Weaver
CONSTRUCTION MANAGEMENT
3679 S Huron Street, Suite 404 Englewood, Colorado 80110
Phone: (303) 789-4111 FAX: (303) 789-4310

SUBMITTAL TRANSMITAL

February 23, 2012
Submittal No: 15815-001

PROJECT: **Harold Thompson Regional WRF**
Birdsall Rd.
Fountain, CO 80817
Job No. 2908

ENGINEER: **GMS, Inc.**
611 No. Weber St., #300
Colorado Springs, CO 80903
719-475-2935 Roger Sams

OWNER: **Lower Fountain Metropolitan Sewage Disposal District**
901 S. Santa Fe Ave.
Fountain, CO 80817
719-382-5303 James Heckman

CONTRACTOR: **Kuck Mechanical Contractors, LLC.**
395 West 67th Street
Loveland, CO 80593
970-461-3553 Melanie Peterson

SUBJECT: Metal Ducts for both the EM and Headworks Buildings

SPEC SECTION: 15815

PREVIOUS SUBMISSION DATES:

DEVIATIONS FROM SPEC: ___ YES _X_ NO

CONTRACTOR'S STAMP: This submittal has been reviewed by Weaver Construction Management and, unless indicated otherwise, has been found to be in conformance with the intent of the contract documents.

Contractor's Stamp:	Engineer's Stamp:
Date: 2/23/12 Reviewed by: Jeff Burst (X) Reviewed Without Comments ( ) Reviewed With Comments	

ENGINEER'S
COMMENTS:_____
_____

	FUNCTION	1.0 INCH	2.0 INCH	3.0 INCH	4.0 INCH	OTHER:	G-90 GALV.	SSTL. (TYPE(S)	ALUMINUM	PCD	PAINTLOCK	CARBON STL.	OTHER:	INTERNAL REIN.	EXTERNAL REIN.	PITTSBURG SEAM	SNAPLOCK SEAM	OTHER: D.W. ETC.	SPIRAL	SNAPLOCK	1.5 DIA C/L ELL	0.5 DIA C/L ELL	CRIMP	BEAD COUPLING	OTHER: D.W. ETC.	1"X STRAP	CLG. WIRE	ROOF STAND	TRAPEZE	THREADED ROD	CABLE SYSTEM	1/2" X 2# LINER	1" X 1-1/2# LINER	1" X 3# LINER	1-1/2" X 2# LINER	WRAP 1-1/2" X 3/4#	WRAP 3" X 3/4#	LAGGING / R-8 INS.	OTHER:	A:JT.,SEAM,PENETR.	B: JOINTS & SEAMS	C: JOINTS ONLY	WELDED	OTHER:
		PRESSURE					MATERIAL							RECT. CONST.					RND. CONST.								HANGER						INSULATION								SEALANT				
SF-1	LP SA		X				X									X	X									X									X					X				
	RA		X				X									X	X									X									X					X				
	OA		X				X												X				X	X		X										X				X				
SYSTEM																																														
MAU-1	LP SA		X				A								X	X										X			X							X			X				
	LP SA								B						X	X										X			X											X				
SYSTEM	MP SA																																													
	LP SA																																													
	RA																																													
	OA																																													
	EA/REL.																																													
SYSTEM																																													
F-1	LP SA		X				X									X	X		X			X				X									X				X				
	RA		X				X									X	X									X									X				X				
	OA		X				X									X	X		X	X		X				X										X				X				
SYSTEM																																													
EF-1	EA		X				X												X	X						X													X				

DIMENSIONS ON PLAN ARE INTERNAL OR EXTERNAL OF LINER — INTERNAL-DESIGNER TO VERIFY

FOOTNOTES:

A	MAU-1 EXTERIOR DUCT IS G-90	C	F
B	MAU-1 INTERIOR DUCT IS ALUMINUM	D	G
C		E	H

PRESSURE TESTING (DESCRIBE IF REQUIRED) N/A

KUCK MECHANICAL CONTRACTORS, LLC
Commercial, Industrial, HVAC, Design Build, Sheet Metal

395 West 67th Street
P.O. Box 388
Loveland, CO 80539-0388
Phone: (970) 461-3553
Fax: (970) 461-3443

SUBMITTAL

DATE: 02/21/12

SENT TO: Weaver General Contractors

Attn: John Jacob

JOB: Harold D. Thompson WRF (#01135)
9001 Birdsall Rd.
Fountain, CO 80817

SUBMITTAL NO.: 00015
SUBMITTAL DUE:
PACKAGE: n/a

VENDOR NAME: Kuck

SPECIFICATION #: 15815

SUBJECT: Metal Ducts

REVIEW DETAILS:

Review #: 1
Desc: Metal Ducts
Reviewer: John Jacob
Weaver General Contractors

Received: 02/21/12
Sent: 02/21/12
Returned:
Forwarded:

Priority: Normal
Status: Open
Sepias: 0
Prints: 0

Sent for the following action(s):

☑ **For Approval** ☑ **For Distribution** ☐ **For Your Use/Files** ☐ **As Req'd per**

Action Needed:

Sincerely,
Melanie Peterson

Kuck Mechanical Contractors
PM Assistant
395 W. 67th Street
Loveland, CO 80538

KUCK MECHANICAL CONTRACTORS, LLC
Commercial, Industrial, HVAC, Design Build, Sheet Metal

15815-2.1, 2.3, 2.6

SINGLE WALL RECTANGULAR DUCTS & FITTINGS

DUCT CONSTRUCTION SUBMITTAL NOTES

RECTANGLE DUCT MATERIAL (CONCEALED): To be G90 Galvanized Sheet Steel for Designated Pressure Class..

ALUMINUM DUCT: To be per ASTM B209 alloy 3003, H14 temper with mill finish for concealed ducts & standard one-side bright finish for exposed duct.

RECTANGLE DUCT TRANSVERSE JOINTS: To be TDC **SMACNA FIG. 2-1**

LONGITUDINAL SEAMS: Will be Pittsburg Lock as per **SMACNA FIG. 2-2.**

DUCT SEALING: Low Pressure Seal Class "B", Medium & High Pressure Seal Class "A" as per **SMACNA TABLE 1-1 and per Specifications**

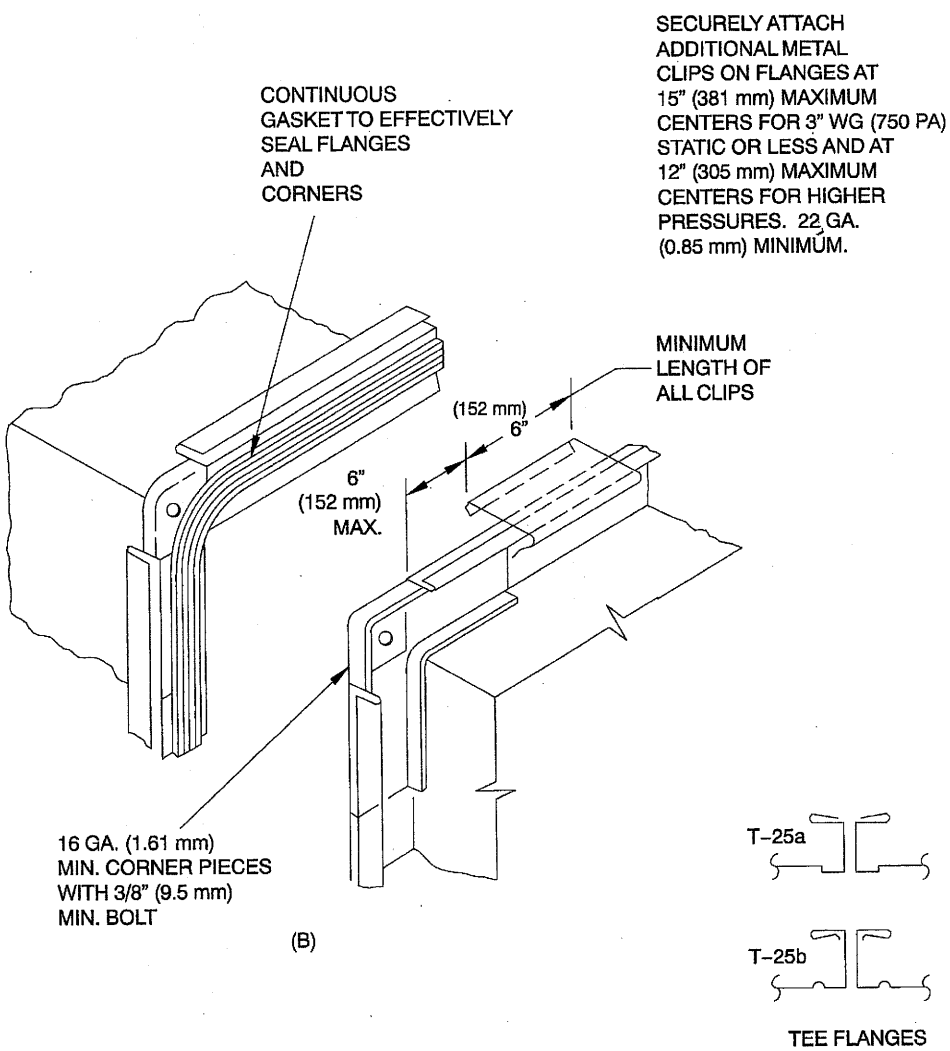
ELBOWS, TRANSITIONS, OFFSETS, BRANCH CONNECTIONS, & OTHER DUCT CONSTRUCTION: As per **SMACNA CHAPTER 4.**

HANGER ATTACHMENTS: Exposed to View

HANGER SPACING: As per **SMACNA TABLE 5-1**

UPPER ATTACHMENTS: 3/8" Expansion Anchors with 3/8" zinc coated all thread as per **SMACNA Fig. 5-1 and 5-2** or Hanger Strap

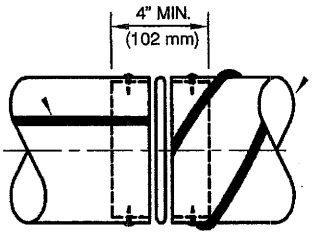
LOWER ATTACHMENTS: Trapeze Hangers as per **SMACNA FIG. 5-5** or Hanger Strap



SCREWS MAY BE USED IN LIEU OF METAL CLIPS. INSTALL 1" (25MM) MAX. FROM END OF CORNER PIECE AND AT 6" (152 MM) MAX. INTERVALS.

