 in.		J-16G	I-16G	H-18G	H-20G	G-22	F-24	F-24	
27 – 28 in.			I-16G	I-18G	H-18G	H-22G	G-24	F-24	
29 – 30 in.			J-16G	I-18G	I-18G	H-22G	H-24G	G-24	
31 – 36 in.				J-16H	I-18H	I-20G	H-22G	H-24G	
37 – 42 in.				J-16I	J-18I	I-18G	I-20H	I-22G	
43 – 48 in.					J-16I	J-18I	I-18H	I-22H	
49 – 54 in.					L-16I	K-18I	J-18H	I-20H	
55 – 60 in.						L-16I	K-18I	J-20I	
61 – 72 in.						L-16I	L-18I	L-18I	
73 – 84 in.							L-16J	L-18J	
85 – 96 in.								Lt-16	
97 – 108 in.								Lt-16	
109 – 120 in.								Lt-16	

**Table 2-7 Rectangular Duct Reinforcement**

NOTE: t following Reinforcement Class letter code indicates tie rod required.



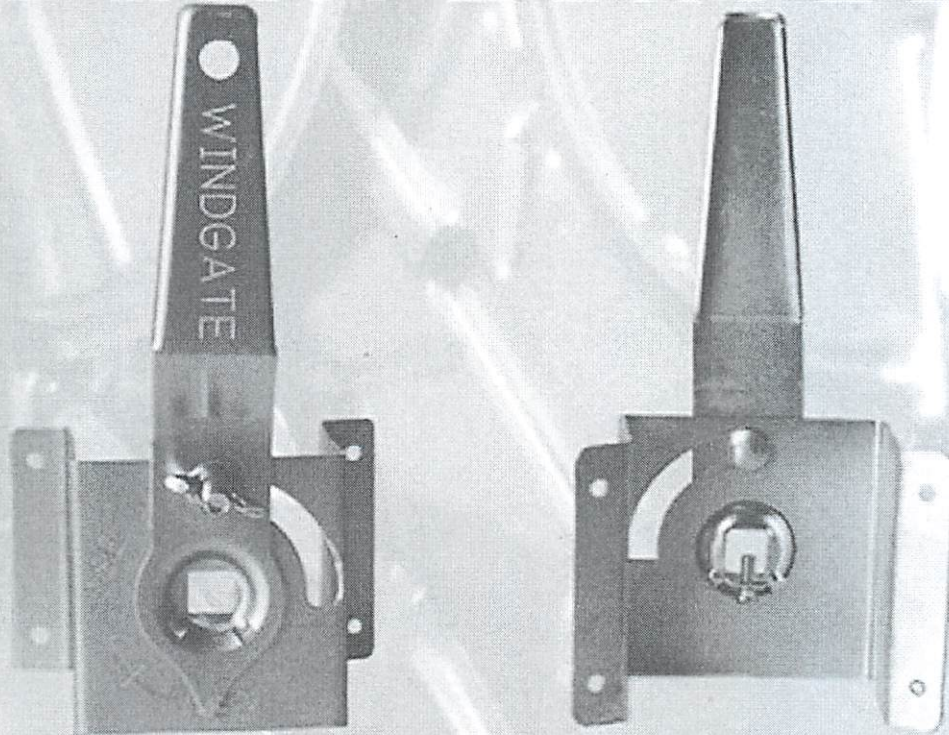




*Use on wrapped duct*

HOME | PRODUCTS | MANUFACTURING

# WINDGATE PRODUCTS



## STAND-OFF REGULATOR WITH GALVANIZED

- Industry leading design to assure quality and craftsmanship
- Heavy duty stand-off constructed of all steel
- Embossed guide for accurate handle positioning
- Optional WindGate exclusive set screw secures 3/8" square rod, thereby e  
vibrational motion
- Made in the USA

## SPECIFICATIONS

- Quadrant: Stamped 18 gauge galvanized sheet metal
- Handle: Stamped 18 gauge galvanized sheet metal with forged steel wing
- Available in 1½" and 2"
- Available in stainless steel and aluminum material

# Ventlok® Dial Regulators

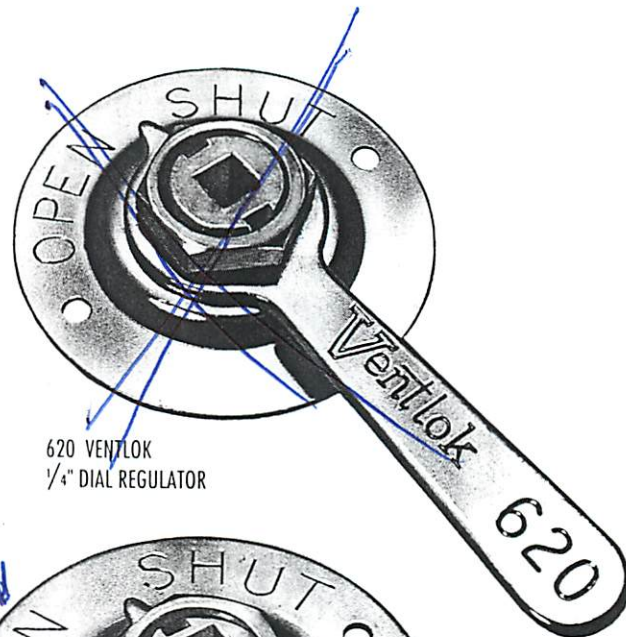
All VENTLOK Regulators are made with a die cast core, a heavy gauge dial, a handle made from  $\frac{3}{32}$  inch steel, and a  $\frac{3}{4}$  inch hexagon nut. All steel parts are zinc plated and can be locked securely in place.

*Unlike most dial regulators and quadrants now available, which can be set with the turn of a thumb screw, VENTLOK controls cannot be tampered with, as a wrench is necessary to change the setting.*

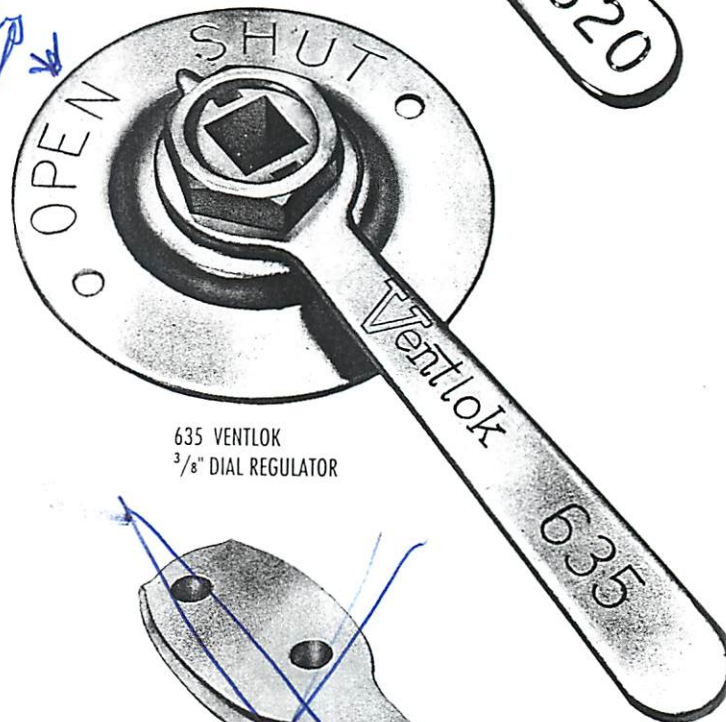
*USE ON DUCT without being wrapped*

## 620 VENTLOK $\frac{1}{4}$ " DIAL REGULATOR

This regulator is recommended for use on small dampers. The center hole is  $\frac{17}{64}$  inches square to accommodate  $\frac{1}{4}$  inch square rod. You may order by sets or individual parts. A set consists of one dial regulator, one #620 Square End Bearing, and one #620 Spring End Bearing. *Weight per 100 sets, 26 lbs.*



