Press Hotel

Section 15820
Air Distribution

2.01 - Ductwork
2.02 - Flexible Ducts
2.03 - Liner
2.04 - Flexible Connections
2.05 - Access Panels and Doors
2.06 - Fire Dampers
2.07 - Diffusers, Grilles, and Registers

Schedule of Material Application

Job Name: Press Hotel
Job Number: 14-0125

System Section	Pressure Class	Material	Notes
Supply Duct	2”	Galvanized	
Return Ducts	1”	Galvanized	
Kitchen Hood	-	Welded Black Iron	
Dishwasher	-	Stainless Steel	

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Rectangular Duct Construction Standards
2” Static Pressure (positive or negative)
TDF – 5’ Joints with 2 ½’ reinforcement spacing

Duct Size	Duct Gauge	JTR	Intermediate Reinforcement
0 – 26	26	NR	NR
27 – 36	26	NR	MPT
37 – 42	24	NR	MPT
34 – 54	22	NR	MPT
55 – 60	22	JTR	MPT
61 – 72	20	JTR	MPT
72 - 96	20	JTR	MPT
97 & up	18	JTR	2.5 x 3/16th ext angle

Notes:

1. NR is not required
2. JTR is joint reinforcement same as center tie rod
3. EMT is ½” up to 39” and ¾” 40” and over positive pressure, see end notes for negative pressure
4. Drive = T-1, S-Lock = T-6, TDF = T-25
5. 0-18 in 1” and 2” systems may be slip and drive in lieu of TDF
6. MPT is MidPanel Tie Rod

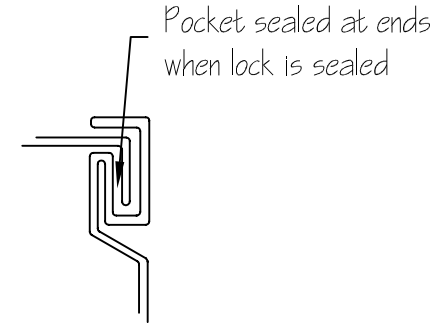
Aero Project Name: Colby Bio-Mass
Aero Project #: 11-0412

Rectangular Duct Construction Standards
1” Static Pressure (positive or negative)
TDF – 5’ Joints with 2 ½’ reinforcement spacing

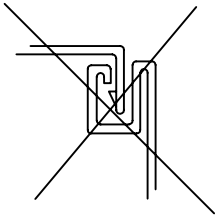
Duct Size	Duct Gauge	JTR	Intermediate Reinforcement
0 – 30	26	NR	NR
31 – 42	26	NR	MPT
43 – 60	24	NR	MPT
61 – 72	24	NR	MPT
78 – 84	22	JTR	(2) MPT
85 – 96	20	JTR	(2) MPT
97 & up	18	JTR	2.5 1/8 ext. angle

Notes:

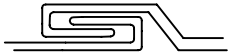
1. NR is not required
2. JTR is joint reinforcement same as center tie rod
3. EMT is ½” up to 39” and ¾” 40” and over positive pressure, see end notes for negative pressure
4. Drive = T-1, S-Lock = T-6, TDF = T-25
5. 0-18 in 1” and 2” systems may be slip and drive in lieu of TDF
6. MPT is MidPanel Tie Rod



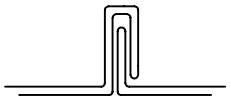
Pittsburgh Lock L-1



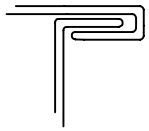
Button Lock L-2
Not Used



Grooved Seam also Called
Flat Lock or Pipe Lock L-3



Standing Seam L-4



Single Corner Seam L-5

Double Corner Seam L-6

Longitudinal Seams - Rectangular Duct

* Information taken from SMACNA Metal and Flexible 2005

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Rectangular Duct Construction

Pressure, Velocity and Seal Classification

Table I-1 denotes the maximum operating pressure for each pressure class. The duct construction standards for each of the pressure classes listed below will be found in the sheets that follow.

Table I-1 Static Pressure	
Pressure Class	Operating Pressure
1" w.g.	Up to 1" w.g.
2" w.g.	Over 1" up to 2" w.g.
3" w.g.	Over 2" up to 3" w.g.
4" w.g.	Over 3" up to 4" w.g.
6" w.g.	Over 4" up to 6" w.g.
10" w.g.	Over 6" up to 10 w.g.

Table I-2 Indicates the velocity ranges for the pressure classes as defined above, and gives the seal class for each of these pressure classes as described in **Table I-3**.

Table I-2									
Pressure - Velocity - Seal Classifications									
Velocity Level	2500 FPM				4000 FPM			+	
Static Pressure Class	+1"	-1"	+2"	-2"	+3"	-3"	+4"	+6"	+10"
Seal Class Rect. Duct	C	C	C	C	B	B	B	A	A

+Determined by designer

Table I-3 **Duct Sealing Requirements**		
Seal Class	**Sealing Required**	**Static Pressure Construction Class**
A	**All transverse Joints, longitudinal seams and duct wall penetrations.**	**4" w.g. and up**
B	**All transverse joints and longitudinal seams.**	**3" w.g.**
C	**Transverse Joints**	**2" w.g.**

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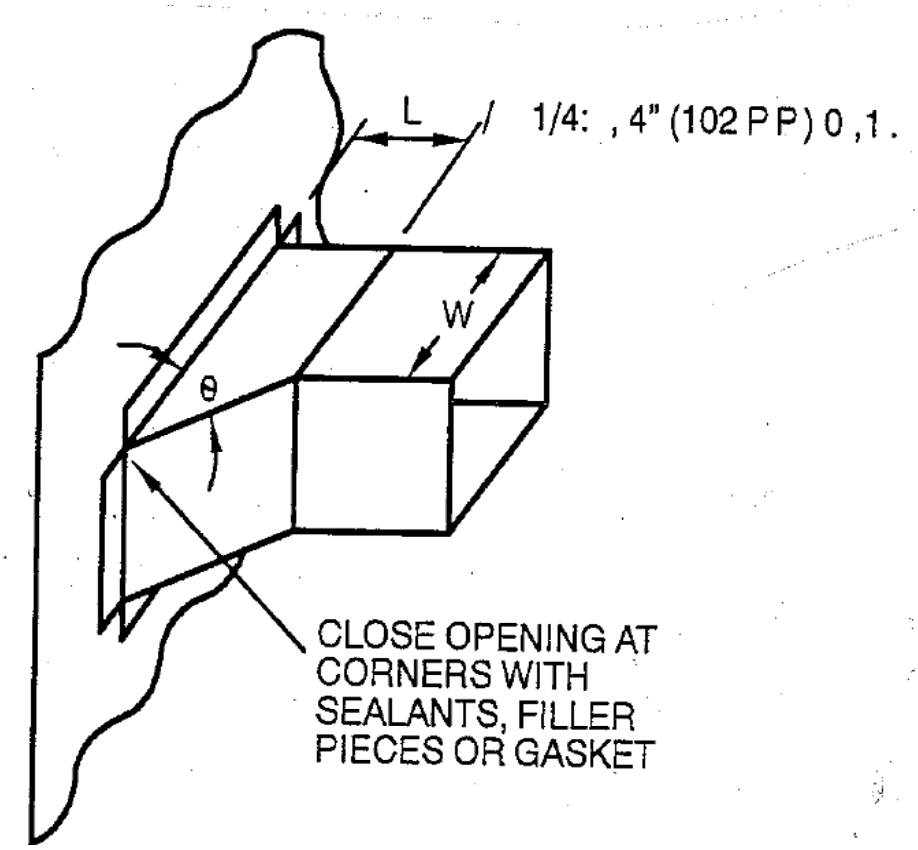
Branch Connection



45 degree entry 0 45°

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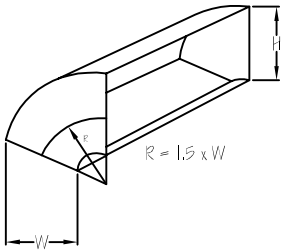
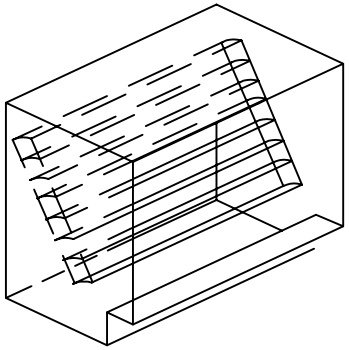
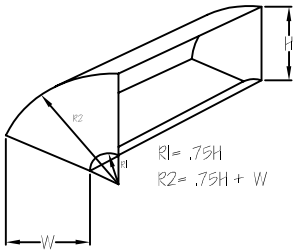


Radius Elbow
Type RE 1



Square Throat Elbow with Vanes
Type RE 2



Dual Radius Elbow
Type RE 5

1. Radius Elbows apply to all angles up to 90 degrees
2. Gauge is per appropriate duct construction schedule.
3. Square throats may be used on Radius Elbows.

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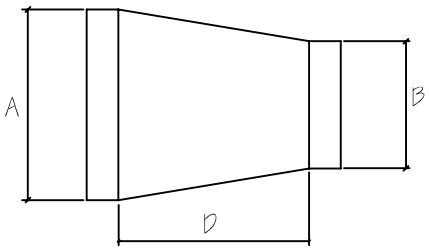
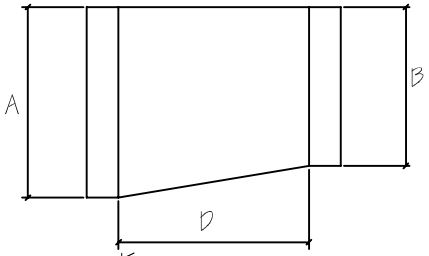
Rectangular Elbows



Concentric



Eccentric

Concentric

A minus B	D
6" & dn	12"
7" to 9"	12"
10" to 12"	12"
13" to 15"	12"
16" to 18"	12"

Eccentric

A minus B	D
6" & dn	12"
7 to 12	18"
13 to 18	24"

Construction

Duct Size	Gauge	Joint
4 to 14	same as duct	TDC
16 to 18	same as duct	TDC
19 to 24	same as duct	TDC
25 to 42	same as duct	TDC
41 to 60	same as duct	TDC
61 to 96	same as duct	TDC

Construction Notes

1. All fittings to be pittsburgh lock construction
2. Taken from SMACNA 2005 Metal & Flexible Manual

Rectangular Transitions

NTS

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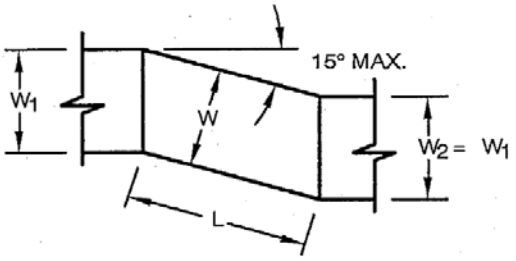
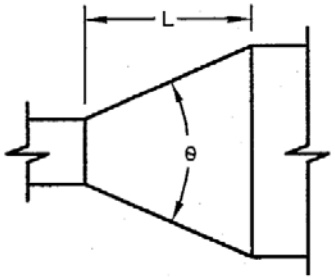
Offsets and Transitions

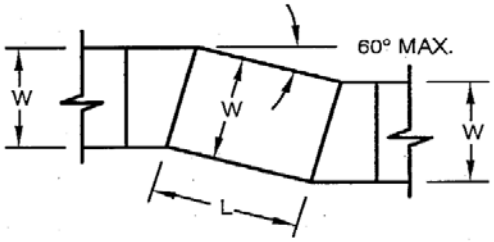
OFFSETS 2 AND 3 AND TRANSITIONS MAY HAVE EQUAL OR UNEQUAL INLET AND OUTLET AREAS. TRANSITIONS MAY CONVERT DUCT PROFILES TO ANY COMBINATION FOR RECTANGULAR, ROUND OR FLAT OVAL SHAPES.



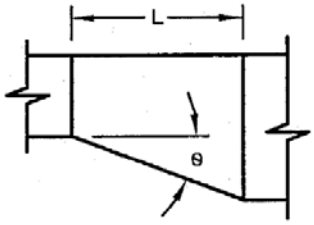
OFFSET TYPE 1
(ANGLED)



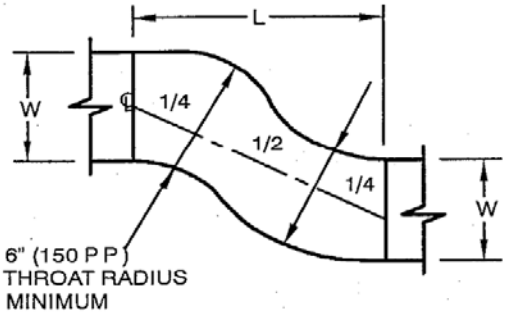
CONCENTRIC TRANSITION
θ MAX. 45° DIVERGING, 60° CONVERGING



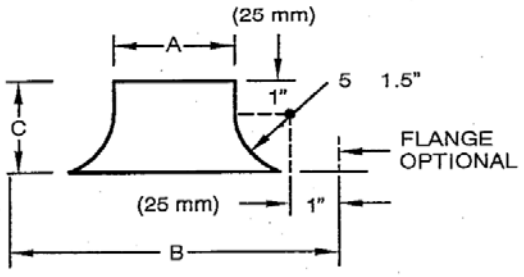
OFFSET TYPE 2
(MITERED)



ECCENTRIC TRANSITION
θ MAX. 30°
(EXCEPT 45° IS PERMITTED
AT ROUND TO FLAT OVAL)



OFFSET TYPE 3
(RADIUSSED
OR OGEE)



STANDARD BELLMOUTH
(ON SHORT PATTERN BELL
& 3" (76 P P)
B A + 4" (102 P P))

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Strap Hanging System

Duct Width	10'-0" Spacing	5'-0" Spacing
0-30	1x22 ga.	
31-72	1x18 ga.	1x22 ga.
73-96	N/A	1x20 ga.
97-120	N/A	1x18 ga.

Trapeze Hanging System

Duct Width	Trapeze	Spacing	Rod Size
0-18	1x1x16 ga.	10'-0"	1/4
19-36	1 1/2x1 1/2 16 ga.	10'-0"	1/4
37-54	1 1/2x1 1/2x1/8	10'-0"	3/8
55-66	1 1/2x1 1/2x3/16	10'-0"	3/8
67-72	1 1/2x1 1/2x1/4	5'-0"	3/8
73-84	2x2x3/16	5'-0"	3/8
85-96	2x2x1/4	5'-0"	3/8
97-120	3x3x1/4	5'-0"	1/2

Notes:

1. Rod is maximum 6" from side of duct
2. Hangers are within 2'-0" of all changes in direction.
3. First hanger on branches must be within 4'-0" of intersection.