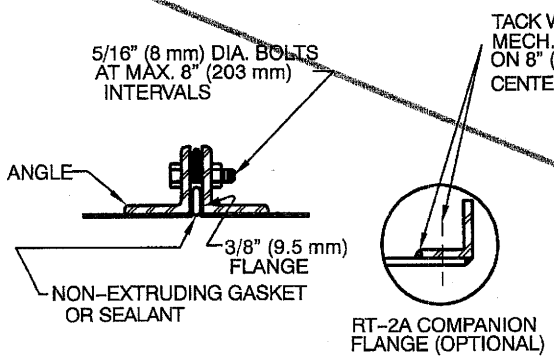
EQUIVALENT FIXATION OF JOINTS MAY BE USED. CONTINUOUS CLEATS MAY BE USED.

FIGURE 2-17 CORNER CLOSURES - FLANGES



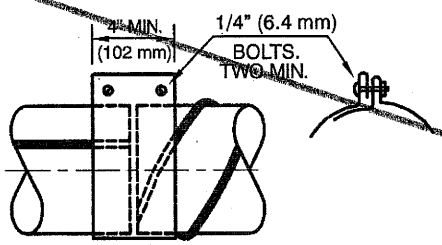
BEADED SLEEVE JOINT
RT–1

- Longitudinal or Spiral Seam
- Sleeve to be at least the same gage as duct
- Screws must be used at uniform intervals of at least 15 in. along the circumference
- Three screws minimum on 14 in. or less diameter



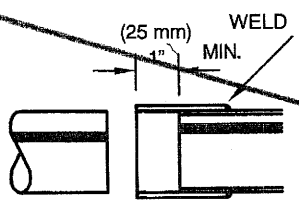
RT–2A COMPANION
FLANGE (OPTIONAL)

- Longitudinal or spiral seam
- Minimum Flange Sizes:
- 1 in. × 1 in. × 10 ga up to 14 in. Dia.
- 1 ½ in. × 1 ½ in. × ⅛ in. over 14 in. Dia.



RT3 DRAWBAND JOINT

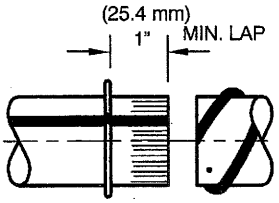
- Longitudinal or spiral seam
- Drawband to be at least same gage as duct



RT4 OUTSIDE SLEEVE

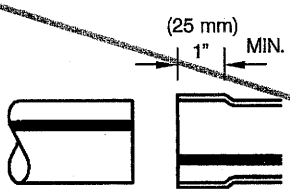
- Longitudinal seam only
- See RT-1 for screw requirements

FIGURE 3–1 ROUND DUCT TRANSVERSE JOINTS



CRIMP JOINT
BEAD OPTIONAL
RT–5

- Longitudinal or spiral seam
- See RT-1 for screw requirements



SWEDGE (BELL)
RT–6

- Longitudinal seam only
- See RT-1 for screw requirements

SLIP–ON
FLANGE
(CONSULT MFRS.)

- Consult manufacturers for ratings established by performance documented to functional criteria in Chapter 11.

FIGURE 3–1 ROUND DUCT TRANSVERSE JOINTS (CONTINUED)

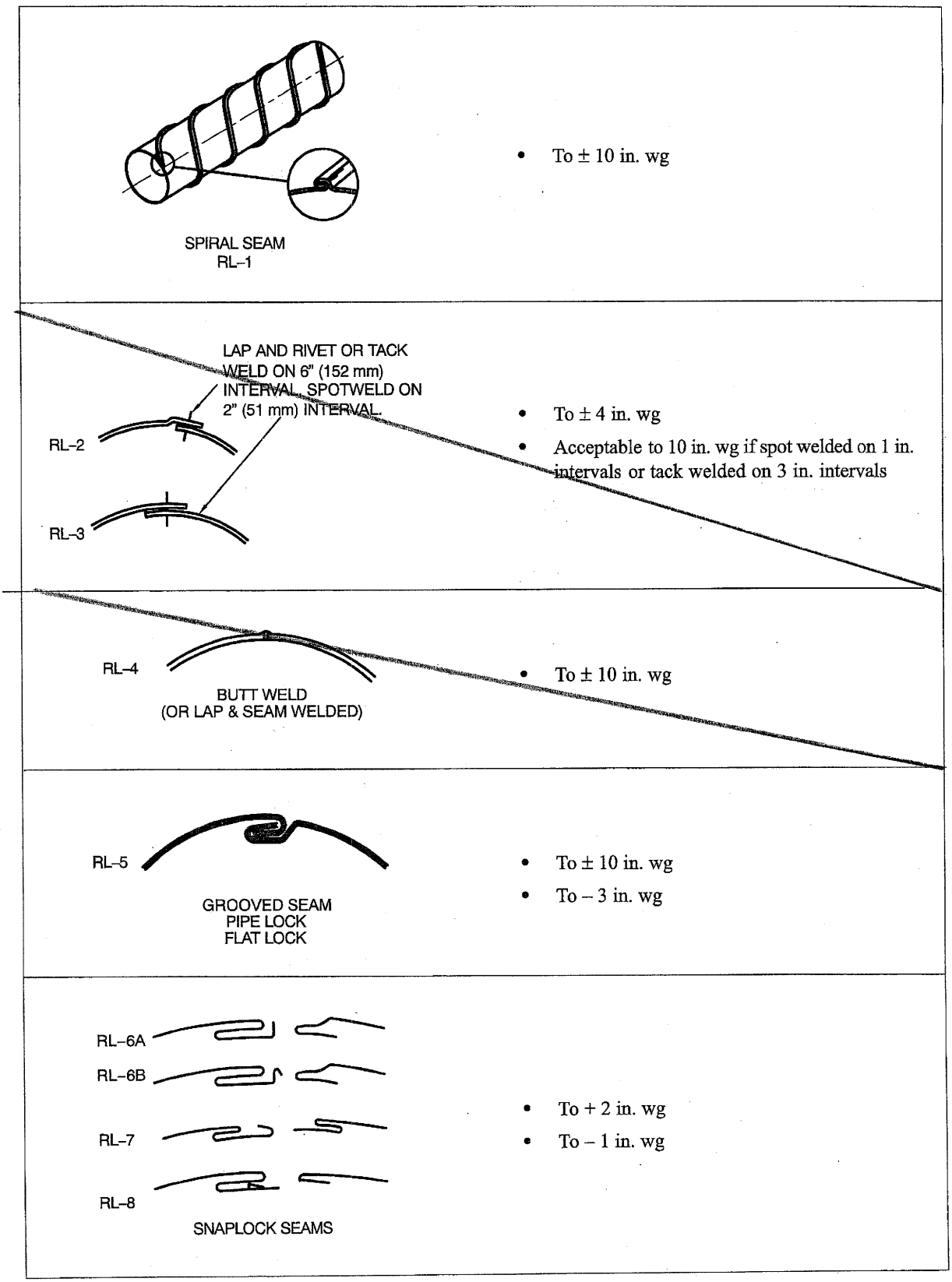
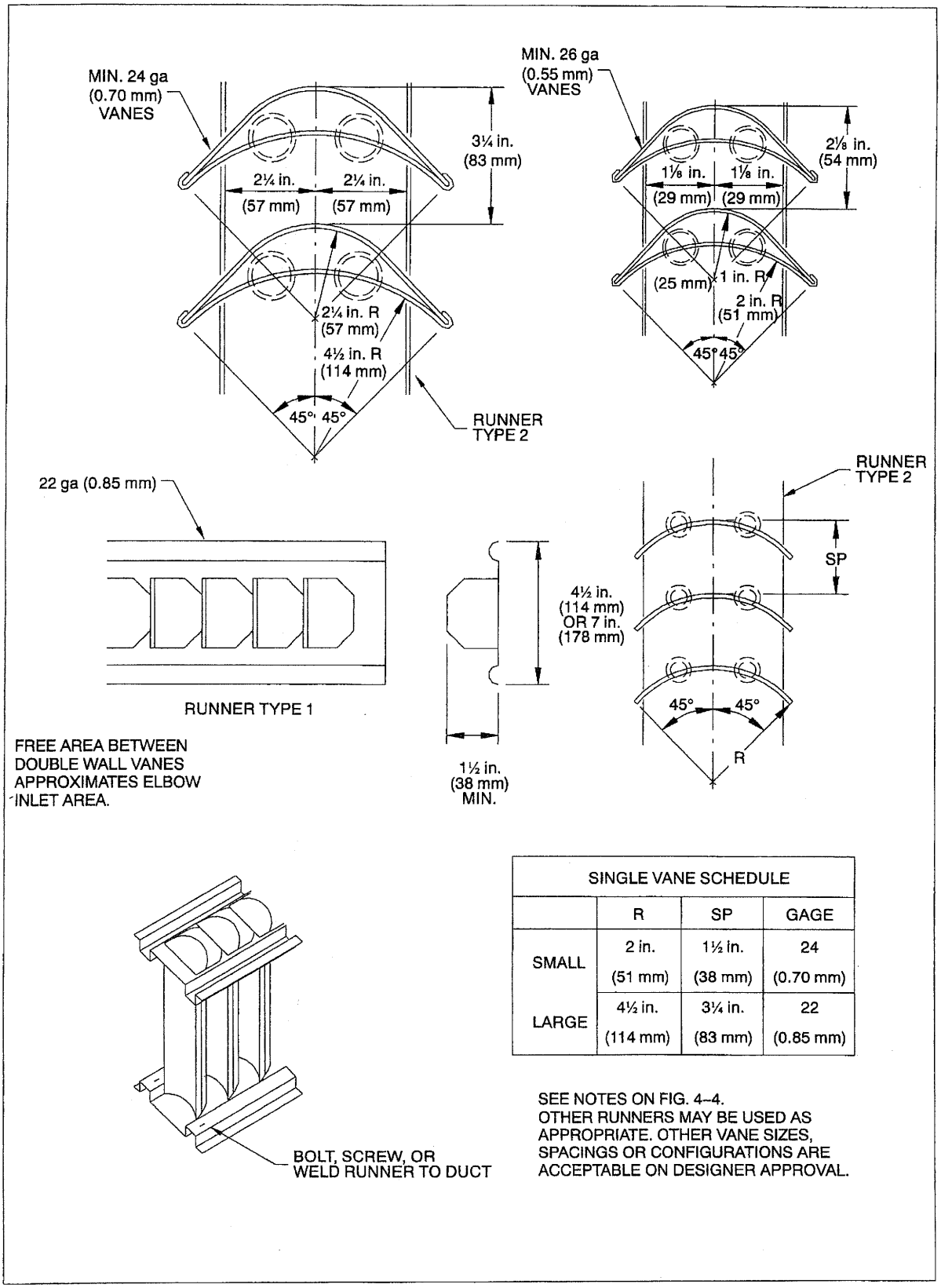