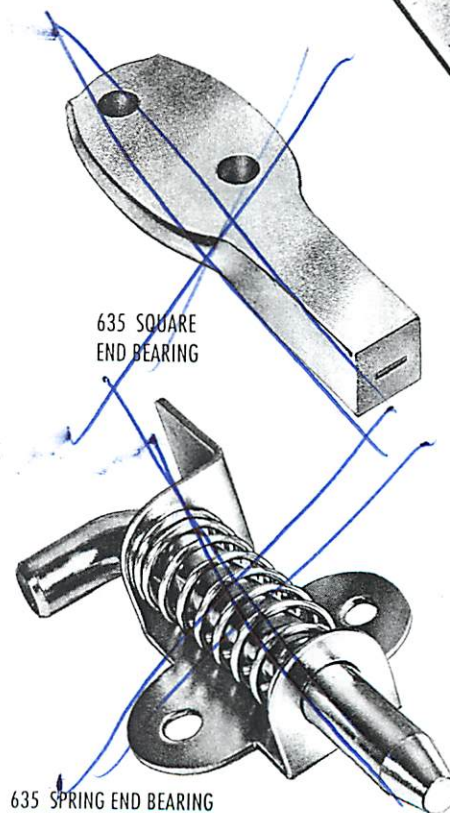
620 VENTLOK  
 $\frac{1}{4}$ " DIAL REGULATOR



635 VENTLOK  
 $\frac{3}{8}$ " DIAL REGULATOR

## 635 VENTLOK $\frac{3}{8}$ " DIAL REGULATOR

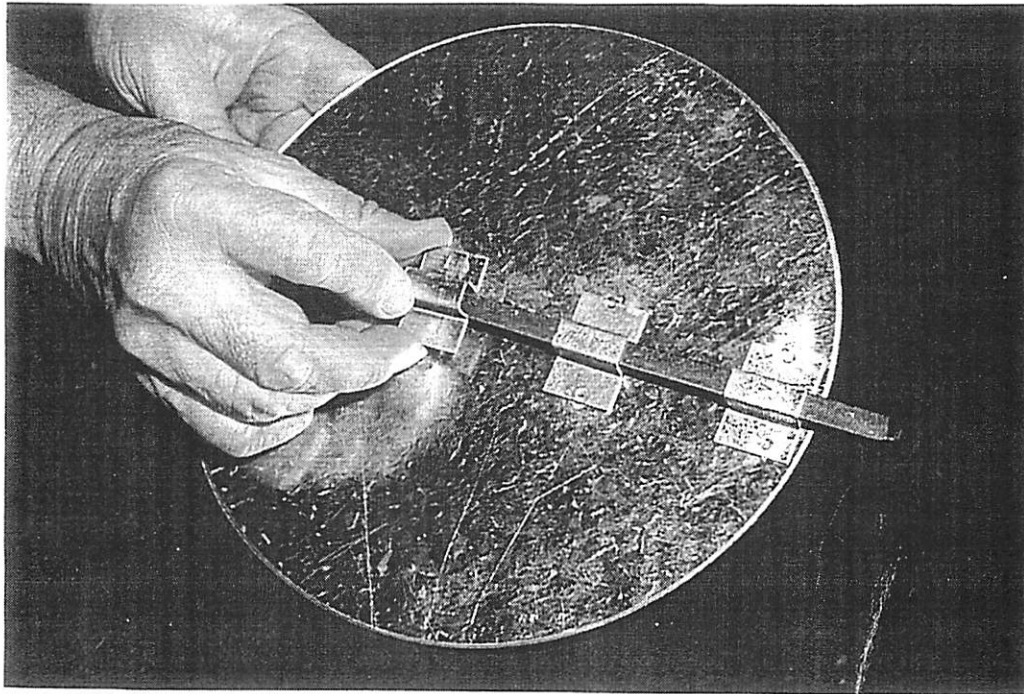
This regulator is recommended for medium size dampers. The centerhole is  $\frac{25}{64}$  inches square to accommodate  $\frac{3}{8}$  inch square rod. The handle and dial are larger than those furnished with the #620. You may order by sets or individual parts. A set consists of one dial regulator, one #635 Square End Bearing, and one #635 Spring End Bearing. *Weight per 100 sets, 46 lbs.*



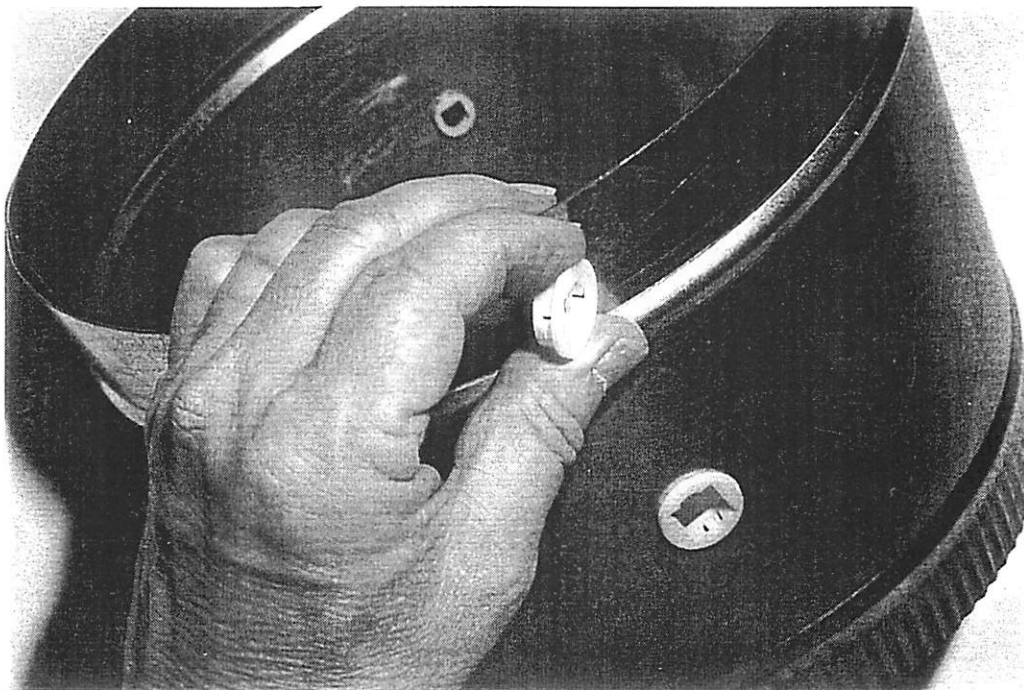
635 SQUARE  
END BEARING

635 SPRING END BEARING

Two more HVAC innovations



**DAMPER CLIPS** – Just “clip on” and spot weld!



**SURE-LOC BUSHINGS** – They “snap in” and stay tight!



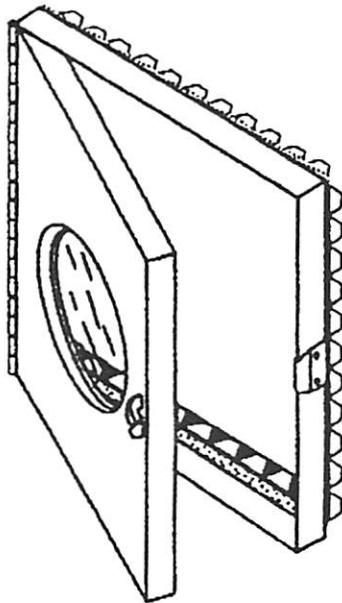
**SERIES 60**  
**model HAD 60 & CAD 60**  
**duct access door**