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Round Duct Construction Standards

Spiral Seam Pipe

Size	Gauge Up to 10" Pos.	Reinforcement Interval	Gauge 2" Neg.	Reinforcement Interval
4	28	none	28	none
6	28	none	28	none
8	28	none	28	none
10	28	none	28	none
12	28	none	28	none
14	28	none	28	none
16	26	none	26	10'
18	26	none	26	10'
20	26	none	26	10'
22	26	none	26	10'
24	26	none	26	10'
26	24	none	24	10'
28	24	none	24	10'
30	24	none	24	10'
36	24	none	24	10'
42	24	none	24	10'
44-54	22	none	22	10'
56-60	22	none	22	10'

Notes:

1. No reinforcement is required on positive pressure.
2. Angle ring reinforcement for 2" neg pressure up to 54" is 1x1x1/8
3. Angle ring reinforcement for 2" neg pressure up to 56-60" is 1 1/4 x 1 1/4 x 3/16
6. Joints are beaded coupling

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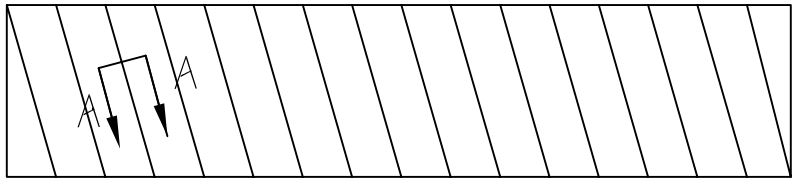
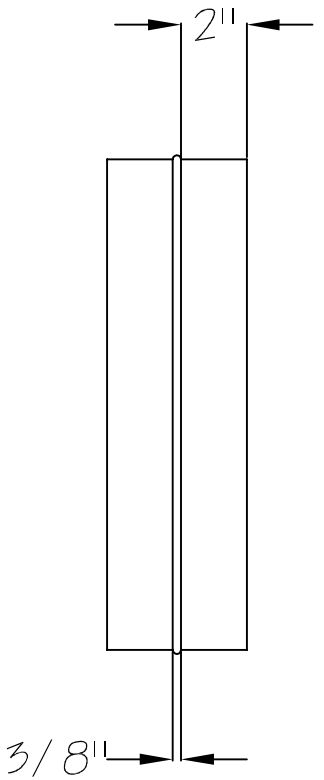


Spiral Duct Elevation View

Spiral Duct Seam
Section A-A



Slip Joint Coupling
* coupling gauge same as duct

Spiral Seam - Round Duct

Information taken from SMACNA Metal and Flexible Manual 2005
* for gauges see "Round Duct Construction Standards"

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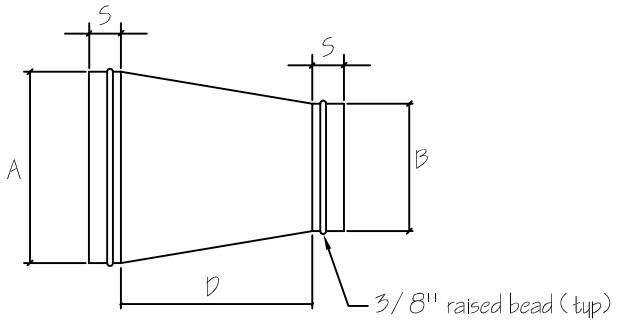
Round Duct Minimum Hanger Sizes

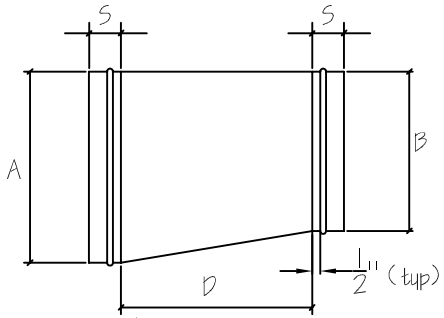
Diameter	Maximum Spacing	Rod	Strap
10” and Dn.	12’	¼”	1” x 22 ga
11”-18”	12’	¼”	1” x 22 ga
19”-24”	12’	¼”	1” x 22 ga
25”-36”	12’	3/8”	1” x 20 ga
37”-50”	12’	3/8” (2)	1” x 20 ga (2)
51”-60”	12’	3/8” (2)	1” x 18 ga (2)
61”-84”	12’	3/8” (2)	1” x 16 ga (2)
85”-96”	12’	½” (2)	1 ½” x 16 ga (2)

Notes:

1. Straps are galvanized steel, rods are uncoated or galvanized steel.
2. Table allows for conventional wall thickness plus 1lb/sq ft insulation weight.
3. Taken from SMACNA Third Edition HVAC Duct Construction Standards Metal and Flexible.



Concentric



Eccentric

Concentric

A minus B	D
6" & dn	4"
7" to 9"	6"
10" to 12"	8"
13" to 15"	10"
16" to 18"	12"

Eccentric

A minus B	D
6" & dn	8"
7 to 12	16"
13 to 18	24"

Construction

Duct Size	Gauge	S	Joint
4 to 14	28	2"	slip
16 to 18	26	2"	slip
19 to 24	26	2"	slip
25 to 42	24	2"	slip
41 to 60	22	3"	slip
61 to 96	22	3"	slip

Construction Notes

1. All fittings to be spot welded or riveted construction
2. Taken from SMACNA 2005 Metal & Flexible Manual

Round Transitions

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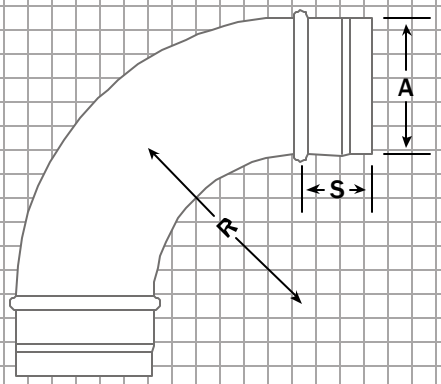
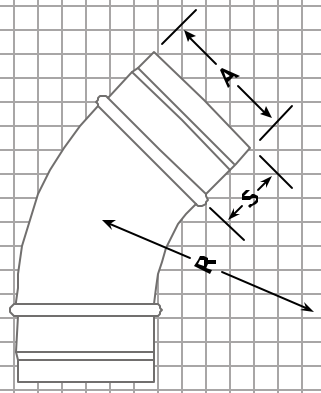
90° Die Stamped Flangeless Elbow
Galvanized (DSE90)
Galvaneal (NDSE90)



45° Die Stamped Flangeless Elbow
Galvanized (DSE45)
Galvaneal (NDSE45)



Key

A = Diameter
R = 1-1/2 A (centerline radius)
S = 2”

Materials Available

- Galvanized (3” to 7”) 24 gauge
- Galvanized (8” to 12”) 22 gauge
- Galvaneal (paint grip) (5” to 12”) 22 gauge

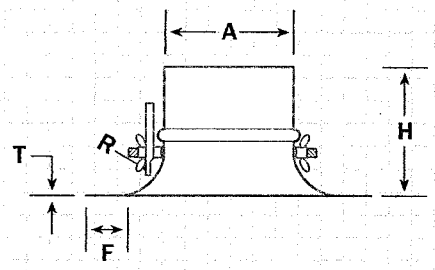
Welding Process

Flangeless elbows are continuously stitch welded on the throat and heel from end to end (past the bead).

Dimensions

Size	(A)	90° (R)	Wt. Per 90° Elbow (DSE90)	Wt. Per 90° Elbow (NDSE90)
3”	2-7/8”	4.5”	0.8#	0.8#
4”	3-7/8”	6.0”	1.4#	1.4#
5”	4-7/8”	7.5”	1.8#	2.5#
6”	5-7/8”	9.0”	2.2#	3.4#
7”	6-7/8”	10.5”	3.5#	4.4#
8”	7-7/8”	12.0”	4.7#	5.4#
9”	8-7/8”	13.5”	6.1#	5.9#
10”	9-7/8”	15.0”	7.6#	6.4#
12”	11-7/8”	18.0”	10.2#	9.0#
Size	**(A)**	**45° (R)**	**Wt. Per 45° Elbow (DSE45)**	**Wt. Per 45° Elbow (NDSE45)**
3”	2-7/8”	4.5”	0.6#	0.6#
4”	3-7/8”	6.0”	0.8#	0.8#
5”	4-7/8”	7.5”	1.0#	1.5#
6”	5-7/8”	9.0”	1.5#	2.0#
7”	6-7/8”	10.5”	1.8#	2.6#
8”	7-7/8”	12.0”	3.0#	3.2#
9”	8-7/8”	13.5”	3.5#	4.0#
10”	9-7/8”	15.0”	4.2#	4.8#
12”	11-7/8”	18.0”	6.5#	6.6#

Bellmouth Take-Off with Damper (BTOBD)



Key

A = Pipe size (small end) **H** = Overall height
R = Radius **T** = Flange thickness (gauge)
F = Flange length

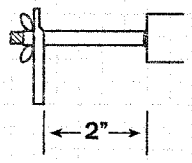
Materials Available

- Galvanized
- Sizes 4"-12" available in 24 gauge, stamped
- Sizes 14"-36" available in 20 gauge, spun

Options Available

- Sizes 4" to 36"
- Peel & stick gasket is standard on BTOBD
- 2" standoff

OPTION: 2" Shaft Extension Handle

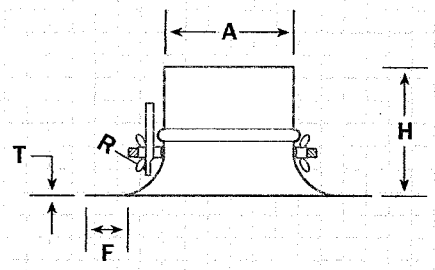


Dimensions

Size	(A)	(R)	(F)	(H)	(T)	Gauge	Weight Each
4"	3 7/8"	1.0"	1"	8.00"	.027"	24 ga.	1.0#
5"	4 7/8"	1.0"	1"	8.50"	.027"	24 ga.	1.2#
6"	5 15/16"	1.0"	1"	4.25"	.027"	24 ga.	1.0#
7"	6 7/8"	1.0"	1"	9.00"	.027"	24 ga.	2.4#
8"	7 15/16"	1.0"	1"	4.25"	.027"	24 ga.	1.4#
9"	8 7/8"	1.0"	1"	9.00"	.027"	24 ga.	3.0#
10"	9 15/16"	1.0"	1"	4.75"	.027"	24 ga.	2.1#
12"	11 15/16"	1.0"	1"	5.50"	.027"	24 ga.	2.6#
14"	13 7/8"	1.0"	.75"	6.50"	.034"	20 ga.	4.2#
16"	15 7/8"	2.0"	.75"	8.50"	.034"	20 ga.	6.4#
18"	17 7/8"	2.0"	1"	8.50"	.034"	20 ga.	7.4#
20"	19 7/8"	2.0"	1"	8.50"	.034"	20 ga.	8.2#
22"	21 7/8"	2.0"	1"	8.50"	.034"	20 ga.	9.0#
24"	23 7/8"	2.0"	1"	8.50"	.034"	20 ga.	9.4#
26"	25 7/8"	2.0"	1"	8.50"	.034"	20 ga.	13.0#
28"	27 7/8"	2.0"	1"	8.50"	.034"	20 ga.	13.0#
30"	29 7/8"	2.0"	1"	8.50"	.034"	20 ga.	17.0#
32"	31 7/8"	2.0"	1"	8.50"	.034"	20 ga.	17.0#
34"	33 7/8"	2.0"	1"	8.50"	.034"	20 ga.	21.0#
36"	35 7/8"	2.0"	1"	8.50"	.034"	20 ga.	21.0#

- 4", 5", 7" & 9" are short BTO's
- Peel & stick gasket is not available on 18"-36"

Bellmouth Take-Off with Damper (BTOBD)



Key

A = Pipe size (small end) **H** = Overall height
R = Radius **T** = Flange thickness (gauge)
F = Flange length

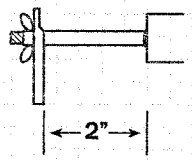
Materials Available

- Galvanized
- Sizes 4"-12" available in 24 gauge, stamped
- Sizes 14"-36" available in 20 gauge, spun

Options Available

- Sizes 4" to 36"
- Peel & stick gasket is standard on BTOBD
- 2" standoff

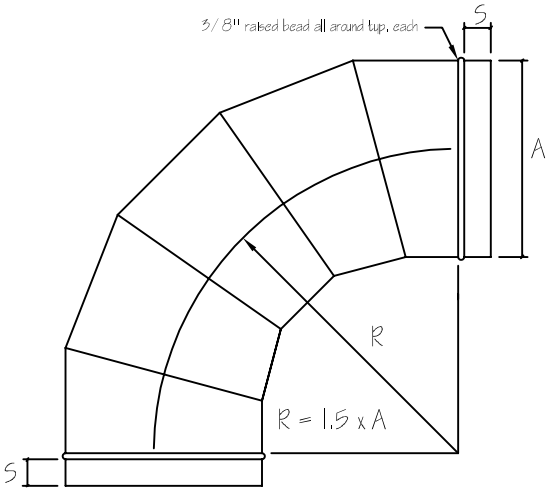
OPTION: 2" Shaft Extension Handle



Dimensions

Size	(A)	(R)	(F)	(H)	(T)	Gauge	Weight Each
4"	3 7/8"	1.0"	1"	8.00"	.027"	24 ga.	1.0#
5"	4 7/8"	1.0"	1"	8.50"	.027"	24 ga.	1.2#
6"	5 15/16"	1.0"	1"	4.25"	.027"	24 ga.	1.0#
7"	6 7/8"	1.0"	1"	9.00"	.027"	24 ga.	2.4#
8"	7 15/16"	1.0"	1"	4.25"	.027"	24 ga.	1.4#
9"	8 7/8"	1.0"	1"	9.00"	.027"	24 ga.	3.0#
10"	9 15/16"	1.0"	1"	4.75"	.027"	24 ga.	2.1#
12"	11 15/16"	1.0"	1"	5.50"	.027"	24 ga.	2.6#
14"	13 7/8"	1.0"	.75"	6.50"	.034"	20 ga.	4.2#
16"	15 7/8"	2.0"	.75"	8.50"	.034"	20 ga.	6.4#
18"	17 7/8"	2.0"	1"	8.50"	.034"	20 ga.	7.4#
20"	19 7/8"	2.0"	1"	8.50"	.034"	20 ga.	8.2#
22"	21 7/8"	2.0"	1"	8.50"	.034"	20 ga.	9.0#
24"	23 7/8"	2.0"	1"	8.50"	.034"	20 ga.	9.4#
26"	25 7/8"	2.0"	1"	8.50"	.034"	20 ga.	13.0#
28"	27 7/8"	2.0"	1"	8.50"	.034"	20 ga.	13.0#
30"	29 7/8"	2.0"	1"	8.50"	.034"	20 ga.	17.0#
32"	31 7/8"	2.0"	1"	8.50"	.034"	20 ga.	17.0#
34"	33 7/8"	2.0"	1"	8.50"	.034"	20 ga.	21.0#
36"	35 7/8"	2.0"	1"	8.50"	.034"	20 ga.	21.0#

- 4", 5", 7" & 9" are short BTO's
- Peel & stick gasket is not available on 18"-36"



Duct Size	Gauge	"S"	Joint
10 to 26	24	2"	slip
27 to 36	22	2"	slip
37 to 50	20	3"	slip
51 to 60	18	3"	slip

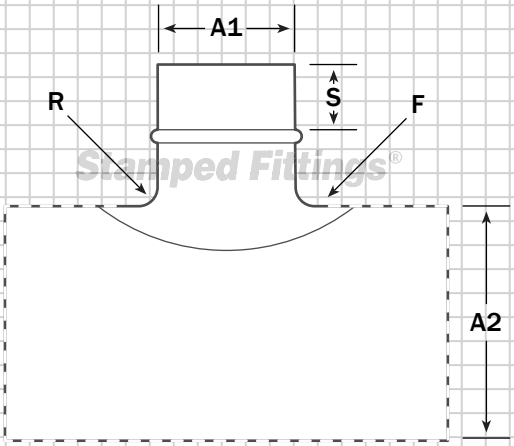
Construction Notes:
1. All Fittings to be spot welded or riveted construction
2. Information taken from SMACNA 2005 Metal & Flexible Manual
3. 90 deg els are 5 gore, 60 deg elbows are 3 gore, and 45 deg elbows are 2 gore.