FIGURE 3–2 ROUND DUCT LONGITUDINAL SEAMS

Diameter, in.	Longitudinal Seam	Spiral Seam
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



SINGLE VANE SCHEDULE			
	R	SP	GAGE
SMALL	2 in. (51 mm)	1½ in. (38 mm)	24 (0.70 mm)
LARGE	4½ in. (114 mm)	3¼ in. (83 mm)	22 (0.85 mm)

SEE NOTES ON FIG. 4–4.
OTHER RUNNERS MAY BE USED AS APPROPRIATE. OTHER VANE SIZES, SPACINGS OR CONFIGURATIONS ARE ACCEPTABLE ON DESIGNER APPROVAL.

FIGURE 4–3 VANES AND VANE RUNNERS

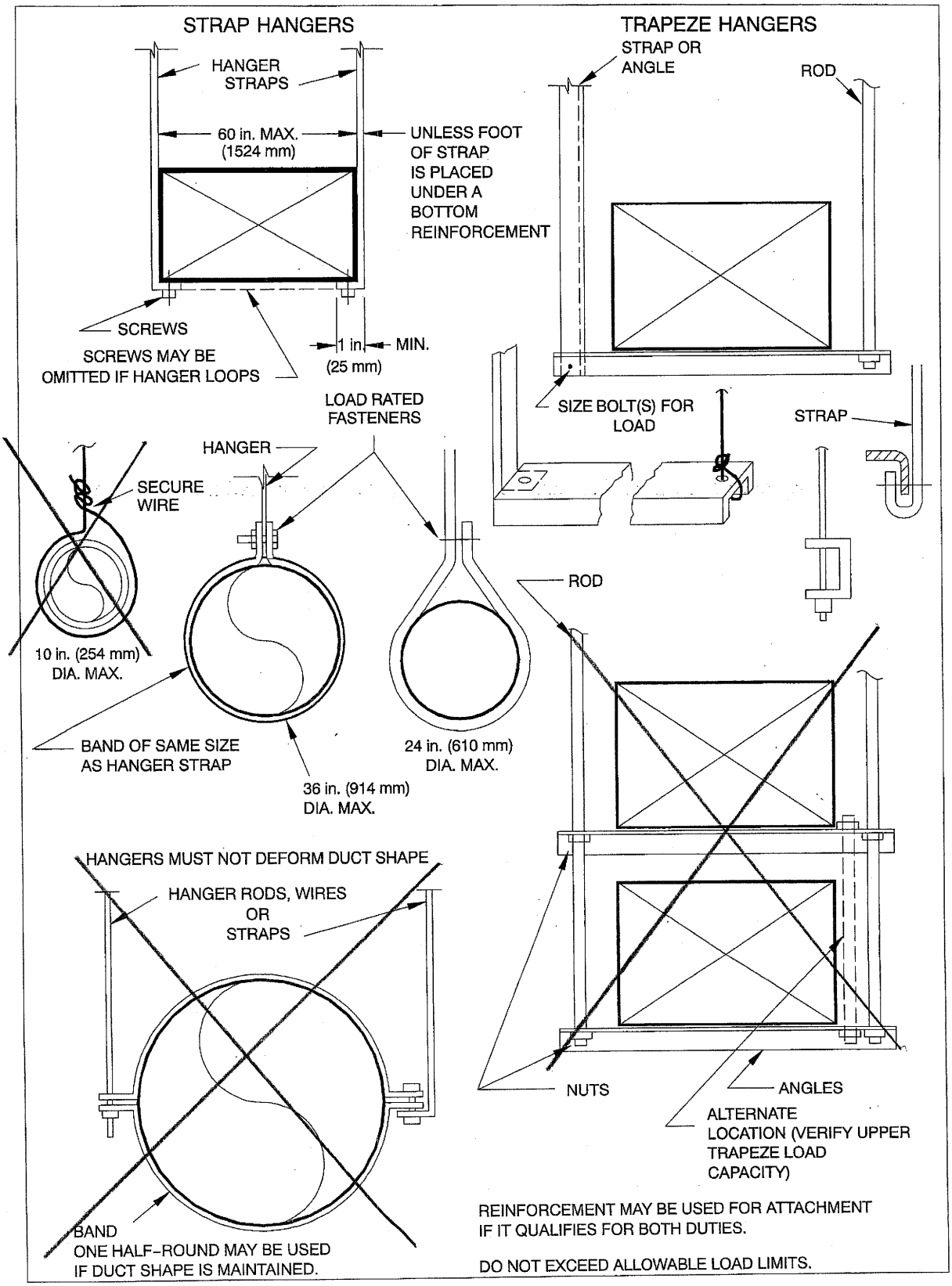


FIGURE 5–5 LOWER HANGER ATTACHMENTS

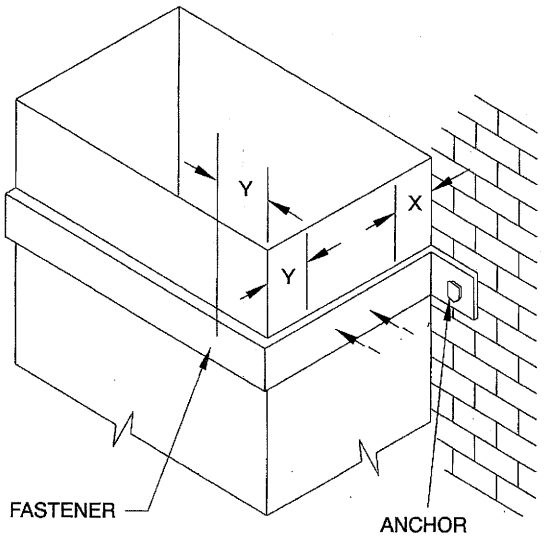


FIG. A

SHOWS SUPPLEMENTAL FASTENER LOCATIONS

FIG. A – SUGGESTED SIZING

DUCT SIZE	BAND
18"x12"	1 1/2"x16 GA.
24"x20"	1"x1/8"

DUCT GAGE	ALLOWABLE LOAD PER FASTENER*
28, 26	25 lb
24, 22, 20	35 lb
18, 16	50 lb

* WELD, BOLT OR NO. 8 SCREW (MIN.) DEVIATION PERMITTED BY OTHER ANALYSIS. X=1", Y=2"; ADD OTHERS TO ACCOMODATE LOAD. MINIMUM OF 3 ON 24" WIDTH AND UP. ADD ALONG SIDES NEAREST ANCHORS.