## SPECIFICATIONS

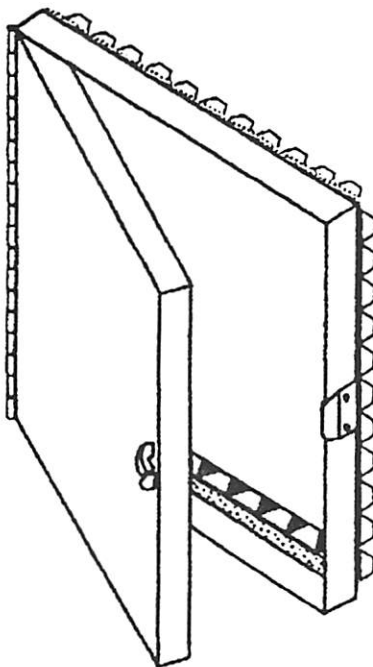
- 22 gauge galvanized steel frame.
- 24 gauge galvanized steel double-wall door.
- 1" thick fiberglass insulation.
- Zinc plated continuous piano type hinge (HAD models only).
- Door-to-frame & frame-to-duct foam gasket.
- HAD models with 'B' ≤ 14" have one lock, doors with B > 14" have two locks.
- Cad models with 'B' ≤ 14" have two locks, doors with B > 14" have four locks.
- Outside frame size fits hole 1" smaller than door size.
- Minimum size is 6"w x 4"h. Maximum size is 24"w x 24"h.

## OPTIONS

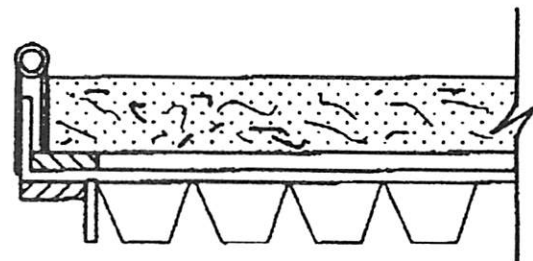
- 22 Gauge galvanized steel door:
- Closed cell neoprene gasket:
- Extra locks:
- Stainless steel construction:
  - 302/304
  - 316
- Ventlock #100 latch:
- See-thru door panel:
  - HAD-60G
  - CAD-60G
- 1" flanged frame:
  - HAD-60F
  - CAD-60F



Model HAD60G (shown above)



Model HAD60 (shown above)



Door side view

Rev. 3-19-93

POTTORFF COMPANY INC. 700 SOUTH VAIL AVENUE MONTEBELLO, CA 90640 (216) 728-0004

**SUBMITTAL RECORD**

JOB \_\_\_\_\_  
 LOCATION \_\_\_\_\_  
 SUBMITTED TO \_\_\_\_\_  
 SUBMITTAL PREPARED BY \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_  
 DATE \_\_\_\_\_



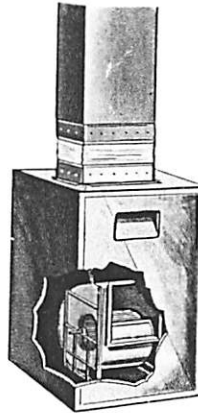
**Specification Form  
 DDFDC-1190**

**Flexible Duct Connector**

**RELATED NFPA 90A & 90B  
 STANDARDS**

**DESCRIPTION**  
 All air duct installations for heating, cooling or ventilation are attached to mechanical equipment containing a fan or blower. Vibrations, noises and rattles resulting from operation of the fan or blower are transmitted into the metal ducts which carry the noises throughout the system.

In order to isolate the vibration and noises to the source, an air-tight flexible joint, consisting of a fabric which is attached to sheet metal on both sides, must be inserted between the equipment and the ductwork. This vibration isolator is called a "Flexible Duct Connector".

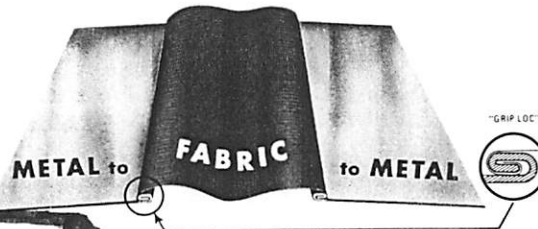


**2-1.2-3** Vibration isolation connectors in duct systems shall be made of an approved flame retardant fabric or shall consist of sleeve joints with packing of approved material having a flame spread rating of not over 25 and a smoke development rating of not over 50. Vibration isolation connectors constructed of fabric shall not exceed 10 inches in length.—NFPA No. 90A 1981.

**2-1.1 exc. no 3** Vibration isolation connectors in duct system shall be made of an approved flame retardant fabric or shall consist of sleeve joints with packing of approved non-combustible material. Vibration isolation connectors constructed of fabric shall not exceed 10 inches in length.—NFPA No. 90B 1980.

"METAL-FAB"

Gauge: 24  
 Dimensions: 3" metal—  
 3" fabric—3" metal  
 Seam: "Grip Loc"



"SUPER METAL-FAB"

Gauge: 24  
 Dimensions: 3" metal—  
 6" fabric—3" metal  
 Seam: "Grip Loc"

FABRIC COMPARISONS	<input checked="" type="checkbox"/> Excelon	<input type="checkbox"/> Neoprene	<input type="checkbox"/> Durlon	<input type="checkbox"/> Insulflex	<input type="checkbox"/> Thermafab
<b>Continuous Temp. Range</b>	-40°F. to 180°F.	-40°F. to 200°F.	-25°F. to 250°F.	-40°F. to 180°F.	-75°F. to 500°F.
<b>Color</b>	Black	Black	White	Black	Green
<b>Weight Per Sq. Yd.</b>	22	30	24	28 (Composite Weight)	17
<b>Abrasion Resistance 1</b>	15,000 cycles	600 cycles	500 cycles	500 cycles	125 cycles
<b>Leakage Resistance 2</b>	350	595	250	125	165
<b>Minimum Radiation Resistance of Fabric 3</b>	19 × 10 <sup>6</sup>	55 × 10 <sup>6</sup>	19 × 10 <sup>6</sup>	19 × 10 <sup>6</sup>	10 × 10 <sup>6</sup>
<b>Tear Strength 4</b>	100/100	12/12	12/12	8/11	7/9
<b>Tensile Strength 5</b>	240/220	500/450	225/300	70/70	125/82
<b>Features</b>	High Tear Strength High Abrasion Resistance.	General Purpose.	Excellent Ozone and Weathering Resistance. Best overall Acid Resistance.	Low Smoke Emission Insulated 3-4-3 Configuration.	Very Low Smoke Emission High Temperature Resistant.
<b>Codes</b>	Metal-Fab Super Metal-Fab	MBX (#10159) MB6X (#10160)	MFN (#10003) MF6N (#10012)	MFD (#10002) MF6D (#10011)	IDC (#10173) MFT (#10005) MF6T (#10013)

1. Abrasion resistance as per Federal Test Standard 191 Method #5306 using CS 17 wheel with 250 Gram load.
2. Leakage resistance as per Federal Test Standard 191 Method #5512. Results in P.S.I. (To convert to inches of water multiply P.S.I. × 27.176.)
3. Radiation resistance shown is in Rads and represents the amount of radiation the fabric can withstand and still retain 95% of its tensile strength.
4. Tear strength in tongue pounds as per Federal Test Standard 191 Method #5134.11(warp/fill).
5. Tensile strength in grab pounds as per Federal Test Standard 191 Method #5100 (warp/fill).