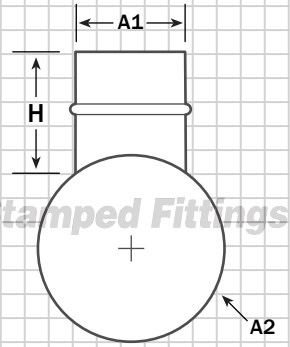
Round Elbows

NTS

Aero Heating & Ventilating, Inc.
Sheetmetal Contractor

90º Die Stamped Saddle Tap (DSTB & DSTNB)





Key

A1 = Branch (nominal) size **R** = Radius
A2 = Pipe (nominal) size **F** = Flange on pipe

R = 0.787" (4 on 4 – 6 on 20/22/24), 1.0" (8 on 8 – 12 on 22/24)
F = 1.0" (4 on 4 – 8 on 20/22/24), 2.0" (10 on 10 – 12 on 22/24)
S = 1-1/4" (4 on 4 – 5 on 16/24), 1-1/2" (6 on 6 – 12 on 22/24)

Materials Available

- Galvanized, 24 ga.

Options Available

- Damper collars in 6" lengths (see DSTDC6 spec)
- Bead or no bead

Dimensions			
(A1)	(A2)	Weight Each	(H)
4"	4"	0.4#	2"
4"	5"	0.4#	2"
4"	6"- 7"	0.4#	2"
4"	8"	0.4#	2"
4"	9"- 10"	0.4#	2"
4"	12"- 14"	0.4#	2"
4"	16"- 24"	0.4#	2"
5"	5"	0.7#	2-1/8"
5"	6"- 7"	0.7#	2-1/8"
5"	8"- 9"	0.7#	2-1/8"
5"	10"	0.7#	2-1/8"
5"	12"- 14"	0.7#	2-1/8"
5"	16"- 24"	0.7#	2-1/8"
6"	6"	0.8#	3-1/8"
6"	8"	0.8#	3-1/8"
6"	10"- 12"	0.7#	3-1/8"
6"	14"- 18"	0.7#	3-1/8"
6"	20"- 24"	0.6#	3-1/8"
8"	8"	1.1#	3-3/8"
8"	10"	1.3#	3-3/8"
8"	12"- 14"	1.1#	3-3/8"
8"	16"- 18"	1.1#	3-3/8"
8"	20"- 24"	1.0#	3-3/8"
10"	10"	1.8#	3-3/8"
10"	12"	2.0#	3-3/8"
10"	14"- 16"	1.8#	3-3/8"
10"	18"- 20"	1.8#	3-3/8"
10"	22"- 24"	1.7#	3-3/8"
12"	12"	2.3#	3-1/2"
12"	14"- 16"	2.0#	3-1/2"
12"	18"- 20"	2.3#	3-1/2"
12"	22"- 24"	2.1#	3-1/2"

2" static pressure (positive or negative)

Duct Size	Duct Gauge	Width Lock	Height Lock	Joint length	Reinforcement
0-18	0.032	S lock	Drive	4'	none required
19-26	0.032	TDF	TDF	4'	none required
27-30	0.040	TDF	TDF	4'	none required
37-42	0.040	TDF	TDF	4'	none required
43-48	0.040	TDF	TDF	4'	none required
49-60	0.050	TDF	TDF	4'	none required
61-72	0.063	TDF	TDF	4'	2x2x1/4 @ joint and mid

Notes:
1. Drive = T-1, S-Lock=T-6, TDF=T-25

3" Static Pressure (positive or negative)

Duct Size	Duct Gauge	Width Lock	Height Lock	Joint length	Reinforcement
0-12	0.032	Stndg S	Drive	4'	none required
13-18	0.032	TDF	TDF	4'	none required
19-30	0.040	TDF	TDF	4'	none required
31-36	0.050	TDF	TDF	4'	none required
37-42	0.040	TDF	TDF	4'	1 1/2x1 1/2x1/8 angle @ mid
43-48	0.050	TDF	TDF	4'	1 3/4x1 3/4x1/8 angle @ mid
49-60	0.063	TDF	TDF	4'	2x2x1/4 angle @ mid
61-72	0.063	TDF	TDF	4'	2x2x1/4 angle @ jt & 3x3x1/4 @ mid

Notes:
1. Drive = T-1, Standing S=T-10, TDF=T-25

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Sheetmetal Contractor

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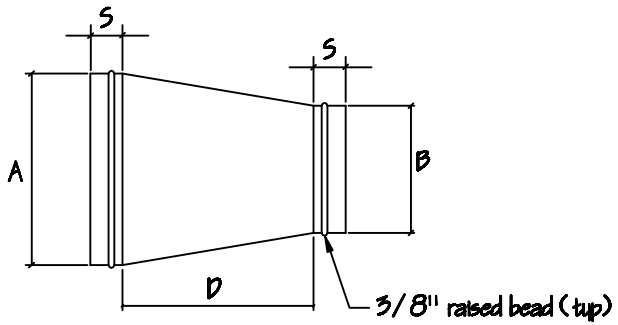
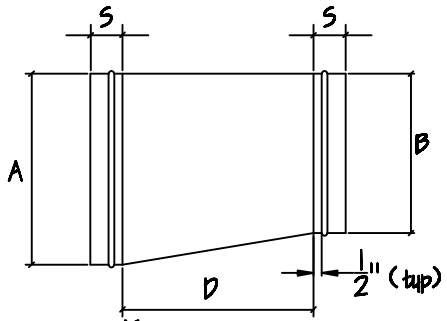


Concentric



Eccentric

Concentric

A minus B	D
6" & dn	4"
7" to 9"	6"
10" to 12"	8"
13" to 15"	10"
16" to 18"	12"

Eccentric

A minus B	D
6" & dn	8"
7 to 12	16"
13 to 18	24"

Construction

Duct Size	Gauge	S	Joint
3 to 8	.032	2"	slip
9 to 19	.032	2"	slip
15 to 26	.040	2"	slip
27 to 36	.040	2"	slip
37 to 50	.063	3"	slip
51 to 60	.071	3"	slip

Construction Notes

1. All fittings to be spot welded or riveted construction
2. Taken from SMACNA 2005 Metal & Flexible Manual

Round Aluminum Transitions

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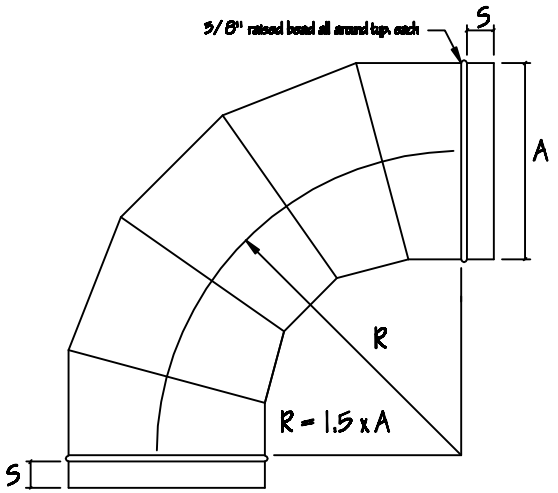


Duct Size	Gauge	"S"	Joint
10 to 26	.040	2"	slip
27 to 36	.050	2"	slip
37 to 50	.063	3"	slip
51 to 60	.071	3"	slip

Construction Notes:
1. All Fittings to be spot welded or riveted construction
2. Information taken from SMACNA 2005 Metal & Flexible Manual
3. 90 deg els are 5 gore, 60 deg elbows are 3 gore, and 45 deg elbows are 2 gore.

Round Aluminum Elbows

NTS

Aero Heating & Ventilating, Inc.

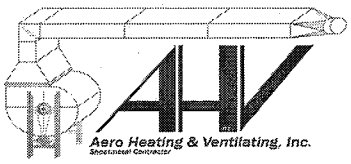
Aero Heating Ventilating, Inc.

Aluminum Duct Construction Standards
Round

Duct Diameter in inches	Maximum 2 in. wg Static Positive		Maximum 2 in. wg Static Negative	
	Spiral Seam Gauge	Longitudal Seam Gauge	Spiral seam Gague	Longitudal Seam Gauge
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

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

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



2" static pressure (negative)

16 ga Black Steel Welded

Duct Size	Duct Gauge	Width Lock	Height Lock	Joint length	Reinforcement
0-18	16	Weld	Weld	5'	none required
19-26	16	Weld	Weld	5'	none required
27-30	16	Weld	Weld	5'	none required
37-42	16	Weld	Weld	5'	none required
43-48	16	Weld	Weld	5'	none required
49-60	16	Weld	Weld	5'	none required
61-72	16	Weld	Weld	5'	none required

Aero Heating & Ventilating, Inc.

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D U C T M A T E

EVERseal™

UNION MADE IN THE USA

Water Based High Velocity Duct Sealant

Permanently seals metal duct joints

- Indoor and outdoor use
- For applications up to 10” WG
- Remains flexible
- UL 181B-M Listed
- UL 723 Classified
- LEED® Compliant

DUCTMATE® Industries, Inc.

EVERseal™

Water Based High Velocity Duct Sealant

DESCRIPTION

EVERseal is a commercial or residential grade water based, smooth duct sealant.

BASIC USE

To seal metal joints against air leaks in low, medium, and high pressure duct systems.

TECHNICAL INFORMATION

BASE:	Synthetic latex emulsion
COLOR:	Gray
TYPE:	Water base
WEIGHT:	11.3 ± .3 lbs per gallon
SOLID CONTENTS:	62% ± -2%
VISCOSITY:	450,000 c.p.s.
APPLICATION TEMPERATURE:	35°F to 110°F
SERVICE TEMPERATURE:	0°F to 220°F
STORAGE TEMPERATURE:	35°F to 110°F
DRY TO TOUCH:	1 hour (approximate)
CURE TIME:	24 to 72 hours + (depending on humidity, application, and temperature)
FLASH POINT:	No flash to boiling
MILDEW RESISTANCE:	Excellent
FREEZE THAW STABILITY:	5 cycles
COVERAGE:	25 sq. ft./gal. at 1/16" 50 sq. ft./gal. at 1/32"
ODOR:	Mild (wet) None (dry)
SHELF LIFE:	1 year (unopened container)
CURED SEALANT:	Tough and permanently flexible
PACKAGING:	1/12 gallon tubes (25 tubes/case) 1 gallon pail (4 pails/case) 5 gallon pail 54 gallon drum

UL LISTED
UL-181B-M
61MF

ALSO CLASSIFIED C UL US
CAULKINGS AND SEALANTS
SURFACE BURNING CHARACTERISTICS
51RF

SURFACE BURNING CHARACTERISTICS

USC - Classification
Applied to Inorganic Reinforced Cement Board +

FLAME SPREAD	0
SMOKE DEVELOPED	5

+ - Tested as applied in one 2 in. wide strip covering 11 percent of the test sample area at a coverage rate of 25 sq. ft. per gal.

CNC - Classification
Applied to Inorganic Reinforced Cement Board +

FLAME SPREAD	5
SMOKE DEVELOPED	5

+ - Tested as applied in two 50.8 mm wide strips 203.2 mm OC and covering 22.2 percent of the exposed test sample area at a coverage rate of 0.6 sq m/l.

SPECIAL CHARACTERISTICS

- Permanently seals metal duct joints
- Indoor and outdoor use
- For applications up to 10" WG
- UL 181B-M Listed
- UL 723 Classified
- LEED® Compliant
- Remains flexible
- Superior adhesion to metal
- Very good UV, water, and mold resistance
- Manufactured by S.M.W.I.A. Local 12
- Paintable with latex epoxy based paint

DIRECTIONS FOR USE

Surface Preparation: For good brushability, store at room temperature at least 24 hours before applying. Surfaces should be clean, dry and free of any dirt, oil, grease, water or foreign matter.

Application: (DO NOT THIN) Do not apply when rain or freezing temperatures will occur within 36 hours.

When Used In Conjunction With Sheet Metal: Apply by brush, hand, trowel or spray. EVERseal should be applied to duct connections according to all applicable SMACNA standards. Apply to the inside of female fittings and outside of male fittings. Assemble the joint.

Brush sealant over the assembled joint. Thoroughly cover joint and screws with a 2" to 3" wide band. Assembly should cure for 24-72 hours before pressure testing the system. Since field temperature/ humidity conditions may vary, longer set times may be required for specific installations. Apply at a rate of 50 sq. ft. per gallon (1/32" thick).

When Used in Conjunction With UL 181 Listed Flexible Air Ducts: Apply by brush a 1/16" (25 sq.ft. per gallon) coating and allow to dry a minimum of 24-72 hours. Since field temperature/humidity conditions may vary, longer set times may be required for specific installations. Use with mechanical fasteners per Air Duct installation instructions.

Clean Up: Use warm, soapy water to clean up sealant while it is still wet.

When Used In Conjunction With Duct Cover: Allow the sealant to cure fully before encapsulating duct ends with ProGuard, or any duct cover products. You may set the duct upright on a palate and encapsulate just the top, allowing air to flow through the bottom until the sealant has cured.

LIMITED PRODUCT WARRANTY

Ductmate warrants that EVERseal™, when properly installed and maintained, will be free from defects in material and workmanship, and will comply with all written specifications made by Ductmate at the time of sale. Ductmate's warranty shall run for a period of one year from the date of manufacture.

Warranty Limitation
The warranty stated above is in lieu of all other warranties, express or implied, including but not limited to the implied warranties of MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Although Ductmate may have suggested the product, or provided written or oral advice to the Purchaser, it is the Purchaser's responsibility to test and determine the suitability of EVERseal™, for the intended use and purpose, and Purchaser and/or its customer assumes all risk and liability whatsoever regarding such suitability.