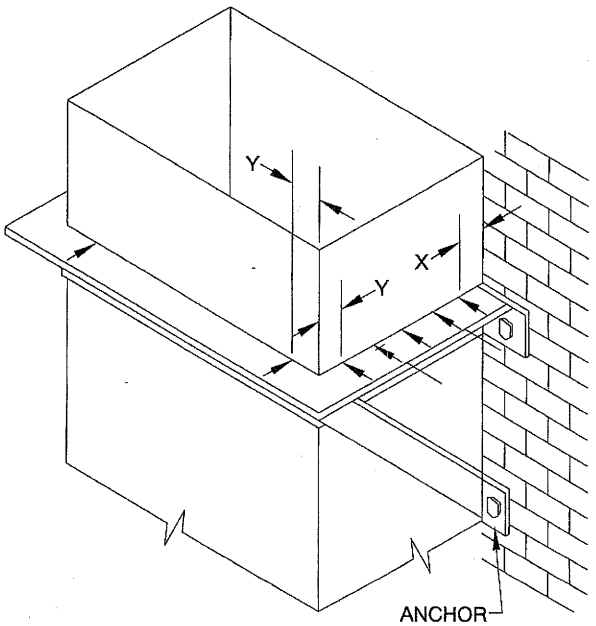
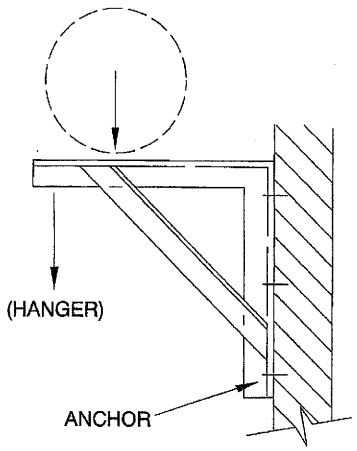


FIG. B



SEE KNEE BRACKET TABLES IN THE ROUND INDUSTRIAL STDS.

FIG. B – SUGGESTED SIZING

DUCT SIZE	ANGLE
30" x 12"	1" x 1" x 1/8"
36" x 18"	1" x 1" x 1/8"
42" x 24"	1 1/4" x 1 1/4" x 1/8"
48" x 30"	1 1/4" x 1 1/4" x 1/8"

NOTES:
1. BRACKETS ARE SIZED FOR 12 FEET OF DUCT, MAXIMUM.
2. LOCATE DUCTS AGAINST WALL OR MAXIMUM OF 2" AWAY FROM WALL.
3. EACH WALL ANCHOR SHALL SATISFY THE FOLLOWING CRITERIA UNLESS OTHER ANALYSIS IS MADE:
   A. TENSILE LOAD = 3/8 x DUCT WEIGHT; SAFETY FACTOR 4.
   B. SHEAR LOAD x 1/2 x DUCT WEIGHT; SAFETY FACTOR 4.

FIGURE 5-9 SUPPORTS FROM WALL

2 in. wg Static Pos. or Neg. / Duct Dimension	5 ft Joints			5 ft Joints w/2 ½ ft Reinf. Spacing				
				Joints/Reinf.			Int. Reinf.	
	Min ga	Joint Reinf.	Alt. Joint Reinf.	Min ga	Joint Reinf.	Alt. Joint Reinf.	Tie Rod	Alt. Reinf.
10 in. and under	26	N/R	N/R	Use 5 ft Joints				
11 – 12 in.	26	N/R	N/R					
13 – 14 in.	26	N/R	N/R					
15 – 16 in.	26	N/R	N/R					
17 – 18 in.	26	N/R	N/R					
19 – 20 in.	26	N/R	N/R					
21 – 22 in.	26	N/R	N/R					
23 – 24 in.	26	N/R	N/R					
25 – 26 in.	26	N/R	N/R					
27 – 28 in.	24	N/R	N/R	26	N/R	N/R	MPT	C
29 – 30 in.	24	N/R	N/R	26	N/R	N/R	MPT	D
31 – 36 in.	22	N/R	N/R	26	N/R	N/R	MPT	D
37 – 42 in.	~~22~~	~~JTR~~	~~(2) C~~	~~24~~	N/R	N/R	MPT	E
	20	N/R	N/A					
43 – 48 in.	~~20~~	~~JTR~~	~~(2) E~~	22	N/R	N/R	MPT	F
	18	N/R	N/A					
49 – 54 in.	~~20~~	~~JTR~~	~~(2) E~~	22	N/R	N/R	MPT	F
	18	N/R	N/A					
55 – 60 in.	20	JTR	(2) H	22	JTR	(2) C	MPT	G
61 – 72 in.	18	JTR	(2) H	20	JTR	(2) E	MPT	H
73 – 84 in.	16	JTR	(2) H	20	JTR	(2) I	(2) MPT	I
85 – 96 in.	Not Designed			20	JTR	(2) I	(2) MPT	I
97 – 108 in.				18	JTR	(2) I		J
109 – 120 in.				18	JTR	(2) I		K

Table 2–17 5 ft Coil/Sheet Stock/T25a/T25b (TDC/TDF) Duct Reinforcement

N/R - Not Required
N/A - Not Applicable
JTR - Joint Tie Rod
MPT - Mid Panel Tie Rod(s)
(2) (X) - Indicates 2 external reinforcements of class (X) to be used in lieu of Joint Tie Rods

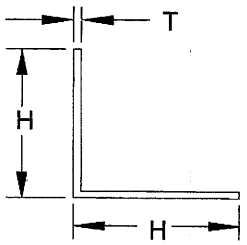
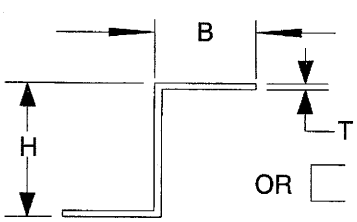
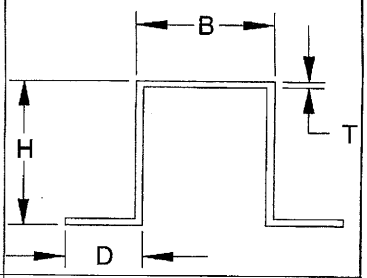
							
Reinf. Class		**Angle**		**Channel or Zee**		**Hat Section**	
	E1*	H × T (MIN)	WT LF	H × B × T (MIN)	WT LF	H × B × D × T (MIN)	WT LF
A	0.43	Use C		Use B		Use F	
B	1.0	Use C		¾ × ½ × 20 ga	0.24	Use F	
C	1.9	C 1 × 16 ga C ¾ × ⅛	0.40 0.57	¾ × ½ × 18 ga 1 × ¾ × 20 ga	0.31	Use F	
D	2.7	H ¾ × ⅛ C 1 × ⅛	0.57 0.80	1 × ¾ × 18 ga	0.45	Use F	
E	6.5	C 1 ¼ × 12 ga H 1 × ⅛	0.90	2 × 1 ⅛ × 20 ga	0.60	Use F	
F	12.8	H 1 ¼ × ⅛	1.02	1 ½ × ¾ × 18 ga	0.54	1 ½ × ¾ × ⅝ × 18 ga 1 ½ × 1 ½ × ¾ × 20 ga	0.90 0.83
G	15.8	1 ½ × ⅛	1.23	1 ½ × ¾ × 16 ga	0.66	1 ½ × ¾ × ⅝ × 18 ga	0.80
H	26.4	1 ½ × 3⁄16 2 × ⅛	1.78 1.65	1 ½ × ¾ × ⅛	1.31	1 ½ × 1 ½ × ¾ × 18 ga 2 × 1 × ¾ × 20 ga	1.08 0.90
I	69	C 2 × 3⁄16 2 ½ × ⅛	2.44 2.10	2 × 1 ⅛ × 12 ga. 3 × 1 ⅛ × 16 ga	1.60 1.05	2 × 1 × ¾ × 16 ga	1.44
J	80	H 2 × 3⁄16 C 2 × ¼ 2 ½ × ⅛ (+)	2.44 3.20 2.10	2 × 1 ⅛ × ⅛	1.85	2 × 1 × ¾ × 12 ga 2 ½ × 2 × ¾ × 18 ga	2.45 1.53
K	103	2 ½ × 3⁄16	3.10	3 × 1 ⅛ × 12 ga	2.00	2 ½ × 2 × ¾ × 16 ga 3 × 1 ½ × ¾ × 16 ga	1.88 2.00
L	207	H 2 ½ × ¼	4.10	3 × 1 ⅛ × ⅛	2.29	2 ½ × 2 × ¾ × ⅛ 3 × 1 ½ × ¾ × 12 ga	3.70 3.40

Table 2–29 Intermediate Reinforcement

See Section 2.1.4. *Effective EI is number listed times 10^5 before adjustment for bending moment capacity. C and H denote cold formed and hot rolled ratings; when neither is listed, either may be used. *See* tie rod options elsewhere.

NOTES:

a. (+) indicates positive pressure use only.

b. Hat Section Dimension "B" may be equal to 2 times Dimension "H" with the same reinforcement class rating.