**SUGGESTED SPECIFICATION**

**Vibration Isolating Flexible Duct Connector for Heating, Cooling & Exhaust Supplies & Returns.**

At the inlet and discharge of all air handling equipment (unless otherwise noted) furnish and install vibration isolators. Vibration isolators shall be a coated woven fabric named \_\_\_\_\_ and shall be "Underwriters Laboratories Classified".

Vibration Isolators shall have a Tear Strength of not less than \_\_\_\_\_, an abrasion resistance of not less than \_\_\_\_\_,

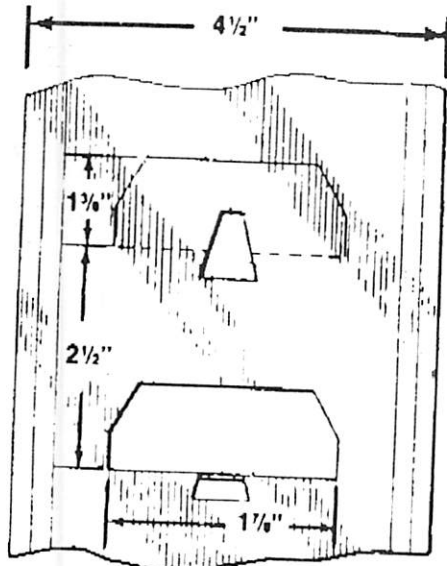
and a continuous temperature range of \_\_\_\_\_. Vibration Isolators shall be preassembled metal to exposed fabric to metal. Fabric and metal shall be joined by means of a double lock seam.

Vibration Isolators shall be Code \_\_\_\_\_ (called Flexible Duct Connectors) as manufactured by Duro Dyne Corporation, Farmingdale, N.Y.



# SHEET METAL CONNECTORS, INC.

112 19th AVENUE NORTHEAST • MINNEAPOLIS, MINNESOTA 55418  
Call toll free 1-800-328-1966 Locally, call 781-4811 FAX 612-781-2605



SMC 324 EZ RAIL  
STOCK LENGTH 10'  
10 PCS PER BOX

## 2" PUSH TYPE SIDE RAILS

MATERIAL (SMC 324)

2" PUSH TYPE SIDE RAILS  
Made from 24 GA Galv Steel

## 2" HOLLOW TURNING VANES

(SMC 226)

DIMPLED

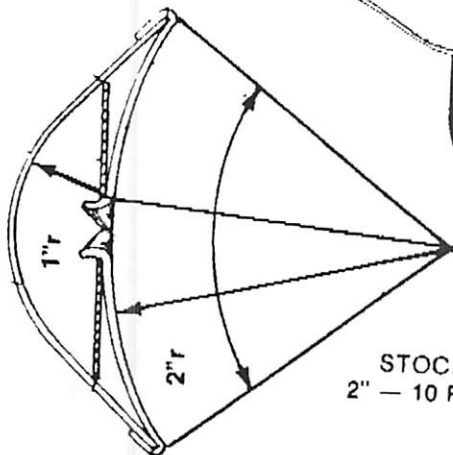
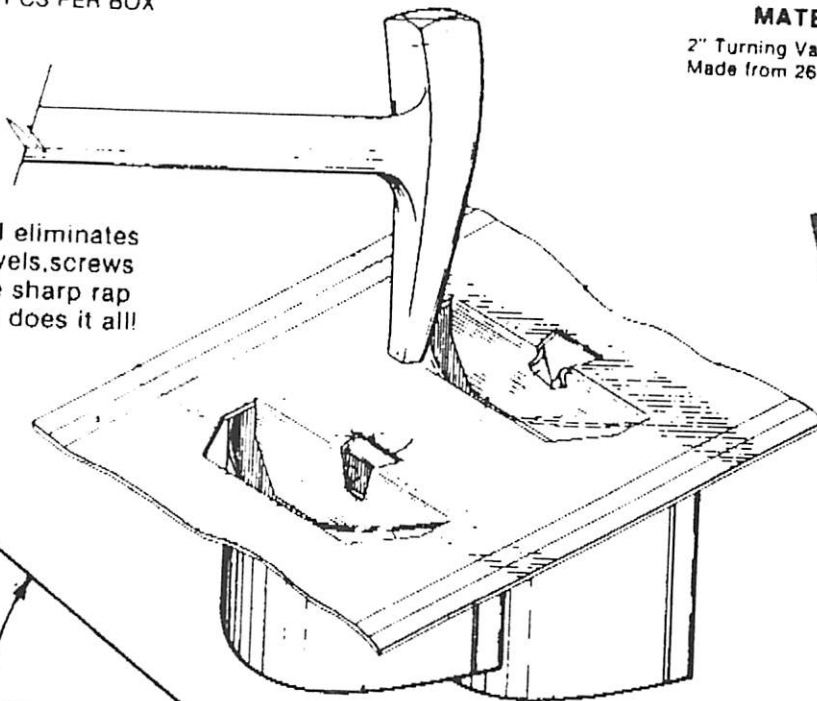


MATERIAL

2" Turning Vane  
Made from 26 Ga Galv Steel

U.S. PAT. # 4,467,829

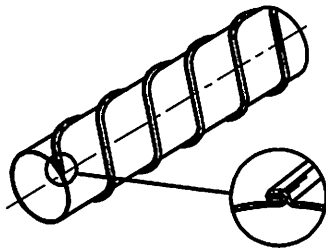
This **NEW** EZ rail eliminates any need for dowels, screws or nails. Just one sharp rap in the right place does it all!



SMC 226  
STOCK LENGTHS 10'  
2" — 10 PCS PER BUNDLE

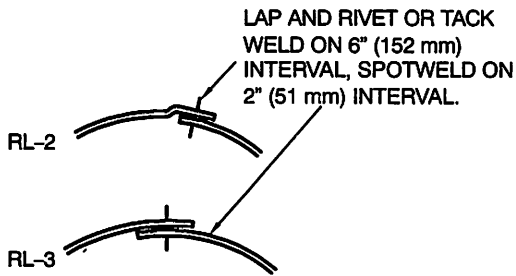


**GALVANIZED**  
Submittal Date  
Effective: Dec. 1, 1990



SPIRAL SEAM  
RL-1

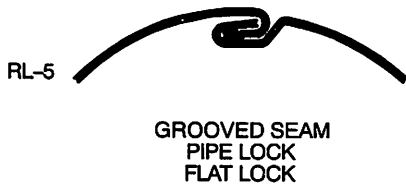
- To  $\pm 10$  in. wg



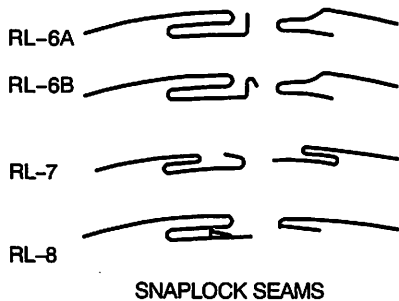
- To  $\pm 4$  in. wg
- Acceptable to 10 in. wg if spot welded on 1 in. intervals or tack welded on 3 in. intervals