Limitation of Liability
In the event of a breach of the above warranty, Ductmate's sole obligation, and Purchaser's sole and exclusive remedy, shall be, at Ductmate's option, repair or replacement of any defective products, or refund of an applicable portion of the purchase price. Ductmate shall have no liability for costs of removal or reinstallation of the product. The Purchaser agrees that no other remedy, including but not limited to loss of profits, loss sales, injury to person or property, or any other special, incidental or consequential damages, shall be available to the Purchaser for any claim arising out of this Agreement, regardless of whether such claim is made in contract or in tort, including strict liability in tort. In no event will Ductmate be obligated to pay damages to the Purchaser in any amount exceeding the purchase price that the Purchaser paid to Ductmate for the allegedly defective product.

KEEP OUT OF REACH OF CHILDREN. Consult MSDS (Material Safety Data Sheet) Before Using

DUCTMATE® Industries, Inc.

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210 Fifth Street
Charleroi, PA 15022
800-245-3188
724-258-0500
FAX: 724-258-5494

Lodi, CA
810 S. Cluff Avenue
Lodi, CA 95240-9141
800-245-3188
724-258-0500
FAX: 209-333-4678

www.ductmate.com

Distributed By:

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SMACNA

SPIDA SPIRAL DUCT MANUFACTURERS ASSOCIATION

UPC #070
25' Insulated
UL 181
Class 1 Air Duct

Description

ATCO's UPC #070 is a UL 181, Class 1 Air Duct and is manufactured with a reinforced grey polyester jacket.

The UPC #070 inner core is air-tight and is designed for low-to-medium operating pressures in HVAC systems.

Construction

A double lamination of tough polyester which encapsulates a steel wire helix forms the air-tight inner core to ATCO's UPC #070. The double-layer core is wrapped in a thick blanket of fiberglass insulation and sheathed in a rugged and durable reinforced grey polyester jacket.

Applications

UPC #070 is designed for indoor use as a supply and return air duct in residential and commercial low-to-medium pressure heating and air conditioning systems. ATCO's UPC #070 can be used as a complete air duct system and/or a branch duct connecting to mixing boxes, diffusers, light troffers, room inlets, or other terminal devices.

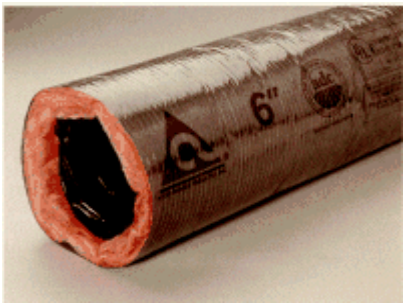
Code Compliance*

UL 181, UMC 10-1, SBCC, BOCA, NFPA 90A &
90B, HUD 515-2.1 (b), Cities of Chicago, New York & San Francisco, County of Dade (Florida), California State Fire Marshal.

*ATCO recommends that you check with the local code body having jurisdiction in your area to determine applicable codes.

Features and Benefits

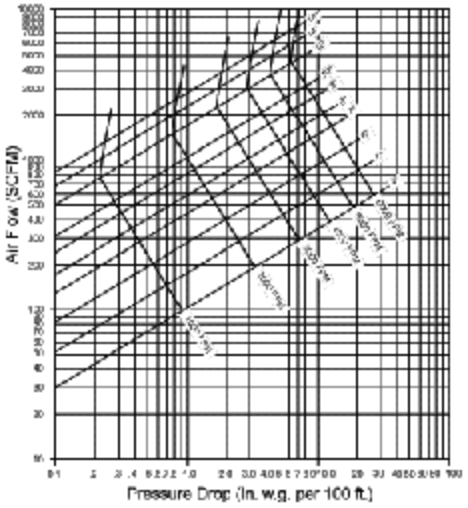
- **Air-tight Inner Core**
  Energy efficient
  No fiberglass erosion into airstream
- **Encapsulated Wire Helix**
  No unraveling when cut to length
  Quick installation
- **Smooth Inner Core**
  Low friction loss
  Low operating cost
- **Thick Blanket of Fiberglass Insulation**
  Energy efficient
  Excellent thermal characteristics
- **Tough Reinforced Polyester Jacket**
  Tear and puncture resistant
  Low maintenance
- **Lightweight Compact Carton**
  Reduces warehouse and job site handling costs.



Page 1 Next page

Product and Performance Data

Air Friction Chart *



STRAIGHT RUN * FD 72-R1 Test Code of the Air Diffusion Council. Friction loss is computed in inches of water gauge per 100 ft. of straight duct. By using CFM or FPM values for a given duct dimension, the friction loss can be determined. Conversion of CFM to FPM also can be made.

Product Data

- Length: 25'
- Diameter: 4", 5", 6", 7", 8", 9", 10", 12", 14", 16", 18", 20"
- Vapor Barrier: Reinforced polyester
- End Treatment: 25'-plain ends
- Packaging: 1 piece per carton

Warranty

Atco warrants that all flexible ducts will be free from defects in material and workmanship for a period of five years from the date of purchase only if the ducts are installed in accordance with Atco's installation instructions and under conditions specified in Atco's performance data. The buyer's exclusive remedies for any defect in the flexible ducts shall be replacement or refund of the purchase price, at Atco's option.

ATCO MAKES NO OTHER WARRANTIES, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE. IN PARTICULAR, ATCO MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ATCO SHALL HAVE NO LIABILITY TO THE BUYER OR ANY THIRD PARTY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, PERSONAL INJURY, PROPERTY DAMAGE, LOST PROFITS OR OTHER ECONOMIC INJURY DUE TO ANY DEFECT IN THE FLEXIBLE DUCTS.

MATERIALS AND SPECIFICATIONS FOR THE FLEXIBLE DUCTS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

UPC #070

Performance Data

- **Rated Positive Pressure:** 10" w.g. per UL-181 (UL Listed pressure ratings are determined in straight lengths @ ambient temperatures.)
- **Recommended Operating Pressures:** (Determined in a 90°bend at elevated temperatures in accordance with ADCFD 72-R1 Test Code.)
- **Maximum Positive:**
  6" w.g. - 4" thru 12" Dia.
  4" w.g. - 14" thru 20" Dia.
  (With factory installed metal collars, 2" w.g. - all diameters)
- **Maximum Negative:**
  3/4" w.g. - all diameters
- **Maximum Velocity:** 5,000 FPM
- **Vapor Transmission:** .6 perms
- **Maximum Operating Temperatures:**
  -20°F to 140°F Continuous (@ maximum pressure)
  -20°F to 180°F Continuous (@ 2" pos. w.g. max.)
  -20°F to 250°F Intermittent (@ ½" pos. w.g. max.)
- **R Value:** R-4.2
  (In accordance with ADC flexible duct performance and installation standards (1991) using ASTM C-518 at installed wall thickness on flat insulation only.)
- **Flame Spread:** Less than 25
- **Smoke Developed:** Less than 50

INSTALLATION: Air duct connections and joints shall be made per installation instructions outlined by ATCO Rubber Products, Inc. and as required by the UL 181 listing procedure. (Installation instructions are included inside of each carton.)

ATCO RUBBER PRODUCTS, INC.
CORPORATE HEADQUARTERS
7101 ATCO DRIVE
FORT WORTH, TEXAS 76118-7098
PHONE: (817) 595-2894
1-800-USS-DUCT (1-800-877-3828)
FAX: 1-(800)-366-3539

SUBMITTAL RECORD_____
JOB _____
LOCATION_____
SUBMITTED TO_____
SUBMITTAL PREPARED BY_____
APPROVED BY_____
DATE_____

Specification Form DDIAD-0806 Insulated Access Doors

DESCRIPTION

Periodic inspection and testing of fire and smoke dampers and detectors in ductwork is a standard safety procedure. easy access to these devices as well as providing a means of removing dust accumulation can be provided by the installation of hinged access doors. These doors incorporate an integral frame which readily fastens to the duct work as well as a camlock latching system for easy entry.

RELATED NFPA 90A & 90B STANDARDS

2-1.4 Duct Access and Inspection Provisions.

2-1.4.1 A service opening or telescoping or removable duct section shall be provided in ducts adjacent to each fire door, fire damper, smoke damper and smoke detector. The opening shall be large enough to permit maintenance and resetting of the device.

2-1.4.1 Service openings, telescoping or removable duct sections shall be identified with letters no less than 1/2 in. (1.27 cm) in height to indicate the location of the fire protection device(s) within.

2-1.4.3 Horizontal ducts and plenums shall be provided with service openings (see 2-1.4.1) to facilitate cleaning the duct of accumulations of dust and combustible materials. Service openings shall be placed at approximately 20 ft. (6.1-m) intervals along the duct and at the base of each vertical riser.

Exception No. 1: Removable air outlet or air inlet devices of adequate size may be accepted in lieu of service openings.

Exception No. 2: Service openings may be omitted in supply ducts when the supply air has previously passed through air filters or water spray.

Exception No. 3: Service openings are not required when all the following conditions prevail:

(a) The occupancy does not produce combustible material such as dust, lint, greasy vapors, etc. Such occupancies include banks, office buildings, churches, hotels, and health care facilities (but not kitchens, service rooms, and manufacturing portions of such facilities).

(b) The air inlets are at least 7 ft. (2.13m) above the floor or are protected by corrosion-resistant metal screens of at least 14 mes, installed at the inlets so that they will not draw papers, refuse, cigarettes or other combustible solids into the return air duct.

(c) The minimum design velocity in the return duct from the particular occupancy is 1,000 ft/min. (508m/sec.).

Duro Dyne East Division, Bay Shore, NY
631-249-9000 Fax: 631-249-8346
Duro Dyne Midwest Division, Fairfield, OH
513-870-6000 Fax: 513-870-6005
Duro Dyne West Division, Santa Fe Springs, CA
562-926-1774 Fax: 562-926-5778
Duro Dyne Canada, Lachine, Quebec, Canada
514-422-9760 Fax: 514-636-0328
www.durodyne.com E-mail: durodyne@durodyne.com

SUGGESTED SPECIFICATIONS

Service openings shall be provided in ducts adjacent to each fire door, fire damper, smoke damper and smoke detector. Horizontal ducts and plenums shall be provided with service openings to facilitate cleaning the duct of accumulations of dust and combustible materials. Service openings shall be placed at approximately 20 foot intervals along the duct and at the base of each vertical riser. Service openings shall be sized _____x_____and shall incorporate access doors coded__ _____as manufactured by Duro Dyne Corporation.

CONSTRUCTION

Door Frame: 24 ga. galvanized steel. Conforms to ASTM-A-591.

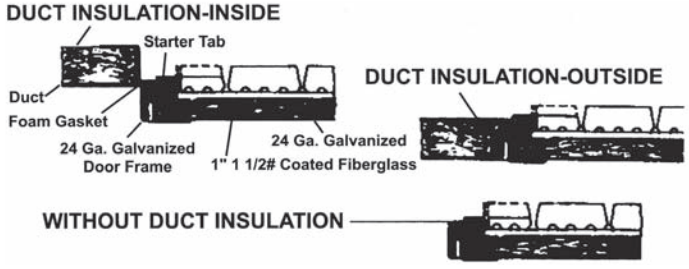
Door Face: 24 ga. galvanized steel. Conforms to ASTM-A-591.

Insulation: 1: 1 1/2 lb. Neoprene coated fiberglass (K Factor .26+ .03@ 75 F) Conforms to NFPA 90.

Seals: Door to Frame/Frame to Door-Urethane gasket. Conforms to ASTM-D 1692-74. Temperature range-30 F to 260 F .22-.28 K Factor.

Latches: Single Camlock action on all hinged doors 12" square and under. Dual latches on larger hinged sizes. Latches constructed of zinc plated cold rolled steel. Steel conforms to ASTMA-A-366. Plating conforms to ASTMA-164-55.

	ITEM#	CODE	DOOR SIZE	CUT HOLE IN DUCT
■	8230	IAD	6"x6"	4 7/8"x4 7/8"
■	8168	IAD	8"x8"	6 7/8"x6 7/8"
■	8169	IAD	10"x10"	8 7/8"x8 7/8"
■	8170	IAD	12"x12"	10 7/8"x10 7/8"
■	8171	IAD	14"x10"	12 7/8"x8 7/8"
■	8167	IAD	14"x14"	12 7/8"x12 7/8"
■	8172	IAD	16"x16"	14 7/8"x14 7/8"
■	8173	IAD	18"x18"	16 7/8"x18 7/8"
■	8174	IAD	20"x20"	18 7/8"x18 7/8"
■	8175	IAD	24"x24"	22 7/8"x22 7/8"

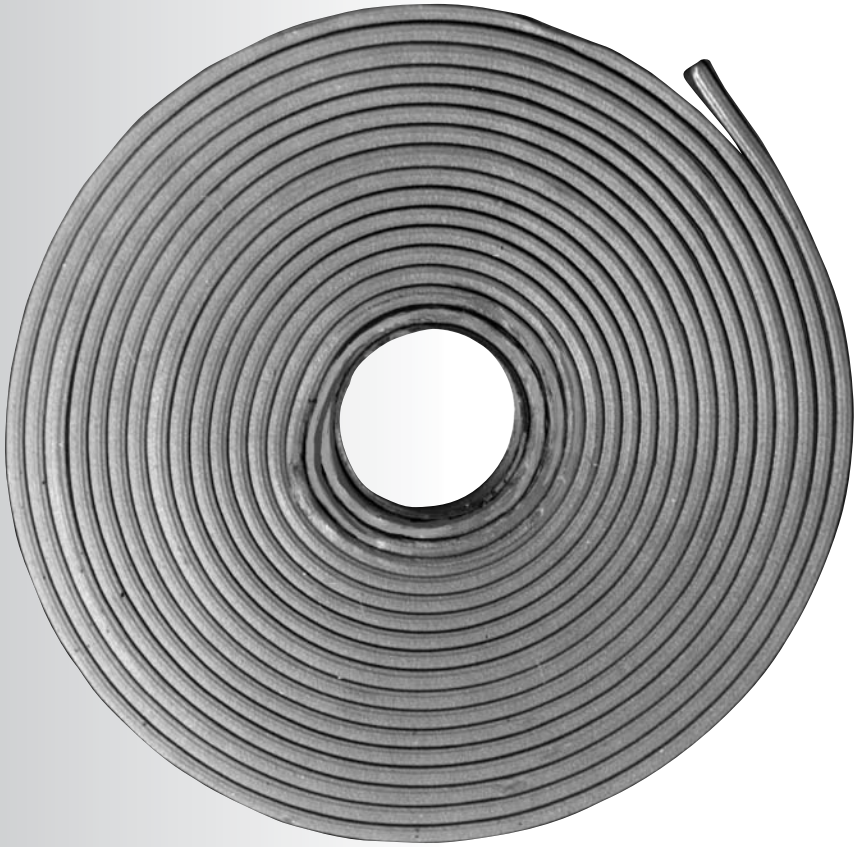


*Plexiglass Window Available Upon Request

Printed in the USA 08/06
BO008402

D U C T M A T E

Sticky Tape



High Quality Sealing Tape

Ideal for Rectangular Connections

- Wide range of application temperatures
- Works under extreme conditions
- Non-hardening
- Superior adhesion to most dry metal surfaces

GASKETS, SEALANTS, ADHESIVES

DUCTMATE® Industries, Inc.