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×T	WT LF	H×T	WT LF	H×T	WT LF	H×T	WT LF	H×T+HR	WT LF
A	0.43	Use B		Use B		½×26 ga	0.5	Use B		Use D	
B	1.0	1⅛×26 ga	0.4	1×26 ga	0.6	½×22 ga 1×26 ga	0.6	1×26 ga	0.7	Use D	
C	1.9	1⅛×22 ga	0.6	1×22 ga	0.8	1×22 ga	0.8	1×24 ga	0.8	Use D	
D	2.7	1⅛×18 ga	0.8	1⅛×20 ga 1×22 ga (+)	0.9	1×20 ga 1×22 ga (+)	0.9	1½×22 ga	1.0	1⅝×24 ga 1½×⅛ Bar	1.4
E	6.5	NOT GIVEN		1⅛×18 ga	1.0	1×18 ga (+)	1.0	1×18 ga 1½×20 ga	1.2	Use F	
F	12.8			Use G		NOT GIVEN		Use G		1⅝×22 ga 1½×⅛ Bar	1.5
G	15.8			1⅝×18 ga	1.3			1½×18 ga	1.3	1⅝×20 ga 1½×⅛ Bar	1.7
H	26.4			NOT GIVEN				NOT GIVEN		1⅝×18 ga 1½×⅛ Bar	2.0
I	69									2⅛×20 ga 2×2×⅛ Angle	2.9
J	80									2⅛×20 ga 2×2×3⁄16 Angle	3.7
K	103									NOT GIVEN	
L	207										

Table 2–31 Transverse Joint Reinforcement

See Section 2.1.4. *Effective EI is number listed times 10^5 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.

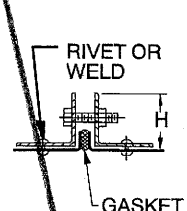
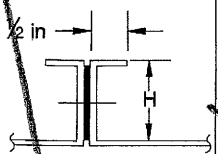
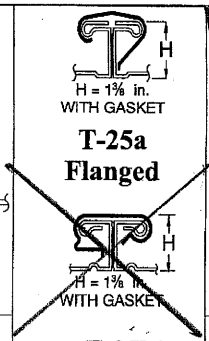
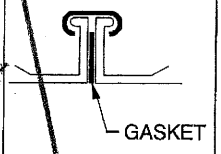
Reinf. Class		T-22 Companion Angles		T-24 Flanged		T-24a Flanged		T-25b Flanged		Slip-On Flange
										
	E1*	H × T	WT LF	T (Nom.)	WT LF	H × T (Nom.)	WT LF	H × T (Nom.)	WT LF	
B	1.0	Use E		Use D		Use D		Use D		Consult manufacturers for ratings established by performance documented to functional criteria 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 × 22 ga	0.4	26 ga	0.5	
E	6.5	C 1 × ⅛	1.7	24 ga	0.6	Use F		24 ga	0.6	
F	12.8	H 1 × ⅛	1.7	22 ga	0.7	1½ × 20 ga	0.6	22 ga	0.7	
G	15.8	1¼ × ⅛	2.1	22 ga (R) 20 G	1.0	1½ × 18 ga	0.8	22 ga (R) 20 ga	1.0	
H	26.4	C 1½ × ⅛ (+) H 1½ × ⅛	2.6	18 ga	1.1	SEE TIE ROD TEXT		18 ga	1.1	
I	69	1½ × ¼	3.7	20 ga (R)	1.0			20 ga (R)	1.0	
J	80	1½ × ¼ (+) 2 × ⅛	4.7	18 ga (R)	1.1			18 ga (R)	1.1	
K	103	2 × 3⁄16	5	18 ga (R)	1.1			18 ga (R)	1.1	
L	207	H 2 × ¼	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 10^5 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.

RECTANGULAR ALUMINUM DUCT
ADAPTED FROM 3 IN. WG (750 PA) OR LOWER

Galv. Steel ga (mm) nominal	28 (0.48)	26 (0.55)	24 (0.70)	22 (0.78)	20 (1.00)	18 (1.31)	16 (1.61)
Min. Alum. equivalent* (mm)	0.023 (0.58)	0.027 (0.69)	0.034 (0.86)	0.043 (1.09)	0.052 (1.32)	0.067 (1.70)	0.083 (2.11)
Commercial size (mm)	0.025 (0.60)	0.032 (0.80)	0.04 (1.00)	0.05 (1.27)	0.063 (1.60)	0.071 (1.80)	0.09 (2.29)
Lbs wt/Sf. Alum.	Consult Appendix page A.5 for Weights						

Table 2–50 Thickness Adjustments

*Alloy 3003-H-14.

Galv. Rigidity Class	A	B	C	D	E	F	G	H	I	J	K	L
Alum. dim. per Galv. Class	C	E	E	F	H	I	I	K	**	**	**	**

Table 2–51 Dimension Adjustments

**Calculate an effective I_x = 3 x that used for steel.

Steel Angle Size In. (mm)	Cod	Equivalent Alum.*** Angle Size, In.	Steel Bar	Alum. Bar***
1 × 1 × 16 ga (25 × 25 × 1.61)	C	1¼ × 1¼ × ⅛ (31.8 × 31.8 × 3.2)	1 × ⅛ (25 × 3.2)	1½ × ⅛ or 1¼ × 3⁄16 (38. 1 × 38.1 or 31.8 × 4.8)
1 × 1 × ⅛ (25 × 25 × 3.2)	D	1½ × 1½ × ⅛ (38.1 × 38.1 × 3.2)	1½ × ⅛ (38.1 × 3.2)	1½ × ⅛ or 1¼ × 3⁄16 (38.1 × 38.1 or 31.8 × 4.8)
1¼ × 1¼ × ⅛ (31.8 × 31.8 × 3.2)	E	1¾ × 1¾ × ⅛ (44.5 × 44.5 × 3.2)		
1½ × 1½ × ⅛ (31.8 × 31.8 × 3.2)	F	2½ × 2½ × ⅛ (63.5 × 63.5 × 3.2)		
1½ × 1½ × 3⁄16 (31.8 × 31.8 × 4.8)	G	2 × 2 × ¼ (51 × 51 × 6.4)		
2 × 2 × ⅛ (51 × 51 × 3.2)	H	2½ × 2½ × 3⁄16 (63.5 × 63.5 × 4.8)		
2 × 2 × 3⁄16 (51 × 51 × 4.8)	I	2½ × 2½ × ⅜ or 3 × 3 × ¼ (63.5 × 63.5 × 7.9 or 76.2 × 76.2 × 6.4)		
2 × 2 × ¼ (51 × 51 × 6.4)	J	2½ × 2½ × ⅜ or 3 × 3 × ¼ (63.5 × 63.5 × 7.9 or 76.2 × 76.2 × 6.4)		
2½ × 2½ × 3⁄16 (63.5 ×. 63.5 × 4.8)	K	3 × 3 × ⅜ or 3½ × 3½ × ¼ (76.2 × 76.2 × 9.5 or 88.9 × 88.9 × 6.4)		

Table 2–52 Reinforcements

***Allow 6061-T Strength normally.

Any aluminum shape substitute must have a moment of inertia three times that of steel and have 30,000 psi minimum yield strength.

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

Table 3–14 Aluminum Round Duct Gage Schedule

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 as related in Table 2-52 (for rectangular duct). Hangers in contact with the duct shall be galvanized steel or aluminum.

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

Duct Diameter (mm)	Maximum 500 Pa Static Positive		Maximum 500 Pa Static Negative	
	Spiral Seam Gage (mm)	Longitudinal Seam Gage (mm)	Spiral Seam Gage (mm)	Longitudinal Seam Gage (mm)
75 thru 200	0.64	0.81	0.64	1.02
230 thru 350	0.64	0.81	0.81	1.02
351 thru 650	0.81	1.02	1.02	1.27
651 thru 900	1.02	1.27	1.27	1.60
901 thru 1250	1.27	1.60	1.60	1.80
1251 thru 1500	1.60	1.80	N.A.	2.29
1501 thru 2100	N.A.	2.29	N.A.	N.A.

Table 3–14M Aluminum Round Duct Gage Schedule

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 as related in Table 2-52 (for rectangular duct). Hangers in contact with the duct shall be galvanized steel or aluminum.