- To  $\pm 10$  in. wg



- To  $\pm 10$  in. wg
- To  $- 3$  in. wg



- To  $+ 2$  in. wg
- To  $- 1$  in. wg

FIGURE 3-2 ROUND DUCT LONGITUDINAL SEAMS



<b>Diameter, in.</b>	<b>Longitudinal Seam</b>	<b>Spiral Seam</b>
4	28	28
6	28	28
8	28	28
10	28	28
12	28	28
14	28	28
16	26	26
18	26	26
20	24	26
22	24	26
24	24	26
30	22	24
36	22	24
42	22	24
48	20	22
54	20	22
60	20	22
66	18	22
72	18	20
78	18	20
84	18	20
90	18	20
96	18	20

**Table 3-5 Round Duct Gage Unreinforced  
Positive Pressure To 10 in. wg**

Neg. Pressure 4 in. wg	Stiffener Spacing											
	Unstiff.		20 ft		12 ft		10 ft		6 ft		5 ft	
Diameter, in.	GA	R	GA	R	GA	R	GA	R	GA	R	GA	R
4	28	NR	28	A	28	A	28	A	28	A	28	A
6	28	NR	28	A	28	A	28	A	28	A	28	A
8	28	NR	28	A	28	A	28	A	28	A	28	A
10	26	NR	26	A	28	A	28	A	28	A	28	A
12	24	NR	26	A	28	A	28	A	28	A	28	A
14	22	NR	24	A	26	A	28	A	28	A	28	A
16	22	NR	24	A	26	A	26	A	28	A	28	A
18	20	NR	24	A	24	A	26	A	28	A	28	A
20	20	NR	22	A	24	A	24	A	28	A	28	A
22	18	NR	22	A	24	A	24	A	26	A	28	A
24	18	NR	22	A	24	A	24	A	26	A	26	A
30	16	NR	20	A	22	A	22	A	24	A	26	A
36	N/A	NR	20	B	22	A	22	A	24	A	24	A
42	N/A	NR	18	B	20	B	22	A	22	A	24	A
48	N/A	NR	18	B	20	B	20	B	22	A	22	A
54	N/A	NR	18	C	18	B	20	B	22	B	22	A
60	N/A	NR	18	D	18	C	20	B	22	B	22	B
66	N/A	NR	16	E	18	C	18	C	20	B	22	B
72	N/A	NR	16	E	18	D	18	C	20	B	20	B
78	N/A	NR	16	E	18	E	18	D	20	C	20	C
84	N/A	NR	16	F	18	E	18	E	20	C	20	C
90	N/A	NR	N/A	G	16	E	18	E	18	D	20	C
96	N/A	NR	N/A	G	16	E	16	E	18	E	20	D

**Table 3-7 Min. Required Gage for Longitudinal Seam Duct Under Neg. Pressure**

*NOTES:*

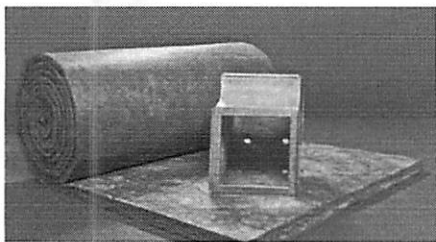
- a. N/A – Not Applicable
- b. NR – Not Required
- c. R – Reinforcement (stiffener) Class





INNOVATIONS FOR LIVING®

## Product Data Sheet



### Availability and Thermal Performance

QuietR® Rotary Duct Liner is available in the following combinations of thicknesses and types.

Thickness		R-Value		Roll Length	
in	mm	(hr•ft <sup>2</sup> •°F)/Btu	(m <sup>2</sup> •°C)/W	ft	m
½	13	2.2	0.38	100	31
1	25	4.2	0.74	100	31
1½	38	6.3	1.11	50	15
2	51	8.0	1.41	50	15

### Typical Physical Properties

Property	Test Method	Value	
Operating Temperature	ASTM C 411	250°F (121°C)	
Maximum Air Velocity	UL 181 Erosion Test ASTM C 1071	6,000 fpm (30.5 m/sec)	
Water Vapor Sorption (by weight)	ASTM C 1104	<3% at 120°F (49°C), 95% R.H.	
Fungi Resistance	ASTM C 1338	Meets requirements	
Fungi Resistance	ASTM G 21	Meets requirements	
Bacteria Resistance	ASTM G 22	Meets requirements	
Corrosiveness	ASTM C 665 (Corrosiveness Test)	Will not cause corrosion greater than caused by sterile cotton on aluminum or steel*	
Thermal Conductivity k at 75°F (λ at 24°C mean)	ASTM C 518	Btu•in/hr•ft <sup>2</sup> •°F	W/m•°C
Type 200		0.23	0.034
R-4.2		0.24	0.035
R-6.3		0.24	0.035
R-8		0.24	0.035
Surface Burning Characteristics	ASTM E 84, UL 723, CAN/ULC S102	Flame Spread	25
Smoke Developed		Smoke Developed	50

### Uses

QuietR® Rotary Duct Liner enhances indoor environmental quality by absorbing noise within sheet metal ducts, and contributes to indoor comfort by lowering heat loss or gain through duct walls.

### Application Recommendations

All portions of duct designated to receive QuietR® Rotary Duct Liner shall be completely covered with duct liner, adhered to the sheet metal with 90% coverage of adhesive complying with ASTM C 916. Transverse joints shall be neatly butted and there shall be no interruptions or gaps. All transverse joints shall be edge-coated. Metal nosing on leading edges must be used where duct liner is preceded by unlined metal, and on all upstream edges when velocity exceeds 6,000 fpm (20.3 m/s). The black mat faced surface of the duct liner shall face the airstream.

QuietR® Rotary Duct Liner shall also be secured with mechanical fasteners, either impact-driven or weld-secured, which shall compress the duct liner sufficiently to hold it firmly in place. For fastener spacing, see Figure 1.

Duct Liner shall be cut to assure overlapped and compressed longitudinal corner joints. For details, refer to NAIMA Publication AH124, Fibrous Glass Duct Liner Standard.

Minor damage and small tears may be repaired by coating with adhesive.

After installation, and prior to occupancy, blow out duct system to remove any cutting scraps or foreign material remaining in the duct.

Installing two layers of material to meet a specific liner thickness is not recommended. If the specification forces the use of multiple layers, the following steps must be taken:

1. Adhere bottom layer of duct liner to duct in normal manner.
2. Adhere top layer to bottom layer of liner using a minimum of 90% adhesive coverage.
3. Treat all leading edges with metal nosings to prevent separation of the two layers.
4. Use mechanical fasteners of the proper length for double layer.

### Specification Compliance

- ASTM C 1071, Type I, Flexible (replaces obsolete Federal Specification HH-1-545B.)
- NFPA 90A/90B
- ICC Compliant
- California Title 24



INNOVATIONS FOR LIVING™

# QuietR® Rotary Duct Liner

## Product Data Sheet

- SMACNA Application Standard for Duct Liners
- NAIMA Fibrous Glass Duct Liner Installation Standard
- Conforms to ASHRAE 62-2001

### Application Limitations

Use of QuietR® Rotary Duct Liner is not recommended for the following applications:

- With wood or coal fired equipment, or equipment of any type which does not include automatic maximum temperature controls and where operating temperatures of 250°F (121°C) may be exceeded.
- In kitchen or fume exhaust ducts, or ducts conveying solids or corrosive gases
- In any application where the duct liner may come in direct contact with liquid water (such as cooling coils, humidifiers, and evaporative coolers) unless protected from the water source.
- Inside fire damper sleeves.
- Immediately adjacent to high temperature heating coils without radiation protection.