Sticky Tape

High Quality Sealing Tape

DESCRIPTION

This product is a high quality general use tape developed for the metal ducting industry for use as a sealant, moisture and dust barrier. It is non-hardening and has excellent adhesion to most dry metal surfaces.

BASIC USE

To be used for TDC and TDF connections, where a highly adhesive, low cost gasket is preferred

SPECIAL CHARACTERISTICS

This product is made from elastomers, butyl, EPDM rubber and proprietary copolymers. The plasticizers are of the Polyisobutylene and Polybutene type and permit no oxidation or migration. The fillers are inert and are primarily used as extenders and process aids and, to a lesser extent, as reinforcing pigments. The remaining materials are antioxidants, fungicides and organic processing aids.

3/16" x 5/8" x 25' per roll. Other sizes available upon request

Mineral Spirits will readily facilitate the cleaning of tools and equipment.

PACKAGING INFORMATION

Standard product is packaged 500 ft. per carton (20 rolls x 25 ft. per roll). All rolls are separated by silicone dividers and protected by upright stacking cores. Standard shipping cartons are constructed of 200 lb Kraft material. Pallets are heavy duty and have 4-way entry. All pallets are stretchwrapped for shipment.

LIMITED PRODUCT WARRANTY

The manufacturer is not liable for consequential, incidental or special damages. There are no statutory or implied warranties including the warranties of fitness for a particular purpose and merchantability. There are no warranties other than as set forth below and factory neither assumes nor authorizes any person to assume any liability or other obligation in connection with Sticky Tape.

Sticky Tape is warranted to be free from any and all defects in material and workmanship only at the time of shipment from our factory. If material is shown to be defective at the time of shipment from our factory, manufacturer will at its sole option, replace or issue credit for the original purchase price.

To determine the suitability of Sticky Tape for each specific purpose the user must conduct his own test. Manufacturer does not guarantee the results from the use of Sticky Tape because of the extreme differences in surface texture and porosity of available materials as well as the possibility of structural movement or externally caused damages.

TECHNICAL INFORMATION

% SOLIDS:	99.8%
COLOR:	Gray
SPECIFIC GRAVITY:	1.46 ± .05
SHELF & SERVICE LIFE:	20 years minimum
HARDNESS:	77°F - 9.0mm - 10.5mm max
PLASTICIZER MIGRATION:	No bleed/contact stain
STAINING:	No bleed/contact stain
FLEXIBILITY:	Passes, no cracking or loss of adhesion
WATER RESISTANCE:	Vacuum .75% max Static 0%
ELONGATION & WEBBING:	0°F 250% min. 77°F 800% min.
ADHESION CHARACTERISTICS:	12 psi min.
AGING CHARACTERISTICS:	(Weather-O-Meter, 1,000 hrs.) 10% reduction in most physicals QUV Cabinet 10% reduction in most physicals
HEAT DISTORTION AND/OR PLASTIC DEFORMATION:	25% max.
SERVICE TEMPERATURE:	-40°F to +190°F -40°C to + 88°C
APPLICATION TEMPERATURE:	Above 40°F
MANUFACTURING TOLERANCES:	Tape Width ± 1/16 Inch Tape Height ± 1/32 Inch

Tested to the equivalent of UL723 and ASTM E-84

DUCTMATE® Industries, Inc.

Charleroi, PA
210 Fifth Street
Charleroi, PA 15022
800-245-3188
724-258-0500
FAX: 724-258-5494

Lodi, CA
810 S. Cluff Avenue
Lodi, CA 95240-9141
800-344-3270
209-333-4680
FAX: 209-333-4678

www.ductmate.com

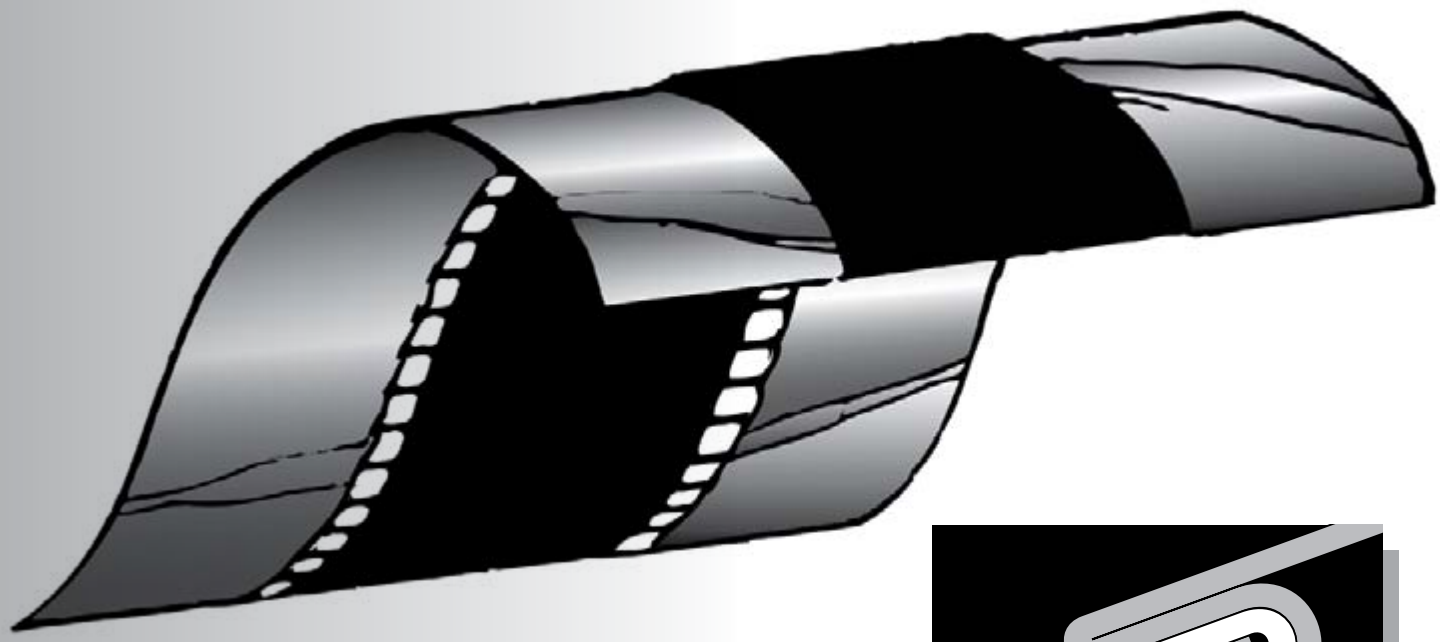
Distributed By:

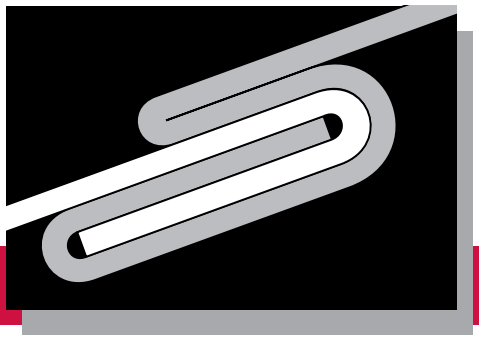
Ductmate is a proud member of the following organizations:

SMACNA SPIDA SPIRAL DUCT MANUFACTURERS ASSOCIATION

PROflex™

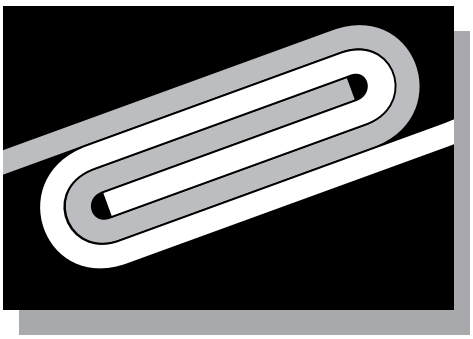
Flexible Duct Connector

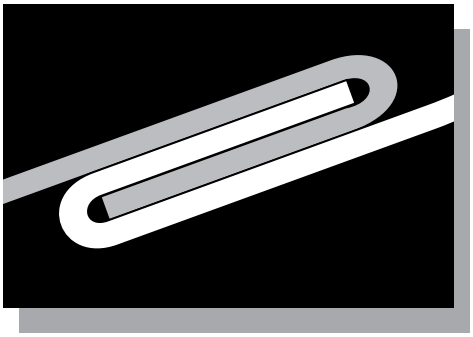




Vibration Dampening Duct Connector

- Commercial or residential applications
- Galvanized, stainless steel or aluminum metal
- Available in a variety of fabrics
- Pre-assembled with sheet metal permanently secured to fabric





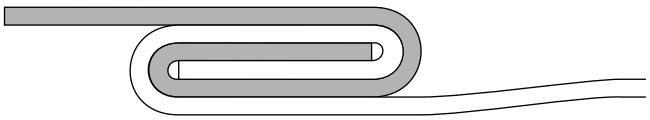
DUCTMATE® Industries, Inc.

PROflex™

Flexible Duct Connector

DESCRIPTION-COMMERCIAL

Flexible duct connector that eliminates duct system noises and vibrations for industrial and commercial applications.



BASIC USE

Typically inserted between the machinery and the ductwork, Proflex is an airtight, flexible joint that isolates vibration to the source and reduces noise inside the duct system.

SPECIAL CHARACTERISTICS

Double-lock gripping fingers of metal to fabric adds to holding power

Designed to meet NFPA 90A & 90B specifications

Airtight and waterproof at 10" w.g. to 10" negative w.g.

24GA galvanized steel which meets ASTM-A-653-94-G60

Fabrics meet NFPA 701 (except Teflon®)

ORDERING INFORMATION

COMMERCIAL

FABRIC	SIZE metal x fabric x metal	GAUGE metal	PART NO.
Vinyl Super Duty	All Fabrics	24	PFC**VSGA
Neoprene Commercial	available in:	24	PFC**NGA
Hypalon	**3"x3"x3"**	24	PFC**HGA
Silicone	**4"x4"x4"**	24	PFC**SGA
Teflon	**3"x6"x3"**	24	PFC**TGA

*** = fabric size 3", 4" or 6"*

Standard 100 ft. per carton.

Metal is available in galvanized, stainless and aluminum.

All fabrics are available without metal attached in 4¾" and 5¾" wide x 100 ft. per roll.

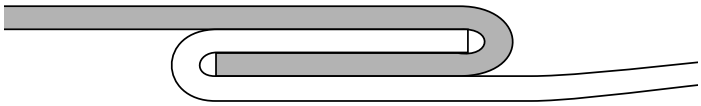
For other alloys, fabric sizes or chemical resistance information, consult your nearest Ductmate distributor or call Ductmate direct.

PRODUCT GUARANTEE

All Proflex flexible duct connectors are guaranteed against defective material.

DESCRIPTION-SINGLE FOLD

Flexible duct connector that eliminates duct system noises and vibrations for industrial, commercial and residential applications.



BASIC USE

Typically inserted between the machinery and the ductwork, Proflex is an airtight, flexible joint that isolates vibration to the source and reduces noise inside the duct system.

SPECIAL CHARACTERISTICS

Designed to meet NFPA 90A & 90B specifications

Airtight and waterproof at 10" w.g. to 10" negative w.g.

24GA galvanized steel which meets ASTM-A-653-94-G60

Fabrics meet NFPA 701 (except Teflon®)

ORDERING INFORMATION

SINGLE-FOLD

FABRIC	SIZE metal x fabric x metal	GAUGE metal	PART NO.
Vinyl Super Duty	All Fabrics	24	PFCS*VSGA
Neoprene Commercial	available in:	24	PFCS*NGA
Hypalon	**4½"x3"x4½"**	24	PFCS*HGA
Teflon	**3"x3"x3"**	24	PFCS*TGA
Silicone	**3"x6"x3"**	24	PFCS*SGA

** T3 = 4½"x3"x4½"; 3 = 3" x 3" x 3"; 6 = 3" x 6" x 3"*

Standard 100 ft. per carton.

Metal is available in galvanized, stainless and aluminum.

All fabrics are available without metal attached in 4¾" and 5¾" wide x 100 ft. per roll.

For other alloys, gauges, fabric sizes or chemical resistance information, consult your nearest Ductmate distributor or call Ductmate direct.

PRODUCT GUARANTEE

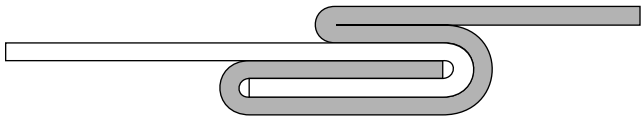
All Proflex flexible duct connectors are guaranteed against defective material.

PROflex™

Flexible Duct Connector

DESCRIPTION-RESIDENTIAL

Flexible duct connector that eliminates duct system noises and vibrations for residential applications.



BASIC USE

Typically inserted between the machinery and the ductwork, Proflex is an airtight, flexible joint that isolates vibration to the source and reduces noise inside the duct system.

SPECIAL CHARACTERISTICS

Additional fold protects fabric when breaking

Double-lock gripping fingers of metal to fabric adds to holding power

Additional fold causes the fabric and metal to lay flat

Designed to meet NFPA 90A & 90B specifications

Airtight and waterproof at 10" w.g. to 10" negative w.g.

28 gauge galvanized steel which meets ASTM-A-653-94-G60

Fabrics meet NFPA 701 (except Teflon®)

ORDERING INFORMATION

RESIDENTIAL

FABRIC	SIZE metal x fabric x metal	GAUGE	PART NO.
Vinyl	All Fabrics available in: 1¾" x 3" x 1¾"	28	PFRO3VGA
Neoprene Residential		28	PFRO3NGA
Hypalon		28	PFRO3HGA
Silicone		28	PFRO3SGA

ECONOMY

FABRIC	SIZE metal x fabric x metal	GAUGE	PART NO.
Vinyl Super Duty™	All Fabrics available in: 2¾" x 4" x 2¾"	28	PFEO3VGA
Neoprene Residential		28	PFEO3NGA
Hypalon		28	PFEO3HGA
Silicone		28	PFEO3SGA

Standard 100 ft. per carton.

Vinyl and Neoprene available in 150 ft. per carton. *(Please specify)*

Metal is available in galvanized, stainless and aluminum.

All fabrics are available without metal attached in 4¾" and 5¾" wide x 100 ft. per roll.

For other alloys, fabric sizes or chemical resistance information, consult your nearest Ductmate distributor or call Ductmate direct.

PRODUCT GUARANTEE

All Proflex flexible duct connectors are guaranteed against defective material.