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

Maximum Half of Duct Perimeter	Pair at 10 ft Spacing		Pair at 8 ft Spacing		Pair at 5 ft Spacing		Pair at 4 ft Spacing	
	Strap	Wire/ Rod	Strap	Wire/ Rod	Strap	Wire/ Rod	Strap	Wire/ Rod
P/2 = 30"	1" × 22 ga	10 ga (.135")	1" × 22 ga	10 ga (.135")	1" × 22 ga	12 ga (.106")	1" × 22 ga	12 ga (.106")
P/2 = 72"	1" × 18 ga	⅜"	1" × 20 ga	¼"	1" × 22 ga	¼"	1" × 22 ga	¼"
P/2 = 96"	1" × 16 ga	⅜"	1" × 18 ga	⅜"	1" × 20 ga	⅜"	1" × 22 ga	¼"
P/2 = 120"	1½" × 16 ga	½"	1" × 16 ga	⅜"	1" × 18 ga	⅜"	1" × 20 ga	¼"
P/2 = 168"	1½" × 16 ga	½"	1½" × 16 ga	½"	1" × 16 ga	⅜"	1" × 18 ga	⅜"
P/2 = 192"	Not Given	½"	1 ½ " × 16 ga	½"	1" × 16 ga	⅜"	1" × 16 ga	⅜"
P/2 = 193" up	Special Analysis Required							

When Straps are Lap Joined Use These Minimum Fasteners:	Single Hanger Maximum Allowable Load	
	Strap	Wire or Rod (Dia.)
1" × 18, 20, 22 ga -two #10 or one ¼" bolt 1" × 16 ga -two ¼" dia. 1½" × 16 ga -two ⅜" dia Place fasteners in series, not side by side.	1" × 22 ga - 260 lbs. 1" × 20 ga - 320 lbs. 1" × 18 ga - 420 lbs. 1" × 16 ga - 700 lbs. 1½" × 16 ga - 1100 lbs.	0.106" - 80 lbs. 0.135" - 120 lbs. 0.162" - 160 lbs. ¼" - 270 lbs. ⅜" - 680 lbs. ½" - 1250 lbs. ⅝" - 2000 lbs. ¾" - 3000 lbs.

Table 5–1 Rectangular Duct Hangers Minimum Size

NOTES:

a. Dimensions other than gage are in inches.

b. Tables allow for duct weight, 1 lb./sf insulation weight and normal reinforcement and trapeze weight, but no external loads!

c. For custom design of hangers, designers may consult SMACNA's *Rectangular Industrial Duct Construction Standards,* the AISI *Cold Formed Steel Design Manual* and the AISC Steel *Construction Manual.*

d. Straps are galvanized steel; other materials are uncoated steel.

e. Allowable loads for P/2 assume that ducts are 16 ga maximum, except that when maximum duct dimension (w) is over 60 in. then P/2 maximum is 1.25 w.

f. For upper attachments *see* Figs. 5-2, 5-3 and 5-4.

g. For lower attachments *see* Fig. 5-5.

h. For trapeze sizes *see* Table 5-3 and Fig. 5-6.

i. 12, 10, or 8 ga wire is steel of black annealed, bright basic, or galvanized type.

j. Cable hanging systems with adjustable mechanical device.

Dia.	Maximum Spacing	Wire Dia.	Rod	Strap
10 in. dn 250 mm dn	12 ft 3.7 m	One 12 ga One 2.75 mm	¼ in. 6.4 mm	1 in. × 22 ga 25.4 x 0.85 mm
11-18 in. 460 mm	12 ft 3.7 m	Two 12 ga or One 8 ga One 4.27 mm	¼ in. 6.4 mm	1 in. × 22 ga 25.4 × 0.85 mm
19-24 in. 610 mm	12 ft 3.7 m	Two 10 ga Two 3.51 mm	¼ in. 6.4 mm	1 in. × 22 ga 25.4 × 0.85 mm
25-36 in. 900 mm	12 ft 3.7 m	Two 8 ga Two 2.7 mm	⅜ in. 9.5 mm	1 in. × 20 ga 25.4 × 1.00 mm
37-50 in. 1270 mm	12 ft 3.7 m	→	Two ⅜ in. Two 9.5 mm	Two 1 in. × 20 ga (2) 25.4 × 1.00 mm
51-60 in. 1520 mm	12 ft 3.7 m	→	Two ⅜ in. Two 9.5 mm	Two 1 in. × 18 ga (2) 25.4 × 1.31 mm
61-84 in. 2130 mm	12 ft 3.7 m	→	Two ⅜ in. Two 9.5 mm	Two 1 in. × 16 ga (2) 25.4 × 1.61 mm
85-96 in. 2400 mm	12 ft 3.7 m	→	Two ½ in. Two 12 mm	Two 1½ in. × 16 ga (2) 38 × 1.61 mm

Table 5–2 Minimum Hanger Sizes for Round Duct

NOTES:

a. Straps are galvanized steel; rods are uncoated or galvanized steel; wire is black annealed, bright basic or galvanized steel. All are alternatives.

b. *See* Figure 5-5 for lower supports.

c. *See* Figs. 5-2, 5-3 and 5-4 for upper attachments.

d. Table allows for conventional wall thickness, and joint systems plus one lb./sf (4.89 Kg/m^2) insulation weight. If heavier ducts are to be installed, adjust hanger sizes to be within their load limits; see allowable loads with Table 5-1. Hanger spacing may be adjusted by special analysis.

e. Designers: For industrial grade supports, including saddles, single point trapeze loads, longer spans and flanged joint loads, *see* SMACNA's *Round Industrial Duct Construction Standards.*

f. *See* Figs. 3-9 and 3-10 for flexible duct supports.

Trapeze	Angles													Channels		
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Length, in.	1" × 1" × 16 ga	1" × 1" × ⅛"	1-½" × 1-½" × 16ga	1-½" × 1-½" × ⅛"	1-½" × 1-½" × 3/16"	1-½" × 1-½" × ¼"	2" × 2" × ⅛"	2" × 2" × 3/16"	2" × 2" × ¼"	2-½" × 2-½" × 3/16"	2-½" × 2-½" × ¼"	3" × 3" × ¼"	4" × 4" × ¼"	3" × 4.1 lb/ft	3" × 6.0 lb/ft	4" × 5.4 lb/ft
18	80	150	180	350	510	650	650	940	1230	1500	1960	-	-	-	-	-
24	75	150	180	350	510	650	650	940	1230	1500	1960	-	-	-	-	-
30	70	150	180	350	510	650	650	940	1230	1500	1960	-	-	-	-	-
36	60	130	160	340	500	620	620	920	1200	1480	1940	-	-	-	-	-
42	40	110	140	320	480	610	610	900	1190	1470	1930	-	-	-	-	-
48	-	80	110	290	450	580	580	870	1160	1440	1900	-	-	-	-	-
54	-	-	-	250	400	540	540	840	1120	1400	1860	-	-	-	-	-
60	-	-	-	190	350	490	490	780	1060	1340	1800	-	-	-	-	-
66	-	-	-	100	270	400	400	700	980	1260	1720	-	-	-	-	-
72	-	-	-	-	190	320	320	620	900	1180	1640	-	-	-	-	-
78	-	-	-	-	-	210	210	500	790	1070	1530	-	-	-	-	-
84	-	-	-	-	-	-	-	380	660	940	1400	2310	4680	4650	5980	9080
96	-	-	-	-	-	-	-	-	320	600	1060	1970	4340	3870	4950	8740
108	-	-	-	-	-	-	-	-	-	-	-	2510	7240	5760	7780	15650
120	-	-	-	-	-	-	-	-	-	-	-	1220	5950	4120	5930	13200
132	-	-	-	-	-	-	-	-	-	-	-	-	4350	2540	3920	10820
144	-	-	-	-	-	-	-	-	-	-	-	-	2420	-	2000	8330
Section Properties I_x	0.012	0.022	0.041	0.078	0.110	0.139	0.190	0.272	0.348	0.547	0.703	1.240	3.040	1.660	2.070	3.850
Section Properties Z	0.016	0.031	0.037	0.072	0.104	0.13	0.130	0.190	0.247	0.303	0.394	0.577	1.050	1.100	1.380	1.930
Section Properties A	0.120	0.234	0.180	0.359	0.527	0.688	0.484	0.715	0.938	0.902	1.190	1.440	1.940	1.210	1.760	1.590
Section Properties lb/ft	0.440	0.800	0.660	1.230	1.800	2.340	1.650	2.440	3.190	3.070	4.100	4.900	6.600	4.100	6.000	5.400

Table 5–3 Allowable Loads in Pounds for Trapeze Bars

NOTES:

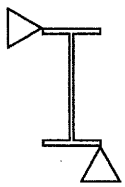
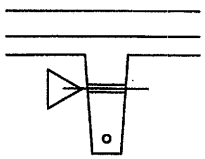
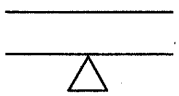
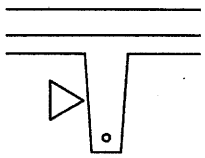
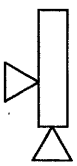
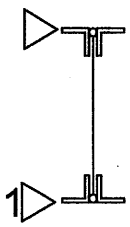
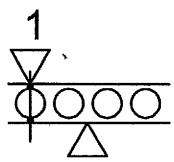
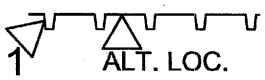
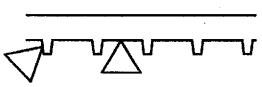
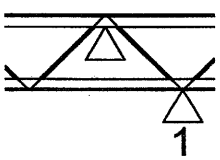
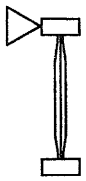
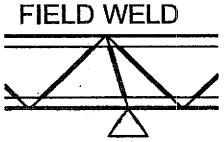
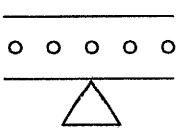
a. It is assumed that steel with a yield strength of 30,000 psi or greater is used.

b. Loads above assume that a hanger rod is 6 in. max distance from the duct side for lengths of 96 in. or less, and 3 in. for greater lengths.

c. Framing Struts, *see* Table 5-4 and other steel shapes having equal or greater (Ix and Z) properties may be used in place of listed shapes. Ix is in in.^{4}, Z is in in.^{3}, and A is in in.^{2}

d. *See* Fig. 5-6 for load calculation method and Table 5-1 for rod and strap load limits.