### Acoustic Performance

Tested Values - QuietR® Duct Liner							
Sound absorption coefficients at octave band center frequencies (Hz)							
Thickness in (mm)	125	250	500	1000	2000	4000	NRC
½ (13)	0.04	0.12	0.39	0.64	0.78	0.74	0.50
1 (25)	0.05	0.30	0.60	0.87	0.98	1.05	0.70
1½ (38)	0.05	0.47	0.85	1.01	1.01	1.01	0.85
2 (51)	0.12	0.66	1.04	1.08	1.04	1.07	0.95

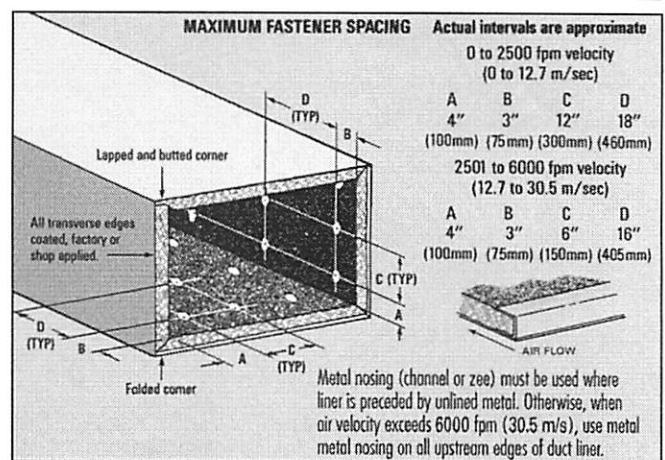
These data were collected using a limited sample size and are not absolute values. Reasonable tolerances must therefore be applied. All tests were conducted in accordance with ASTM C 423, Mounting A (material placed against a solid backing such as a block wall). For more information, call your Owens Corning Representative.

### Insertion Loss, dB per ft of Lined Duct

P/A, ft/ft²	1" Liner						2" Liner					
	Octave band center frequencies, Hz						Octave band center frequencies, Hz					
	125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
8	0.6	1.5	2.7	5.8	7.4	4.3	0.8	2.9	4.9	7.2	7.4	4.3
6	0.5	1.2	2.3	5.0	5.8	3.6	0.6	2.3	4.2	6.2	5.8	3.6
4	0.4	0.8	1.9	4.0	4.1	2.8	0.5	1.6	3.5	5.0	4.1	2.8
2	0.2	0.5	1.4	2.8	2.2	1.8	0.3	0.8	2.3	3.3	2.0	1.7
1	0.1	0.1	1.0	2.0	1.2	1.2	0.2	0.5	1.8	2.3	1.1	1.1

Duct Liner Insertion Loss - Data extracted from ASHRAE Handbook, HVAC Applications, Chapter 43, 1999  
P/A = duct perimeter, ft/duct cross sectional area (ft²). Example: 12" x 12", P/A = 4 (1/ft). For more information, call your Owens Corning Representative.

Figure 1



INNOVATIONS FOR LIVING™

**OWENS CORNING INSULATING SYSTEMS, LLC**  
ONE OWENS CORNING PARKWAY  
TOLEDO, OHIO 43659

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www.owenscorning.com

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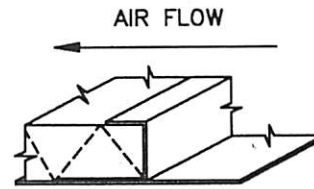
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**NOTE:**

SEE TYPICAL DUCT BRANCH ENTRY CONDITION IN FIG. 2-6.

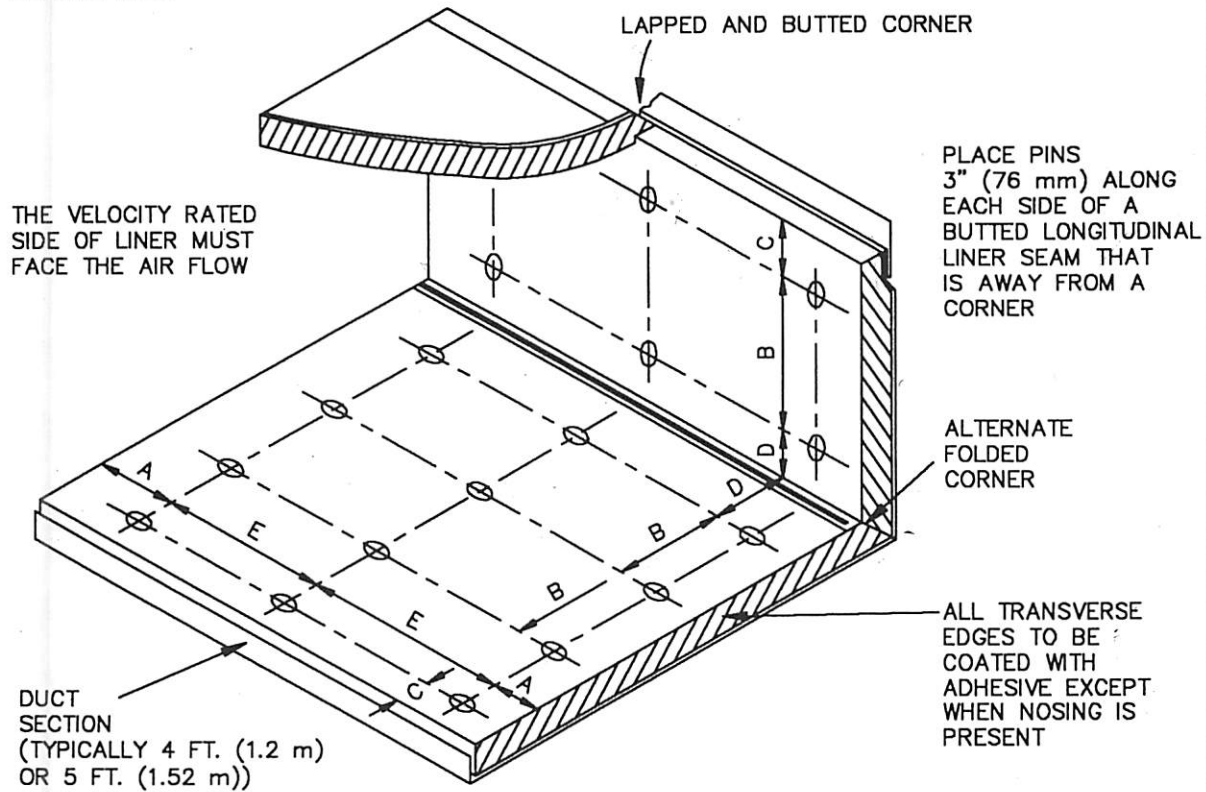
METAL NOSING MUST BE USED WHEREVER LINER IS PRECEDED BY UNLINED METAL; OTHERWISE WHEN VELOCITY EXCEEDS 4000 FPM (20.3 MPS) USE METAL NOSING ON EVERY LEADING EDGE. NOSING MAY BE FORMED ON DUCT OR BE CHANNEL OR ZEE ATTACHED BY SCREWS, RIVETS OR WELDS.



DETAIL - A

METAL NOSING  
CHANNEL OR ZEE

INTERIOR WIDTH OF 8" (200 mm) AND LESS DOES NOT REQUIRE PINS.



MAXIMUM SPACING FOR FASTENERS.  
ACTUAL INTERVALS ARE APPROXIMATE.