FABRIC SPECIFICATIONS

VINYL RESIDENTIAL (coated fabric)

Base Fabric: woven polyester
Color: black
Weight: 13 oz./sq. yd.
Tongue Tear: 77/77 lbs.
Tensile Strength: 220/220 lbs.
Low Temperature: -40°F
High Temperature: 160°F

- Economical all-purpose fabric with excellent resistance to cuts, tears and abrasions
- Flame retardant coating
- Resistant to weather and most chemicals
- Meets NFPA 701

VINYL SUPER DUTY™ (coated fabric)

Base Fabric: woven nylon
Color: black
Weight: 22 oz./sq. yd.
Tongue Tear: 115/85 lbs.
Tensile Strength: 500/400 lbs.
Low Temperature: -22°F
High Temperature: 158°F

- Strongest all-purpose fabric in the industry with excellent resistance to cuts, tears and abrasions
- Flame retardant coating
- Resistant to weather and most chemicals
- Mildew resistant per ASTM G-21
- Meets NFPA 701

NEOPRENE COMMERCIAL (coated fabric)

Base Fabric: woven fiberglass
Color: black
Weight: 30 oz./sq. yd.
Tongue Tear: 25/20 lbs.
Tensile Strength: 475/375 lbs.
Low Temperature: -40°F
High Temperature: 200°F

- Ideal for fume hoods
- Fire retardant coating with non-combustible fabric
- Resistant to weather and most chemicals, fat, grease and oil
- Meets NFPA 701

NEOPRENE RESIDENTIAL (coated fabric)

Base Fabric: woven fiberglass
Color: black
Weight: 24 oz./sq. yd.
Tongue Tear: 25/20 lbs.
Tensile Strength: 475/375 lbs.
Low Temperature: -40°F
High Temperature: 200°F

- Ideal for fume hoods
- Fire retardant coating with non-combustible fabric
- Resistant to weather and most chemicals, fat, grease and oil
- Meets NFPA 701

HYPALON (coated fabric)

Base Fabric: woven fiberglass
Color: white
Weight: 24 oz./sq. yd.
Tongue Tear: 20/15 lbs.
Tensile Strength: 400/300 lbs.
Low Temperature: -50°F
High Temperature: 250°F

- Ideal for outdoor applications & fume hoods
- Flame proof coating with non-combustible fabric
- Resistant to weather and most chemicals, fat, grease and oil
- UV Resistant
- Meets NFPA 701

SILICONE (coated fabric)

Base Fabric: satin weave fiberglass
Color: aluminum
Weight: 17.5 oz./sq. yd.
Tongue Tear: 50/40 lbs.
Tensile Strength: 200 lbs. or better
Low Temperature: -67°F
High Temperature: 500°F

- Ideal for high temp applications
- Flame proof coating with non-combustible fabric
- Resistant to weather and most chemicals
- Adversely affected by gas, Toluene, Acetone and grease
- Meets NFPA 701
- FFDCA Approved for use near food prep

TEFLON® (coated fabric)

Base Fabric: woven fiberglass
Color: gray
Weight: 18 oz./sq. yd.
Tongue Tear: 60/40 lbs.
Tensile Strength: 400/300 lbs.
Low Temperature: -67°F
High Temperature: 500°F

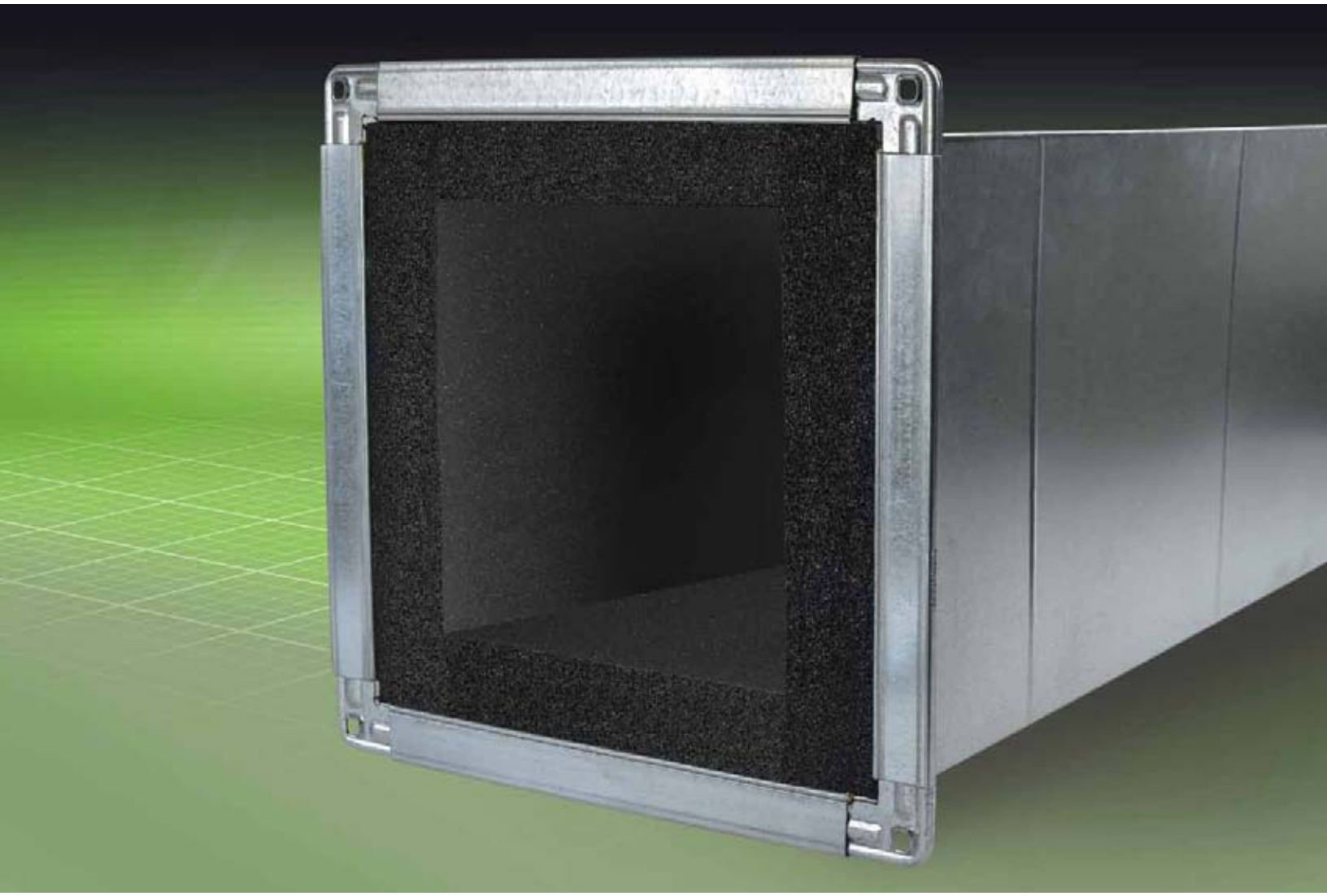
- Excellent chemical resistance
- Excellent flexibility in extreme temperatures
- Flame proof coating with non-combustible fabric
- FFDCA Approved for use near food prep

AP/Armaflex®
AP/Armaflex® FS

Duct Liner and Wrap

Fiber Free

The original, fiber-free, closed-cell thermal and acoustical duct insulation engineered to safeguard IAQ, attenuate HVAC noise, and reduce energy loss



- Fiber-free, non-particulating, formaldehyde-free, free of PDBE flame retardants, low VOC, and manufactured with built-in Microban® antimicrobial protection to improve Indoor Air Quality
- Attenuates airborne noise to reduce background noise from HVAC systems
- Meets ASHRAE 90.1 - 2010, ASHRAE Standard 189.1, IECC 2012 and California Title 24 for increased energy efficiency
- Designed to last the useful life of mechanical equipment

armacell
advanced insulation

GREENGUARD Children & Schools Indoor Air Quality Certified

U.S. Green Building Council Member

Microban® antimicrobial product protection

Technical Data: AP Armaflex® and AP Armaflex® FS Black Duct Liner and Wrap

Description:

Black flexible closed-cell elastomeric thermal and acoustical duct insulation in sheet and roll form

Specifications Compliance:

ASTM C 534, Type II — Sheet Grade 1 ASTM C 1534 ASTM D 1056, 2B1	ASTM E 84, NFPA 255, UL723 ASTM G21/C1338 ASTM G22 CAN/ULC S102[1]	MEA 107-89M MIL-P-15280J, FORM S[2] MIL-C-3133C (MIL STD 670B) Grade SBE 3[2]	NFPA 90A, 90B UL 181 UL 94 5V-A, V-0, File E55798 City of LA – RR 7642

Approvals, Certifications, Compliances:

- GREENGUARD® Children & Schools Indoor Air Quality certified.
- Manufactured without CFCs, HFCs, HCFCs, PBDEs, or Formaldehyde.
- Made with EPA registered Microban® antimicrobial product protection.
- All Armacell facilities in North America are ISO 9001:2008 certified.

Typical Properties

Specifications:	Values			Test Method:
	AP Armaflex Through 1" Duct Liner and Wrap	AP Armaflex FS 1-1/2" & 2" Duct Liner	AP Armaflex 1-1/2" & 2" Duct Wrap	
Thermal Conductivity: Btu • in./h • ft² • °F (W/mK)				
75°F Mean Temperature (24°C) 90°F Mean Temperature (32°C)	0.25 (0.036) 0.256 (0.037)	0.28 (0.040) 0.28 (0.040)	0.25 (0.036) 0.256 (0.037)	ASTM C 177 or C 518
Water Vapor Permeability: Perm-in. [Kg/(s • m • Pa)]	0.05 (0.725 x 10^{-13})	0.08 (1.16 x 10^{-13})	0.05 (0.725 x 10^{-13})	ASTM E 96, Procedure A
Flame Spread and Smoke Developed Index:	25/50 rated	25/50 rated	Does not pass	ASTM E 84 CAN/ULC S102[1] - AP through 1"
Water Absorption, % by Volume:	0.2%	0.2%	0.2%	ASTM C 209
Mold Growth: **Fungi Resistance :** **Bacterial Resistance:**	Passed	Passed	Passed	UL181 ASTM G21/C1338 ASTM G22
Upper Use Limit: [2]	180°F (82°C)	180°F (82°C)	180°F (82°C)	
Lower Use Limit: [3]	-297°F (-183°C) [4]	-297°F (-183°C) [4]	-297°F (-183°C) [4]	
Ozone Resistance:	GOOD	GOOD	GOOD	
Erosion Resistance:	Does not break away, flake off or show evidence of delamination at velocities of 10,000 ft/min			ASTM C1071

R-Value	R-1.4	R-2.1	R-3.1	R-4.2	R-6	R-8
Thickness:	3/8"	1/2"	3/4"	1"	1-1/2"	2"

Sound Absorption Coefficients Frequency	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	NRC	SAA
Thickness Nom. 1" (25mm)	0.01	0.13	0.39	0.69	0.29	0.26	0.40	0.38

Sizes:

Sheet: Width x Length	36" x 48"
Roll: Width	48" (all thicknesses) and 60" (1"only)
Wall: Thickness	AP Armaflex Duct Liner and Wrap: 1/2", 3/4", and 1" AP Armaflex FS Duct Liner: 1-1/2" and 2" AP Armaflex Duct Liner: 1-1/2" and 2"

[1] AP Armaflex meets CAN/ULC S102 through 1" thickness.

[2] AP Armaflex and AP Armaflex FS Black Duct Liner/Wraps withstand temperature of 250°F (121°C) when tested according to ASTM C 411. "Test Method for Surface Performance of High-Temperature Insulations". At this temperature, AP/ Armaflex Duct Liner/Wrap insulation shows no evidence of flaming, glowing, smoldering, delamination, melting or insulation collapse. Although this insulation will withstand high temperatures, continuous use temperature should be limited to 180°F (82°C).

[3] At temperatures below -20°F (-29°C), elastomeric insulation starts to become less flexible. However, this characteristic does not affect thermal efficiency and resistance to water vapor permeability of Armaflex insulation.

[4] For applications of -40°F to -297°F (-40°C to -183°C), contact Armacell.

ARMACELL LLC
TEL: 800.866.5638
FAX: 919.304.3847
info.us@armacell.com
www.armacell.us
7600 Oakwood Street Extension, Mebane, NC 27302

armacell
advanced insulation

SUBMITTAL

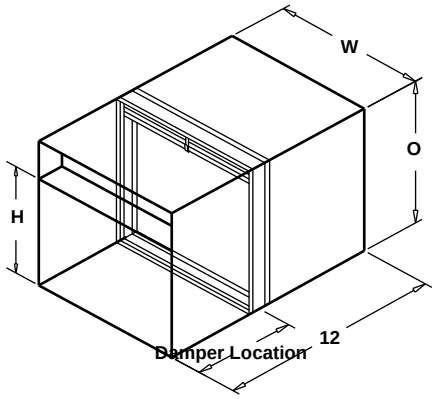
Job Title: **PRESS HOTEL**

Contractor: AERO HEATING AND VENTILATING
Elevation: (ft) 62
Date: 02/11/14
Submitted By: Ed Sawyer

BUCKLEY ASSOCIATES INC
498B WOODFORD STREET
PORTLAND , ME 04103-2461
US
Phone: (207)773-0078
Fax: (207)773-0074
Email Address: esawyer@buckleyonline.com

SUBMITTAL NOTES:

FIRE DAMPERS
FIRE/SMOKE DAMPERS



DFD-150X12

Dynamic Rated Fire Damper

Application & Design

The model DFD-150X12 (fire damper with integral 12.000 in. sleeve) is approved for use in walls, floors, and partitions with fire resistance ratings less than 3 hours. This model carries a 1 1/2 hour UL fire damper label. UL 555 classifies dynamic rated fire dampers for use in HVAC systems that are operational in the event of fire.

UL555 FIRE RESISTANCE RATINGS
Fire Rating: 1 1/2 hours
Maximum Velocity: 4,000 ft/min up to 24.000 in. x 24.000 in. vertical only
2,000 ft/min vertical or horizontal, all sizes
Maximum Pressure: 4 in. wg

Note: When ordering C, CO or CR transitions, they are positioned 1.000 in. from bottom of sleeve.

Notes: All dimensions shown are in units of inches.
W & H furnished approximately 0.25 in. undersized.
(sleeve thickness IS included)

Codes Approved

This model meets the requirements for fire dampers established by:
NFPA Standards 80, 90A & 101.

UL Classified to U.S. and Canadian Safety Standards 555 (Listing #R13317)

IBC (International Building Codes)

CSFM - California State Fire Marshal Fire Damper Listing (#3225-0981:102)

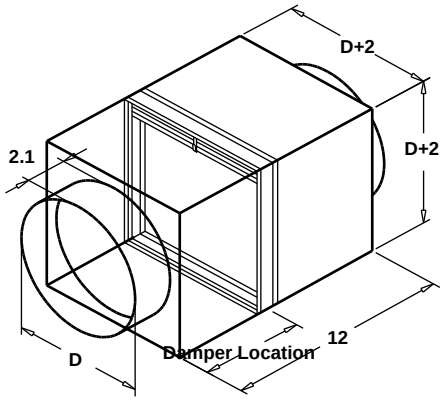
New York City (MEA Listing #260-91-M)

Installation instructions available at www.greenheck.com.