HANGER ATTACHMENT

STL. BEAM 	CONC. TEE  REQUIRES X-RAY & ENGINEER APPR.	POURED CONC. 	CONC. TEE  NEVER DRILL BOTTOM OF TEE! ENGR. TO APPR. LOC. IN SIDES
TJI 	LAM. BEAM MICRO LAM DIM. LUMBER 	BAR JOIST  1) REQUIRES ENGR. APPROVAL	CONC. PLANK  1) REQUIRES ENGR. APPROVAL
PURLIN  1) MFG'D. ANCHOR APPR. FOR APPLIC.	MTL. DECK ROOF  ALT. LOC. AVOID 1) PREFERRED LOC. REQUIRES ENGR. APPROVAL	DECK & CONC. 	BAR JOIST  1) GENERALLY LIMITED TO 50# & ENGR. APPR.
WOOD JOIST OPEN WEB 	BAR JOIST ADDED STRUT FIELD WELD  REQUIRES ENGR. APPROVAL	POST-TENSIONED CONC.  REQUIRES ENGR. APPROVAL	

(12 GAUGE) PHD STRUT "UNISTRUT" CHANNEL ALLOWABLE BEAM LOADING (LBS.)

SOLID CHANNEL

	UNIFORM LOADING:						CONCENTRATED LOADING:					
SPAN (FT.)	**13/16 X 1-5/8**	**1-5/8 X 1-5/8**	**1-5/8 X 3-1/4**	**DBL 13/16**	**DBL 1-5/8**		**13/16 X 1-5/8**	**1-5/8 X 1-5/8**	**1-5/8 X 3-1/4**		**DBL 13/16**	**DBL 1-5/8**
3	255						**128**					
5	110	495		410			**55**	**248**			**205**	
7	45	250	1490	210	1280		**23**	**125**	**745**		**105**	**640**
9	25	150	900	125	775		**13**	**75**	**450**		**63**	**388**

CHANNEL WITH 1-1/8" X 9/16" SLOTS 2" O.C.

	UNIFORM LOADING:						CONCENTRATED LOADING):					
SPAN (FT.)	**13/16 X 1-5/8**	**1-5/8 X 1-5/8**	**1-5/8 X 3-1/4**	**DBL 13/16**	**DBL 1-5/8**		**13/16 X 1-5/8**	**1-5/8 X 1-5/8**	**1-5/8 X 3-1/4**		**DBL 13/16**	**DBL 1-5/8**
3	217						**109**					
5	94	421		349			**47**	**211**			**175**	
7	38	213	1267	179	1088		**19**	**107**	**634**		**90**	**544**
9	21	128	765	106	659		**11**	**64**	**383**		**53**	**330**

DEFLECTION IS 1/240TH OF SPAN

SEE CATALOG DATA FOR CONDITIONS NOT SHOWN

2.4 Duct Liner

Johns Manville

Air Handling Systems

Linacoustic® RC

Fiber Glass Duct Liner with Reinforced Coating System

Description

Linacoustic RC is a flexible duct liner insulation made from strong, glass fibers bonded with a thermosetting resin. The airstream surface is protected with JM's exclusive Reinforced Coating system, which combines our state-of-the-art Permacote® acrylic coating with a flexible glass mat reinforcement to provide a smooth airstream surface.

Factory-Applied Edge Coating

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

Uses

Linacoustic RC is specifically designed for lining sheet metal ducts in air conditioning, heating and ventilating systems, providing superior acoustical and thermal performance.

General Properties

Operating temperature (max.) – ASTM C 411	250°F (121°C)
Air velocity (max.) – ASTM C 1071	6000 fpm (30.5 m/sec)
Water repellency – INDA IST 80.6	≥6
Fungi resistance – ASTM C 1338	Does not breed or promote
Fungi resistance – ASTM G 21	No growth
Bacteria resistance – ASTM G 22	No growth

Standard Thicknesses and Packaging

Thickness		Roll Length		Roll Widths for All Thicknesses*	
in	mm	lineal feet	lineal meters	in	mm
½	13	100, 150, 200	31, 46, 61	34 to 36	864 to 914
1	25	50,100,150,200	15, 31, 46, 61	44 to 48	1118 to 1219
1½	38	50, 100	15, 31	56 to 60	1422 to 1524
2	51	50	15	66 to 72	1676 to 1829

**Available in ¼" (6.4 mm) increment*

Contact your Regional Sales Office for stock items and availability of special sizes.

Surface Burning Characteristics

Linacoustic RC meets the Surface Burning Characteristics and Limited Combustibility of the following standards:

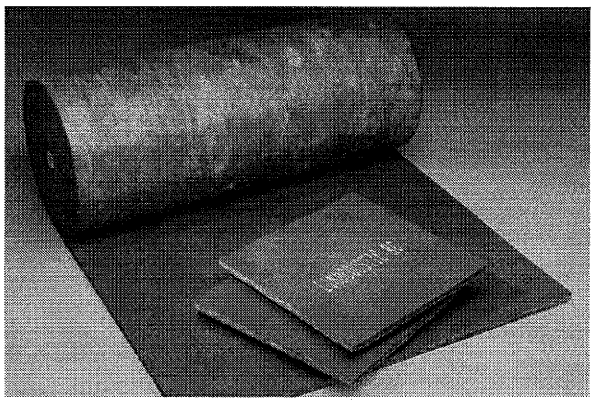
Standard/Test Method
- ASTM E 84
- UL 723
- NFPA 255
- NFPA 90A and 90B
- NFPA 259
- CAN/ULC S102-M88

Maximum Flame Spread Index	25
Maximum Smoke Developed Index	50

UL labels supplied on packages when requested on order.

Specification Compliance

- ASTM C 1071, Type I
- ICC Compliant
- California Title 24
- MEA #353-93-M
- ASHRAE 62
- SMACNA Application Standards for Duct Liners
- NAIMA Fibrous Glass Duct Liner Installation Standard
- Canada: CGSB 51-GP-11M and CAN/CGSB 51.11



Advantages

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

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 an immobilized, EPA-registered, protective agent to protect the coating from potential growth of fungus and bacteria.

Linacoustic RC duct liner meets all requirements 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.

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 Reinforced Coating 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."

Highly Resistant to Water. The Reinforced Coating surface provides superior resistance to penetration of incidental water into the fiber glass wool core.

Green Building Attributes

GREENGUARD® certification is not intended for residential environments. Instead, the certification is intended only for buildings meeting ASHRAE 62.1-2007 commercial building ventilation rates. This certification is proof that the product meets the GREENGUARD Environmental Institute's indoor air quality standards and product emission standards for VOCs.

GREENGUARD Indoor Air Quality Certified

SCS CERTIFIED Minimum 25% Recycled Content

5% Pre-consumer
20% Post-consumer
SCIENTIFIC CERTIFICATION SYSTEMS
SCS-MC-01073

Linacoustic® RC

Fiber Glass Duct Liner with Reinforced Coating System

Installation

Linacoustic RC installation must be performed in accordance with the requirements of the NAIMA Fibrous Glass Duct Liner Standards or SMACNA HVAC Duct Construction Standard. All transverse edges, or any edges exposed to airflow, must be coated with an approved duct liner coating material, such as Johns Manville SuperSeal products.

Minimizes Pre-installation Damage. Linacoustic RC's Reinforced Coating System is highly resistant to damage that can occur during in-shop handling, fabrication, jobsite shipping and installation.

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

Thermal Performance

Thickness		R-value		Conductance	
in	mm	(hr•ft²•°F)/Btu	m²•°C/W	Btu/(hr•ft²•°F)	W/m²•°C
½	13	2.2	0.39	0.46	2.61
1	25	4.2	0.74	0.24	1.36
1½	38	6.3	1.11	0.16	0.91
2	51	8.0	1.41	0.13	0.74

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.

Sound Absorption Coefficients (Type "A" Mounting)

Thickness		Sound Absorption Coefficient at Frequency (Cycles per Second) of						
in	mm	125	250	500	1000	2000	4000	NRC
½	13	0.07	0.20	0.44	0.66	0.84	0.93	0.55
1	25	0.08	0.31	0.64	0.84	0.97	1.03	0.70
1½	38	0.10	0.47	0.85	1.01	1.02	0.99	0.85
2	51	0.25	0.66	1.00	1.05	1.02	1.01	0.95

Coefficients were tested in accordance with ASTM C 423 and ASTM E 795.

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.

Johns Manville

717 17th St.
Denver, CO 80202
(800) 654-3103
specJM.com

AHS-329 02/10 (Replaces 10/09)

North American Sales Offices, Insulation Systems

Eastern Region
P.O. Box 158
Defiance, OH 43512
(800) 334-2399
Fax: (419) 784-7866

Western Region and Canada
P.O. Box 5108
Denver, CO 80217
(800) 368-4431
Fax: (303) 978-4661

The physical and chemical properties of the Linacoustic® RC Fiber Glass Duct Liner with Reinforced Coating System listed herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Numerical flame spread and smoke developed ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions. Check with the Regional Sales Office nearest you to assure current information.