"A" PIN ROW MAY BE OMITTED WHEN METAL NOSING IS USED. "E" THEN STARTS FROM THE NOSING.

LINER ADHERED TO THE DUCT WITH 90% MIN. AREA COVERAGE OF ADHESIVE

Velocity *	Dimensions				
	A	B	C	D	E
0 - 2500 FPM (0 - 12.7 MPS)	3" (76.2)	12" (305)	4" (102)	6" (152)	18" (457)
2501 - 6000 FPM (12.7 - 30.5 MPS)	3" (76.2)	6" (152)	4" (102)	6" (152)	16" (406)

\* UNLESS A LOWER LEVEL IS SET BY MANUFACTURER OR LISTING AGENCY

**FLEXIBLE DUCT LINER INSTALLATION**

**FIG. 2-19**



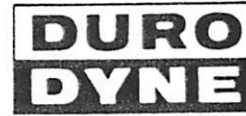
**SUBMITTAL RECORD**

JOB \_\_\_\_\_  
 LOCATION \_\_\_\_\_  
 SUBMITTED TO \_\_\_\_\_  
 SUBMITTAL PREPARED BY \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_  
 DATE \_\_\_\_\_

**DESCRIPTION:** When liner is placed inside air conditioning or heating duct work, the movement of air could cause the insulation to delaminate. To prevent this SMACNA Specifications call for the use of Fasteners in addition to adhesive to secure the liner.

The fasteners may be of three types:

- A. **ADHESIVE:** This fastener is bonded to the ductwork with an appropriate adhesive and allowed to set up. After sufficient drying time the liner is impaled on the pin and a washer added to retain the liner.
- B. **MECHANICAL:** This type of fastener mechanically attaches itself to the duct work. The most popular style is a hardened nail with an attached washer. This fastener is impact driven through the liner and forms a positive mechanical grip with the metal.



**Specification Form  
 DDIF-689  
 Insulation Fastener**

- C. **WELD:** This fastener forms a permanent bond to the duct work by becoming part of it as in any weld. Two styles are currently in use. One—like the mechanical fastener is driven through the liner and welded to the duct work underneath. The second fastener is a pin which is welded to the ductwork prior to the insulation. The liner is then impaled (much like the adhesive fastener) over the pin and secured by a washer.

**WELDED FASTENERS**

- CP Washer Diameter—1.0", Gauge—.015-.017 Zinc Plated CRS Area—.785/sq.", Pin Gauge—.15 dia. Zinc Plated.**



ITEM #	Descrip.	Approx. Pin Length		Use
		Before Weld	After Weld	
<input type="checkbox"/> 26023	CP12	.49	.365	1/2" insulation
<input type="checkbox"/> 26024	CP34	.656	.531	1" 1/2-1 1/2 # density
<input type="checkbox"/> 26025	CP100	.906	.781	1" 2#-3#
<input type="checkbox"/> 26032	CP118	1.125	1.000	1" 3# +

- FTC Washer Diameter—1.0", Gauge—.015-.017 Area—.785 sq.", Pin Gauge—.130 dia. Zinc Plated**



ITEM #	Descrip.	Approx. Pin Length		Use
		Before Weld	After Weld	
<input type="checkbox"/> 26072	FTC12	.49	.365	1/2" insulation
<input type="checkbox"/> 26073	FTC34	.656	.531	1" 1/2-1 1/2 #
<input type="checkbox"/> 26074	FTC100	.906	.781	1" 2#-3#

ITEM #	Descrip.	Approx. Pin Length	Use
<input type="checkbox"/> 26001	PN34	.75	1/2" insulation
<input type="checkbox"/> 26002	PN114	1.25	1" insulation
<input type="checkbox"/> 26003	PN200	2.0	1 1/2"-2" insulation
<input type="checkbox"/> 26004	PN250	2.5	2"-3" insulation

**LN Pins**

Pin Diameter 16 Gauge galvanized

ITEM #	Descrip.	Approx. Pin Length	Use
<input type="checkbox"/> 26149	LN 34	.75	1/2" Insulation
<input type="checkbox"/> 26148	LN150	1.5	1" Insulation
<input type="checkbox"/> 26147	LN250	2.5	1 1/2"-2" Insulation
<input type="checkbox"/> 26150	LN350	3.5	2"-3" Insulation
<input type="checkbox"/> 26151	LN450	4.5	3"-4" Insulation
<input type="checkbox"/> 26152	LN550	5.5	4"-5" Insulation

**Washers for Spotter Pins**

ITEM #	Descrip.	Area
<input type="checkbox"/> 26017	PC1	3.0 1.4375 sq."
<input type="checkbox"/> 26145	LC1	Galvanized
<input type="checkbox"/> 26021	NC1	Nylon "Stop Clip" 1 3/16" dia.
<input type="checkbox"/> 26161	NC2	



- SCPM Stamped feed clip**  
18 Gauge (.047 min) Zinc Coated CRS

ITEM #	Descrip.	Approx. Pin Length		Use
		Before Weld	After Weld	
<input type="checkbox"/> 26042	SCPM-12	.445-.460	.320	1/2" insulation
<input type="checkbox"/> 26047	SCMP-100	.822-.831	.797	1" insulation



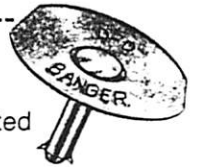
**MECHANICAL FASTENERS**

- TBG Tripod Bangers—Washer Diameter—1" Gauge .015 Zinc Plated Area—.77 sq.", Pin Diameter—.136 Zinc Plated**



ITEM #	Descrip.	Approx. Length		Use
		Before Setting	After Setting	
<input type="checkbox"/> 26129	TBG-12	.475	.375	1/2" insulation
<input type="checkbox"/> 26130	TBG-100	.625	.525	1" 1-2#
<input type="checkbox"/> 26135	TBG-10H	.750	.650	1" 3#

- BGT Bangers—Washer Diameter—1", Gauge .015 Zinc Plated, Area—.77 sq", Pin Diameter—.136 Zinc Plated**



ITEM #	Descrip.	Before Setting		After Setting		Use
		Before Setting	After Setting	Before Setting	After Setting	
<input type="checkbox"/> 26033	BGT12	.475	.375	.475	.375	1/2" insulation
<input type="checkbox"/> 26124	BGT100	.625	.525	.625	.525	1" 1-2#
<input type="checkbox"/> 26121	BGT10H	.750	.650	.750	.650	1" 3#
<input type="checkbox"/> 26121	BGT1VH	.900	.800	.900	.800	1" 4-6#
<input type="checkbox"/> 26122	BGT118	1.250	1.150	1.250	1.150	1 1/2"-1 1/2#
<input type="checkbox"/> 26123	BGT150	1.500	1.400	1.500	1.400	

**ADHESIVE FASTENERS**

- Self Adhesive**

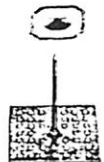
Pin Diameter min. 13 Gauge  
 Base Dimension 2 x 2 galvanized 28 Gauge steel  
 Adhesive Polyethylene foam impregnated with rubber base adhesive.