CONSTRUCTION FEATURES

Transition: B
Transition Location: Both Sides
Mounting: Vertical
Closure Device: Fusible Link
Closure Temp. (F): 165
Sleeve Thickness (ga): 20
Sizing: Nominal
Velocity (ft/min): 2,000
Static Pressure (in. wg): 4

ID #	Tag	Qty	W (in.)	H (in.)	Sections Wide	Sections High	Damper Location (K) (in.)	O Dimension (in.)	Sleeve Length (in.)
1-1		6	8.000	4.000	1	1	6	6	12
Tags:									
1-2		1	16.000	14.000	1	1	6	16	12
Tags:									
1-3		1	36.000	14.000	1	1	6	16	12
Tags:									



DFD-150X12

Dynamic Rated Fire Damper

Application & Design

The model DFD-150X12 (fire damper with integral 12.000 in. sleeve) is approved for use in walls, floors, and partitions with fire resistance ratings less than 3 hours. This model carries a 1 1/2 hour UL fire damper label. UL 555 classifies dynamic rated fire dampers for use in HVAC systems that are operational in the event of fire.

UL555 FIRE RESISTANCE RATINGS
Fire Rating: 1 1/2 hours
Maximum Velocity: 4,000 ft/min up to 24.000 in. x 24.000 in. vertical only
2,000 ft/min vertical or horizontal, all sizes
Maximum Pressure: 4 in. wg

Note: When ordering C, CO or CR transitions, they are positioned 1.000 in. from bottom of sleeve.

Notes: All dimensions shown are in units of inches.
W & H furnished approximately 0.25 in. undersized.
(sleeve thickness IS included)

Codes Approved

This model meets the requirements for fire dampers established by:
NFPA Standards 80, 90A & 101.

UL Classified to U.S. and Canadian Safety Standards 555 (Listing #R13317)

IBC (International Building Codes)

CSFM - California State Fire Marshal Fire Damper Listing (#3225-0981:102)

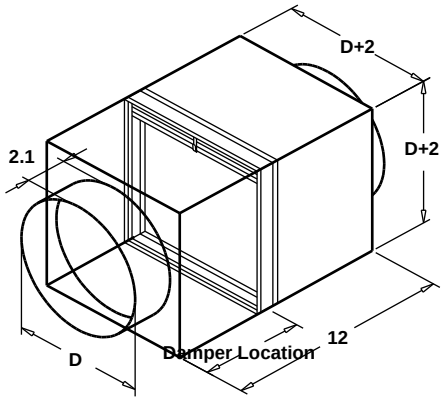
New York City (MEA Listing #260-91-M)

Installation instructions available at www.greenheck.com.

CONSTRUCTION FEATURES

Transition: R
Transition Location: Both Sides
Transition Offset (in.): 2
Mounting: Vertical
Closure Device: Fusible Link
Closure Temp. (F): 165
Sleeve Thickness (ga): 20
Sizing: Nominal
Velocity (ft/min): 2,000
Static Pressure (in. wg): 4

ID #	Tag	Qty	Dia. (in.)	Sections Wide	Sections High	Damper Location (K) (in.)	Sleeve Length (in.)
2-1		104	4.000	1	1	6	12
Tags:							
2-2		4	6.000	1	1	6	12
Tags:							
2-3		1	7.000	1	1	6	12
Tags:							



DFD-150X12

Dynamic Rated Fire Damper

Application & Design

The model DFD-150X12 (fire damper with integral 12.000 in. sleeve) is approved for use in walls, floors, and partitions with fire resistance ratings less than 3 hours. This model carries a 1 1/2 hour UL fire damper label. UL 555 classifies dynamic rated fire dampers for use in HVAC systems that are operational in the event of fire.

UL555 FIRE RESISTANCE RATINGS
Fire Rating: 1 1/2 hours
Maximum Velocity: 4,000 ft/min up to 24.000 in. x 24.000 in. vertical only
2,000 ft/min vertical or horizontal, all sizes
Maximum Pressure: 4 in. wg

Note: When ordering C, CO or CR transitions, they are positioned 1.000 in. from bottom of sleeve.

Notes: All dimensions shown are in units of inches.
W & H furnished approximately 0.25 in. undersized.
(sleeve thickness IS included)

Codes Approved

This model meets the requirements for fire dampers established by:
NFPA Standards 80, 90A & 101.

UL Classified to U.S. and Canadian Safety Standards 555 (Listing #R13317)

IBC (International Building Codes)

CSFM - California State Fire Marshal Fire Damper Listing (#3225-0981:102)

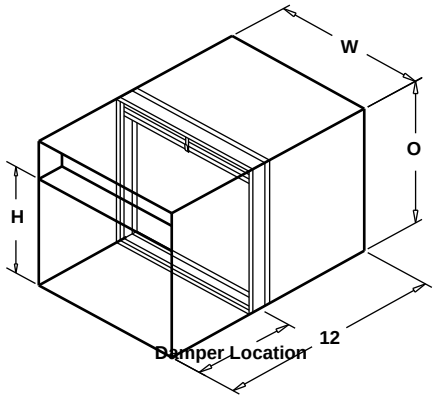
New York City (MEA Listing #260-91-M)

Installation instructions available at www.greenheck.com.

CONSTRUCTION FEATURES

Transition: R
Transition Location: Both Sides
Transition Offset (in.): 2
Mounting: Horizontal
Closure Device: Fusible Link
Closure Temp. (F): 165
Sleeve Thickness (ga): 20
Sizing: Nominal
Velocity (ft/min): 2,000
Static Pressure (in. wg): 4

ID #	Tag	Qty	Dia. (in.)	Sections Wide	Sections High	Damper Location (K) (in.)	Sleeve Length (in.)
3-1		1	8.000	1	1	6	12
Tags:							
3-2		1	12.000	1	1	6	12
Tags:							



DFD-150X12

Dynamic Rated Fire Damper

Application & Design

The model DFD-150X12 (fire damper with integral 12.000 in. sleeve) is approved for use in walls, floors, and partitions with fire resistance ratings less than 3 hours. This model carries a 1 1/2 hour UL fire damper label. UL 555 classifies dynamic rated fire dampers for use in HVAC systems that are operational in the event of fire.

UL555 FIRE RESISTANCE RATINGS
Fire Rating: 1 1/2 hours
Maximum Velocity: 4,000 ft/min up to 24.000 in. x 24.000 in. vertical only
2,000 ft/min vertical or horizontal, all sizes
Maximum Pressure: 4 in. wg

Note: When ordering C, CO or CR transitions, they are positioned 1.000 in. from bottom of sleeve.

Notes: All dimensions shown are in units of inches.
W & H furnished approximately 0.25 in. undersized.
(sleeve thickness IS included)

Codes Approved

This model meets the requirements for fire dampers established by:
NFPA Standards 80, 90A & 101.

UL Classified to U.S. and Canadian Safety Standards 555 (Listing #R13317)

IBC (International Building Codes)

CSFM - California State Fire Marshal Fire Damper Listing (#3225-0981:102)

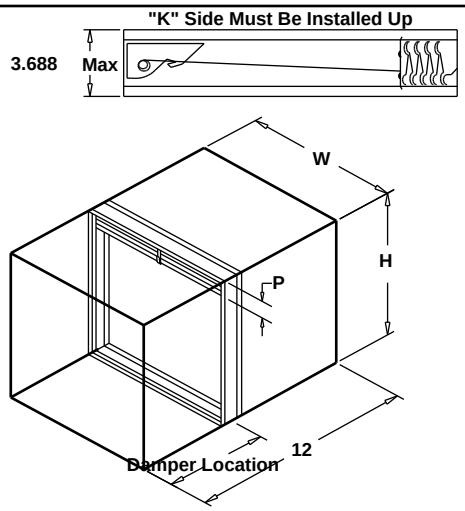
New York City (MEA Listing #260-91-M)

Installation instructions available at www.greenheck.com.

CONSTRUCTION FEATURES

Transition: B
Transition Location: Both Sides
Mounting: Horizontal
Closure Device: Fusible Link
Closure Temp. (F): 165
Sleeve Thickness (ga): 20
Sizing: Nominal
Velocity (ft/min): 2,000
Static Pressure (in. wg): 4

ID #	Tag	Qty	W (in.)	H (in.)	Sections Wide	Sections High	Damper Location (K) (in.)	O Dimension (in.)	Sleeve Length (in.)
4-1		1	10.000	10.000	1	1	6	12	12
Tags:									
4-2		1	10.000	24.000	1	1	6	28	12
Tags:									
4-3		2	12.000	12.000	1	1	6	14	12
Tags:									
4-4		1	14.000	14.000	1	1	6	16	12
Tags:									
4-5		1	16.000	8.000	1	1	6	10	12
Tags:									
4-6		1	28.000	14.000	1	1	6	16	12
Tags:									



DFD-150

Dynamic Rated Fire Damper

Application & Design

The model DFD-150 is approved for use in walls, floors, and partitions with fire resistance ratings less than 3 hours. This model carries a 1 1/2 hour UL fire damper label. UL-555 classifies dynamic rated fire dampers for use in HVAC systems that are operational in the event of fire.

UL555 FIRE RESISTANCE RATINGS
Fire Rating: 1 1/2 hours
Maximum Velocity: 4,000 ft/min up to 24.000 in. x 24.000 in. vertical only
2,000 ft/min vertical or horizontal, all sizes
Maximum Pressure: 4 in. wg

Note: When ordering C, CO or CR transitions, they are positioned 1.000 in. from bottom of sleeve.

Notes: All dimensions shown are in units of inches.
W & H furnished approximately 0.25 in. undersized. (sleeve thickness is NOT included)

Codes Approved

This model meets the requirements for fire dampers established by:
National Fire Protection Association :NFPA Standards 80, 90A, and 101
Underwriters Laboratories
UL Classified to U.S. and Canadian Safety Standards UL standard 555 (Listing#R13317)
IBC (International Building Codes)
CSFM California State Fire Marshall: Fire Damper Listing (#3225-0981-102)
New York City (MEA Listing #260-91-M)
FM Approvals Specification Tested Product
Installation Instructions available at www.greenheck.com.

CONSTRUCTION FEATURES

Transition: A
Mounting: Horizontal
Closure Device: Fusible Link
Closure Temp. (F): 165
Sleeve Thickness (ga): 20
Sizing: Nominal
Velocity (ft/min): 2,000
Static Pressure (in. wg): 4

ID #	Tag	Qty	W (in.)	H (in.)	Sections Wide	Sections High	P-Dim (in.)	Damper Location (K) (in.)	Sleeve Length (in.)
5-1		3	18.000	6.000	1	1	0.966	6	12
Tags:									
5-2		7	14.000	6.000	1	1	0.966	6	12
Tags:									
5-3		2	6.000	6.000	1	1	0.966	6	12
Tags:									
5-4		2	30.000	6.000	1	1	0.966	6	12
Tags:									
5-5		1	12.000	6.000	1	1	0.966	6	12
Tags:									

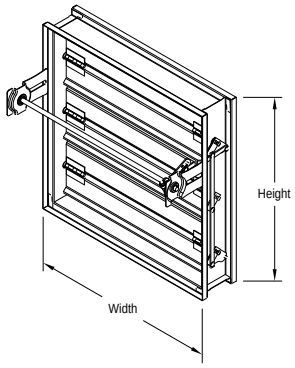
Model: FSD-211

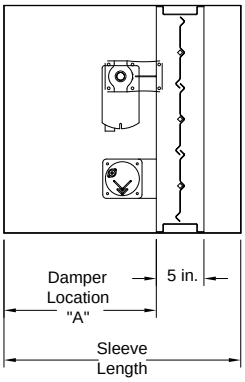
Ratings and General Construction

Mounting:	Horizontal	Axle/Linkage Material:	Steel	Axle Bearings:	Bronze
Velocity (ft/min):	2,000	Pressure Rtg. (in. wg):	4	Sizing:	Nominal
Closure Device:	RRL / OCI	Closure Temp (ºF):	165	Sealed Trans/Slv.:	No
Frame Thickness (ga):	16	Blade Action:	Parallel	Blade Seal:	Silicone
Clean Wrap:	No	FM Approved Label:	No		

Actuator

Actuator Type:	120 VAC	Actuator Mounting:	External	Actuator Location:	Right Side
Actuator Mfr.:	All	Fail Position:	Closed	Operating Mode:	Two Position
Actuator Temp. (ºF):	250	Cycle Time:	Standard	NEMA Enclosure:	1
Auxiliary Switch:	Yes				





Notes: All dimensions shown are in units of inches.

Width & Height furnished approximately 0.25 in. under size.
(Add sleeve thickness for overall sleeved damper dimension)

Application & Design

Model FSD-211 is a combination fire smoke damper with 3V style blades. The FSD-211 has been qualified to 2,000 ft/min and 6 in. wg for operation and dynamic closure in emergency fire smoke situations. This model may be installed vertically (with blades running horizontal) or horizontally and is rated for airflow and leakage in either direction.

Ratings

UL 555 Fire Resistance Rating

Fire Rating:	1½ hours
Max. Pressure:	Consult Factory

UL555S Leakage Rating

Leakage Class:	I

Codes Approved

Model FSD-211 meets the requirements for fire dampers, smoke dampers and combination fire smoke dampers established by:

National Fire Protection Association:
- NFPA Standards 80, 90A, 92A, 92B, 101, 105

IBC International Building Codes
New York City (MEA listing #260-91-M)
CSFM (Fire Damper Listing)
- Listing #:3225-0981:103

CSFM (Leakage Smoke Damper Listing)
- Listing #:3230-0981:104

FM Approval Specification Tested Product
Underwriters Laboratories
- UL Classified to U.S. and Canadian safety standards
- Standard 555 & 555S (Listing #R13317)

Installation instructions available at www.greenheck.com.

Row ID	Tag	Qty	Width (in.)	Height (in.)	Drive Arrangement	Actuator Model	Act. Qty.	Sleeve Length (in.)	Sleeve Gauge (ga)	"A" Dim. (in.)
6-1		1	10.000	10.000	Drive-MLS-11-1FER-1	FSTF120-S	1	21.000	20	12.000
6-2		1	14.000	10.000	Drive-MLS-11-1FER-1	FSTF120-S	1	21.000	20	12.000
6-3		1	14.000	14.000	Drive-MLS-11-1FER-1	FSTF120-S	1	16.000	20	7.188
6-4		1	20.000	12.000	Drive-MLS-11-1FER-1	FSTF120-S	1	16.000	20	7.188
6-5		1	20.000	14.000	Drive-MLS-11-1FER-1	FSTF120-S	1	16.000	20	7.188
6-6		1	24.000	14.000	Drive-MLS-11-1FER-1	FSTF120-S	1	16.000	20	7.188

Total Qty: 6
Total Number of Actuators: 6

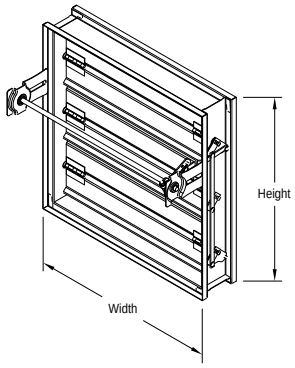
Model: FSD-211

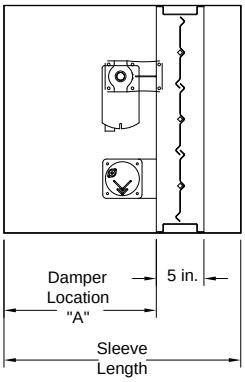
Ratings and General Construction

Mounting:	Vertical	Axle/Linkage Material:	Steel	Axle Bearings:	Bronze
Velocity (ft/min):	2,000	Pressure Rtg. (in. wg):	4	Sizing:	Nominal
Closure Device:	RRL / OCI	Closure Temp (ºF):	165	Sealed Trans/Slv.:	No
Frame Thickness (ga):	16	Blade Action:	Parallel	Blade Seal:	Silicone
Clean Wrap:	No	FM Approved Label:	No		

Actuator

Actuator Type:	120 VAC	Actuator Mounting:	External	Actuator Location:	Right Side
Actuator Mfr.:	All	Fail Position:	Closed	Operating Mode:	Two Position
Actuator Temp. (ºF):	250	Cycle Time:	Standard	NEMA Enclosure:	1
Auxiliary Switch:	Yes				





Notes: All dimensions shown are in units of inches.