All Johns Manville products are sold subject to Johns Manville's standard Terms and Conditions, including Limited Warranty and Limitation of Remedy. For a copy of the Johns Manville standard Terms and Conditions, Limited Warranty and Limitation of Remedy, and information on other Johns Manville thermal insulation and systems, call (800) 654-3103.

Technical support bulletin

DP 2500

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 inslulation board.

Features and Benefits:

- LEED Qualified
- UL Classified
- Excellent Wet Tack
- Non-Flammable
- Moisture Resistant
- Exceptional Coverage
- Low Odor
- Non-Oxidizing
- Meets Requirements of UL 723, ASTM E-84 NFPA 90A & 90B, and 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 2500 may be applied by brush, roller, roller coater, or spray equipment. DP 2500 may be applied to either the galvanized steel or the fibrous insulation.

For internal fiberglass duct insulation: Apply DP 2500 evenly and secure with mechanical fasteners in accordance with SMACNA standards.

DP 2500 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: Clear
Base: Water
Chemical Family: Synthetic Latex
Solids Content: 40 ± 2%
Viscosity: Approx. 2,000 - 3,000 cps
Application Temperature: 40°F - 110°F
Storage Temperature: 40°F - 110°F.
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: 5 gallon pail, 50 gallon drum, 275 gallon tote
VOC: 22 g/l

UNDERWRITERS LABORATORIES INC.
CLASSIFIED ADHESIVES
5Z09
DP 2500 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.
CLASSIFIED C UL US

DESIGN POLYMERICS
11609 Martens River Circle
Fountain Valley, CA 92708
Toll Free 800.641.0808
Phone 714.432.0600
Fax 714.432.0660
www.designpoly.com

Revised 2-26-10

AIRSEAL® 22

WATER BASED DUCT SEALANT

LEED COMPLIANT

FEATURES

- *LEED EQ Credit 4.1*
- *Cures to a tough, flexible film*
- *Formulated Indoor and Outdoor use*
- *Seals High Pressure HVAC Duct Systems*
- *Exceeds all SMACNA Pressure and Sealing Classes.*
- *Has excellent mold and mildew resistance.*

TECHNICAL SPECIFICATIONS	
Packaging	(24) 10.5 oz. tubes, (12) 29 oz. tubes, (4) 1 gal./ case, 2 gal. pail, 5 gal. pail, 55/53 gal. drum
Shelf Life	18 months in unopened containers
Pressure Rating	Maximum 12" water column pressure
Coverage Rate	Approximately 80 sq. feet per gallon @ 20 mils. wet film thickness.
Solids Content	70%± 2% by weight
Weight per gal.	10.8 lbs.± 0.3 lbs.
Color	Gray, White
Temperature Limits	Storage and application... 35°F to 115°F Service..... -40°F to 200°F **Protect From Freezing.** If frozen, completely thaw prior to use. Passes 5 Freeze-Thaw Cycles.
Class 1 Smoke and Flame Rating LEED COMPLIANT SCAQMD Rule 1168	UNDERWRITERS LABORATORIES INC. CLASSIFIED CAULKING AND SEALANTS Applied to organic, Reinforced Cement Board. Flame Spread .....5 Smoke Developed .....0 10YF Tested in accordance with UL 723, and ASTM E-84. Satisfies the requirements of NFPA 90A, 90B, and 225.
Clean Up	Use warm soap and water

RECOMMENDED USES

AIRSEAL 22 is a UL 181 A-M & B-M listed fast drying water based duct sealant with excellent adhesion, formulated to pressure seal all types of HVAC duct systems, including sheet metal, fiberglass duct board and flexible duct.

APPLICATION INSTRUCTIONS

Apply to clean, dry surfaces, free from oils, dirt, and foreign matter. Spread at a minimum 20 mils. wet film thickness with a brush, or pump into well fitted joints. Seal all joints, seams, and penetrations in the ductwork to ensure an airtight system. Dries to touch in one (1) hour. Prior to pressure testing, allow 12 - 24 hours dry time depending on temperature, humidity and application thickness. Do not apply on outdoor surfaces within 5 hours of possibility of rain or freezing temperatures.

UL 181 A-M & B-M APPLICATION INSTRUCTIONS:
Materials must be applied in strict accordance with the following instructions in order to meet the requirements of UL 181. Allow 48 hours dry time minimum for UL 181 applications.

UL 181 A-M DUCT BOARD:

1. Fold grooved duct board to form the module, making certain that both ends are flush and the shiplaps are properly sealed.
2. Staple the duct board flap on 2" centers using outward clinching staples.
3. Spread mastic base coat onto the surface at a minimum rate of 10 mils. wet film thickness, 3" wide over stapled joint.
4. Embed fiberglass scrim tape (5 mils thick, 20 x 10 plain weave) into base coat.
5. Finish with a top coat of mastic, applied at 10 mils. minimum wet film thickness.

UL 181 B-M FLEXIBLE DUCT / METAL DUCT:

1. Coat around the collar fitting with mastic at 20 mils. wet film thickness, 3" wide.
2. Pull back jacket and insulation from the inner core. Slide 2" of the inner core over the mastic and collar. Secure with a mechanical fastener.
3. Pull the jacket and insulation back over core. Secure jacket in accordance with Flexible duct installation instructions.

Polymer Adhesives Sealant Systems Inc., is proud to be affiliated with the following organizations:

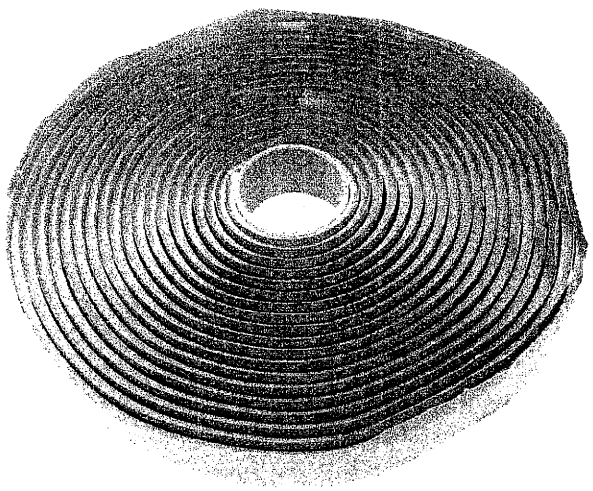
SMACNA NFPA HARDI UL LISTED UL 181A-M UL 181B-M 10YF

POLYMER ADHESIVES
SEALANT SYSTEMS, INC.

www.polymeradhesives.com

501 Garrett Morris Parkway, Mineral Wells, TX 76067 (888) 721-SEAL Fax (888) 921-SEAL

440 BUTYL GASKET



DESCRIPTION

en's 440 Butyl Gasket is a high quality gray butyl gasket tape that is extruded on smooth silicone release paper. It is designed for use with 4 bolt duct connection systems. It is non-curing and adheres extremely well to metal surfaces.

SPECIAL TESTING RESULTS

Meets ASTM-84 (ASTM-723)
Flame Spread 0/Smoke Density 1.8

Elgen Manufacturing
10 Railroad Ave, Closter, NJ 07624
(800) 503-9805 :: www.elgenmfg.com

BASIC USE

Working Conditions

Apply in normal dry working conditions.

Surface Preparation

All surfaces to be sealed should be free of dust, dirt, oil, moisture, grease, etc. before applying tape.

Application

Apply directly from roll or cut to size with knife or scissors.Press 440 Butyl Gasket firmly into place with hand. Intimate contact must be made between tape and subsurface to assure a air-tight seal. Gently peel off silicone release paper. When lapping tape, allow at least 1/4" (6.4 mm) overlap.

TECHNICAL DATA

Test Method	Test	Typical Results
GSTM 10*	Color	Grey
ASTM C-771-74	Nonvolatile, % Weight @ 212± 3°F/100±-2°C	99+
ASTM D-217	Needle Penetration @ 77°F/25°C, 100 g/5 sec, 1/10 mm	60
ASTM D 792-66	Weight/Gallon @ 77°F Weight/Liter @ 25°C	14 lbs 1.68 kg
ASTM D 792-66	Specific Gravity @ 77°F/25°C	1.65
GSTM 11*	Service Temperature - Range	-30° to +180°F -34° to +82°C
ASTM D1833	Odor	No Unpleasant Odor
GSTM 13*	Elongation, % @ 77°F/25°C	400%+
GSTM 7*	Staining	No Migratory Staining
GSTM 16*	Sag (3 weeks @ 160°F/71°C)	None
ASTM C-765-73	Cold Temperature Flexibility 1/2" (12.7 mm) Mandel Bend @ -60°F/-51°C	No Cracking Or Loss Of Adhesion
GSTM 21*	Water Absorption, % Wt. Gain, 7 Days @ 160°F/71°C	0.75

FEATURES & BENEFITS

- Superior Adhesion
- Provides Air-Tight Seal
- Shelf And Service Life: 20 Years Minimum
- Application Temp: Above 40° F
- Surface Burning Characteristics
- Minimum 30% recycled material, which meets LEEDS requirements
- Contains no Solvent
- Zero VOC's

WARRANTY

Elgen's 440 Butyl Gasket is guaranteed by Elgen Manufacturing against defective material.