ITEM #	Descrip.	Approx. Length	Use
<input type="checkbox"/> 26067	SAH34	.75	1/2" insulation
<input type="checkbox"/> 26068	SAH114	1.25	1" insulation
<input type="checkbox"/> 26069	SAH134	1.75	1 1/2" 1-1 1/2#
<input type="checkbox"/> 26070	SAH200	2.00	1 1/2" 2# +
<input type="checkbox"/> 26071	SAH212	2.5	2" insulation

- Perforated Base Adhesive Hangers**

Pin 14 Gauge galvanized  
 Base 2 x 2 28 Gauge galvanized



ITEM #	Descrip.	Approx. Length	Use
<input type="checkbox"/> 26075	PBH34	.75	1/2" insulation
<input type="checkbox"/> 26076	PBH114	1.25	1" insulation
<input type="checkbox"/> 26077	PBH134	1.75	1 1/2" 1-1 1/2#
<input type="checkbox"/> 26078	PBH200	2.0	1 1/2" 2# +
<input type="checkbox"/> 26079	PBH212	2.5	2" insulation

# DP 2502

## WATER BASED DUCT LINER ADHESIVE

**A water based, premium quality, UL Classified duct liner adhesive specifically formulated for spray, brush, and roller applications.**

### Recommended Uses:

- Bonding fibrous duct wrap and duct liner insulation to galvanized duct work.
- Sealing cut edges of fiberglass insulation.
- Bonding kraft backed foil coverings to fiberglass and urethane flat stock or pipe insulation.
- Bonding multiple layers of fibrous insulation board.

### Features and Benefits:

- **LEED** Qualified
- UL Classified
- Excellent Wet Tack
- Non-Flammable
- Moisture Resistant
- Exceptional Coverage
- Low Odor
- Non-Oxidizing
- Meets FDA, USDA, and EPA Standards
- Meets Requirements of NFPA 90A & 90B, ASTM E-84, UL 723, ASTM C-916 Type II

### Directions For Use:

**Surface Preparation:** Surfaces should be clean, dry and free of dirt, oil and any foreign matter.


**Application:** DP 2502 may be applied by brush, roller, roller coater, or spray equipment. DP 2502 may be applied to either the galvanized steel or the fibrous insulation.

**For internal fiberglass duct insulation:** Apply DP 2502 evenly and secure with mechanical fasteners in accordance with SMACNA standards.

DP 2502 should be applied at temperatures above 40°F and should never be exposed to temperatures that exceed 200°F or fall below -25°F. **Do not thin.**

### Technical Data:

- Color:** Black or White
- Base:** Water
- Chemical Family:** Synthetic Latex
- Solids Content:** 40 ± 2%
- Viscosity:** Approx. 2,500 - 3,500 cps
- Application Temperature:** 40°F - 110°F
- Storage Temperature:** 40°F - 110°F. Do not allow to freeze
- Service Temperature:** -25°F - 200°F
- Freeze/Thaw Stability:** Do not allow to freeze
- Flammability:** Non-flammable wet or dry
- Flash Point:** No flash to boiling
- Shelf Life:** 1 Year (unopened containers)
- Open Time:** 10 to 20 minutes depending on humidity, temperature, and application rate
- Coverage:** Typical spray application may yield up to 400 sq. ft. per gallon
- Clean Up:** Use warm water and soap
- Packaging:** 1 gallon pail, 5 gallon pail, 50 gallon drum, 275 gallon tote
- VOC:** 22 g/l

<p>UNDERWRITERS LABORATORIES INC. CLASSIFIED ADHESIVES 5209</p> <p>DP 2502 Duct Liner Adhesive applied to Inorganic Reinforced Board Flame Spread: 5      Smoke Developed: 0 Test applied at a coverage rate of 14.7 sq. m/L. Flash point of liquid adhesive (closed cup), no flash to boiling.</p>	
---	---



3301 W. Segerstrom Ave.  
Santa Ana, CA 92704  
Toll Free 800.641.0808  
Phone 714.432.0600  
Fax 714.432.0660  
www.designpoly.com

**DP****1020****WATER BASED DUCT SEALANT**

**A fiber reinforced, water based, premium quality, UL Listed, high pressure/high velocity duct sealant for commercial and residential supply and return air duct use.**

**Recommended Uses:**

- DP 1020 is recommended for sealing joints, seams, and duct wall penetrations.
- DP 1020 is recommended for sealing connections on flexible duct.
- DP 1020 is recommended up to 15 inches water column pressure.

**Features and Benefits:**

- **LEED** Qualified
- **ZERO** VOC's
- UL Listed
- Excellent Workability
- Crack and Peel Resistant
- Mold and Mildew Resistant
- Excellent Dry Adhesion
- Indoor and Outdoor Usage
- Minimal Shrinkage
- Sag Resistant
- Excellent Water and U.V. Resistance
- Meets FDA, USDA, and EPA Standards
- Meets Requirements of NFPA 90A & 90B, ASTM E-84, and UL-723
- Paintable with latex or epoxy paints after cured

**Directions For Use:**

**Uses:** DP 1020 may be used to seal joints on metal, flexible and fiberglass duct board supply and return air duct.

**Surface Preparation:** Surfaces should be clean, dry and free of dirt, oil and any foreign matter.

**For sheet metal duct:** DP 1020 should be applied to all connections according to SMACNA standards. Brush, caulk, pump or trowel DP 1020 on all duct seams. Apply to TDC/TDF and applied flange corners. Apply to all penetrations in the duct wall including sheet metal screw heads and tie rods. When caulking DP 1020, sealant should be brushed into seams.

**For round and oval spiral duct:** Apply DP 1020 to the male section of the fitting or to the inside slip duct coupling. Secure with sheet metal screws per manufacturers requirements. Apply a 2-inch band of DP 1020 around outside of joint, covering all screws.

**For rigid fiberglass air duct:** Assemble sections according to the manufacturers recommendations. Apply a 3-inch by 20 mil band of DP 1020 to the joint. Embed a fiberglass scrim (5 mil, 20 x 10 plain weave, 1.75 oz per sq. yd.) in the sealant and apply another 20 mil coat of DP 1020 over the scrim.

**For flexible duct:** Install flexible duct per manufacturers instructions

**Technical Data:**

- Color:** Gray
- Base:** Water
- Chemical Family:** Synthetic Latex
- Solids Content:** 68 ± 2%
- Viscosity:** Approx. 300,000 - 400,000 cps
- Application Temperature:** 40°F - 110°F
- Storage Temperature:** 40°F - 110°F. Do not freeze. If product freezes, allow to return to room temperature before applying.
- Freeze/Thaw Stability:** 5 cycles no deterioration (DPTM-20)
- Service Temperature:** -25°F - 200°F
- Flammability:** Non-flammable wet or dry
- Flash Point:** No flash to boiling
- Shelf Life:** 2 Years (unopened containers)
- Cure Time:** 24-72 hours depending on temperature, humidity, and application
- Coverage:** Dependent on application thickness, 80-90 sq. ft. at 20-40 wet mils
- Clean Up:** Use warm water and soap
- Packaging:** 1/12 gallon tubes, 1 gallon pails, 2 gallon pails, 5 gallon pails, 54 gallon drums
- Pressure Classes:** Meets all SMACNA pressure classes
- Seal Classes:** Meets all SMACNA seal classes
- VOC:** <5 g/l

ASTM E-84 SURFACE BURNING CHARACTERISTICS  
 DP 1020 Duct Sealant applied to inorganic reinforced cement board  
 Flame Spread: 0 Smoke Developed: 0  
 Test applied in two 2" wide strips 8" on center (coverage 16% of the exposed test sample area) at a spread rate of 250 sq. ft. per gal.  
 Flash point of finished sealant, closed cup. No flash to boiling.

UNDERWRITERS LABORATORIES INC.  
 LISTED ADHESIVES  
 16UK  
 UL 181 B-M

For use with UL Listed flexible air ducts or connectors



CH support bulletin