Width & Height furnished approximately 0.25 in. under size.
(Add sleeve thickness for overall sleeved damper dimension)

Application & Design

Model FSD-211 is a combination fire smoke damper with 3V style blades. The FSD-211 has been qualified to 2,000 ft/min and 6 in. wg for operation and dynamic closure in emergency fire smoke situations. This model may be installed vertically (with blades running horizontal) or horizontally and is rated for airflow and leakage in either direction.

Ratings

UL 555 Fire Resistance Rating

Fire Rating:	1½ hours
Max. Pressure:	Consult Factory

UL555S Leakage Rating

Leakage Class:	I

Codes Approved

Model FSD-211 meets the requirements for fire dampers, smoke dampers and combination fire smoke dampers established by:

National Fire Protection Association:
NFPA Standards 80, 90A, 92A, 92B, 101, 105
IBC International Building Codes
New York City (MEA listing #260-91-M)
CSFM (Fire Damper Listing)
Listing #:3225-0981:103
CSFM (Leakage Smoke Damper Listing)
Listing #:3230-0981:104
FM Approval Specification Tested Product
Underwriters Laboratories
UL Classified to U.S. and Canadian safety standards
Standard 555 & 555S (Listing #R13317)
Installation instructions available at www.greenheck.com.

Row ID	Tag	Qty	Width (in.)	Height (in.)	Drive Arrangement	Actuator Model	Act. Qty.	Sleeve Length (in.)	Sleeve Gauge (ga)	"A" Dim. (in.)
7-1		1	10.000	6.000	Drive-MLS-11-1FER-1	FSTF120-S	1	21.000	20	12.000
7-2		1	10.000	10.000	Drive-MLS-11-1FER-1	FSTF120-S	1	21.000	20	12.000
7-3		2	14.000	10.000	Drive-MLS-11-1FER-1	FSTF120-S	1	21.000	20	12.000
7-4		1	20.000	12.000	Drive-MLS-11-1FER-1	FSTF120-S	1	16.000	20	7.188
7-5		10	18.000	6.000	Drive-MLS-11-1FER-1	FSTF120-S	1	21.000	20	12.000

Total Qty: 15
Total Number of Actuators: 15

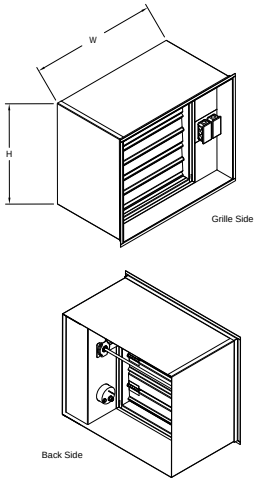
Model: GFSD-211

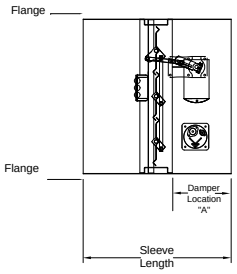
Ratings and General Construction

Mounting:	Vertical	Axle/Linkage Material:	Plated Steel	Axle Bearings:	Bronze
Velocity (ft/min):	2,000	Sizing:	Actual		
Closure Device:	RRL / OCI	Closure Temp (ºF):	165		
Partition Depth (in.):	6	OBD Depth (in.):	1.75	Grille Depth (in.):	1.25
Jamb Seal:	304 SS	Blade Material:	Galvanized		
Frame Material:	Galvanized	Jackshaft Material:	Galvanized	Frame Thickness (ga):	16
Blade Thickness:	16 ga	Blade Action:	Parallel	Blade Seal:	Silicone
Clean Wrap:	No				

Actuator

Actuator Type:	120 VAC	Actuator Mounting:	External	Actuator Location:	Left
Actuator Mfr.:	All	Pressure Rating:	4	Fail Position:	Closed
Operating Mode:	Two Position	Actuator Temp (ºF):	250	Cycle Time:	Standard
Auxiliary Switch:	Yes				





Application & Design

Model GFSD-211 is a 1½ hour fire resistance rated combination fire smoke damper with 3V style blades designed for easy access through the grille to the damper, closure device, and the actuator. A separate compartment on the side of the damper houses the actuator. The GFSD-211 has been UL qualified to 2,000 ft/min and 4 in. wg for operation and dynamic closure in emergency fire smoke situations. Model GFSD-211 may be installed vertically (with blades running horizontal) or horizontally and is rated for airflow and leakage in either direction.

Codes Approved

Model GFSD-211 meets the requirements for fire dampers, smoke dampers and combination fire smoke dampers established by:

National Fire Protection Association:
NFPA Standards 80,90A,92A,92B,101,105
IBC International Building Codes
CSFM (Fire Damper Listing)
Listing #:3225-0981:103
CSFM (Leakage Smoke Damper Listing)
Listing #:3230-0981:104

UL CLASSIFIED (see complete marking on product)
UL CLASSIFIED to Canadian safety standards (see complete marking on product)
Standard 555 & 555S (Listing #R13317)

Ratings

UL 555 Fire Resistance Rating

Fire Rating:	1½ hours
Dynamic Closure Rating:	Actual ratings are size dependent
Max. Velocity:	up to 4,000 ft/min
Max. Pressure:	Consult Factory

UL555S Leakage Rating

Leakage Class:	I
Operational Rating:	Actual ratings are size dependent
Max. Velocity:	up to 4,000 ft/min
Max. Pressure:	Consult Factory
Maximum Temperature:	350 °F depending upon the actuator

Selected Accessories

Breakaway/Flange Actuator Side: Flanged

Row ID	Tag	Qty	Width (in.)	Height (in.)	Drive Arrangement	Actuator Model	Sleeve Length (in.)	Sleeve Gauge (ga)	"A" Dim. (in.)	Flange Width
8-1		10	14.000	12.000	11-1FEL-1	FSLF120-S	18.25	16	8.75	0.75
8-2		6	20.000	36.000	11-1FEL-1	FSNF120-S	18.25	16	8.75	0.75

Total Qty: 16
Total Number of Actuators: 16

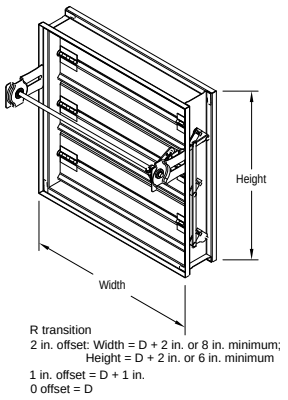
Model: FSD-211

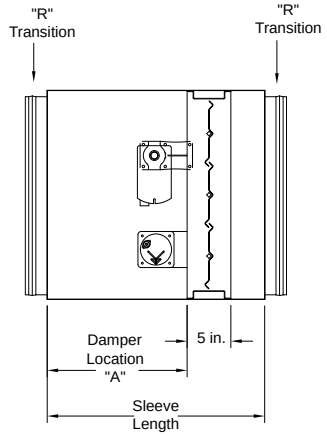
Ratings and General Construction

Mounting:	Vertical	Axle/Linkage Material:	Steel	Axle Bearings:	Bronze
Velocity (ft/min):	2,000	Pressure Rtg. (in. wg):	4	Sizing:	Nominal
Closure Device:	RRL / OCI	Closure Temp (ºF):	165	Transition:	R
Transition Location:	Both Sides	Transition Offset (in.):	2	Sealed Trans/Slv.:	No
Frame Thickness (ga):	16	Blade Action:	Parallel	Blade Seal:	Silicone
Clean Wrap:	No	FM Approved Label:	No		

Actuator

Actuator Type:	120 VAC	Actuator Mounting:	External	Actuator Location:	Right Side
Actuator Mfr.:	All	Fail Position:	Closed	Operating Mode:	Two Position
Actuator Temp. (ºF):	250	Cycle Time:	Standard	NEMA Enclosure:	1
Auxiliary Switch:	Yes				





Notes: All dimensions shown are in units of inches.

Width & Height furnished approximately 0.25 in. under size.
(Add sleeve thickness for overall sleeved damper dimension)

Application & Design

Model FSD-211 is a combination fire smoke damper with 3V style blades. The FSD-211 has been qualified to 2,000 ft/min and 6 in. wg for operation and dynamic closure in emergency fire smoke situations. This model may be installed vertically (with blades running horizontal) or horizontally and is rated for airflow and leakage in either direction.

Ratings

UL 555 Fire Resistance Rating

Fire Rating:	1½ hours
Max. Pressure:	Consult Factory

UL555S Leakage Rating

Leakage Class:	I

Codes Approved

Model FSD-211 meets the requirements for fire dampers, smoke dampers and combination fire smoke dampers established by:

National Fire Protection Association:
- NFPA Standards 80, 90A, 92A, 92B, 101, 105

IBC International Building Codes
New York City (MEA listing #260-91-M)
CSFM (Fire Damper Listing)
- Listing #:3225-0981:103

CSFM (Leakage Smoke Damper Listing)
- Listing #:3230-0981:104

FM Approval Specification Tested Product
Underwriters Laboratories
- UL Classified to U.S. and Canadian safety standards
- Standard 555 & 555S (Listing #R13317)

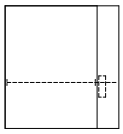
Installation instructions available at www.greenheck.com.

Row ID	Tag	Qty	Diameter (in.)	Drive Arrangement	Actuator Model	Act. Qty.	Sleeve Length (in.)	Sleeve Gauge (ga)	"A" Dim. (in.)
9-1		1	6.000	Drive-MLS-11-1FER-1	FSTF120-S	1	21.000	20	12.000
9-2		1	7.000	Drive-MLS-11-1FER-1	FSTF120-S	1	21.000	20	12.000

Total Qty: 2
Total Number of Actuators: 2

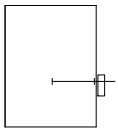
Damper Drive Arrangements Job Summary -Start-

Drive Arrangement: Drive-GFSD-11-1FEL-1



VIEWED FROM GRILLE SIDE

Drive Arrangement: Drive-MLS-11-1FER-1



Damper Drive Arrangements Job Summary -End-

GREENHECK DFD-150X series

Dynamic Rated **FIRE DAMPERS** *with Sleeve*

1½ Hour Fire Resistance Rating

APPLICATION

Model DFD-150X is approved for use in walls, floors and partitions with fire resistance ratings less than 3 hours. This model carries a 1½ hour UL fire damper label. UL 555 classifies dynamic rated fire dampers for use in HVAC systems that are operational in the event of fire .

RATINGS

UL555 Fire Resistance Rating
Fire Rating: 1 1/2 hours
Dynamic closure rating
Maximum Velocity: 4000 fpm (20.3 m/s) up to 24 in. x 24 in. (610mm x 610mm) 2000 fpm (10.2 m/s) above 24 in. x 24 in. (610mm x 610mm)
Maximum Pressure: 4 in. wg (1 kPa)

Construction	Standard	Optional
Frame Material	Galvanized Steel*	-
Blade Material	Galvanized Steel*	-
Closure Spring	Stainless Steel	-
Fusible Link	165°F (74°C)	212°F or 286°F (100°C) or (141°C)
Mounting	Vertical	Horizontal
*** in gauges required by UL listing R-13317**		

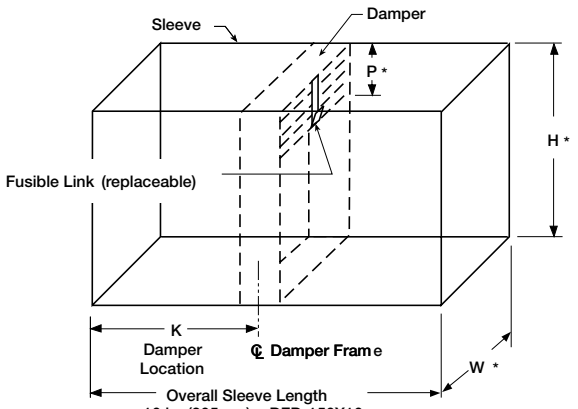
OPTIONAL FEATURES

- Security bars
- One piece retaining angles (POC)
- Transitions (B, C, CO, CR, & R)
- Steel stud connection
- Sealed transitions and sleeves

Model DFD-150X meets the requirements for fire dampers established by:

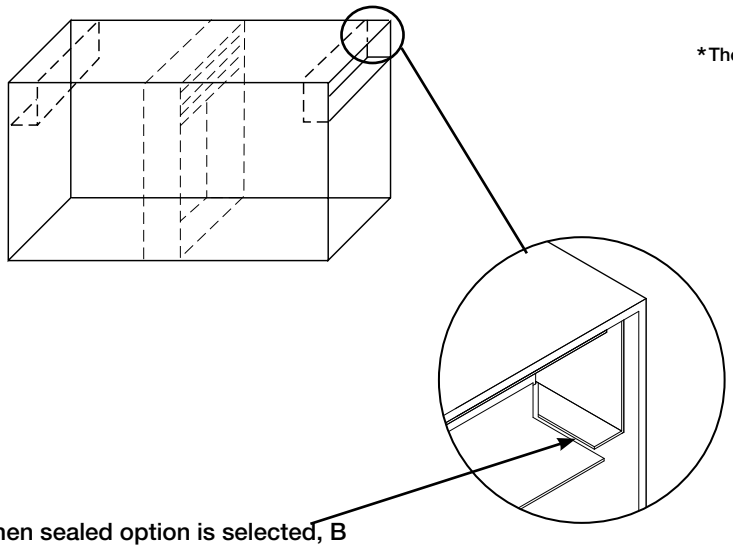
National Fire Protection Association
(NFPA Standards 80, 90A & 101)
IBC International Building Code
New York City (MEA listing #260-91-M)
California State Fire Marshall
(Listing #3225-981:102 for use in walls)

"UL CLASSIFIED (see complete marking on product)"
"UL CLASSIFIED to Canadian safety standards (see complete marking on product)"
Standard 555 (Listing #R13317)

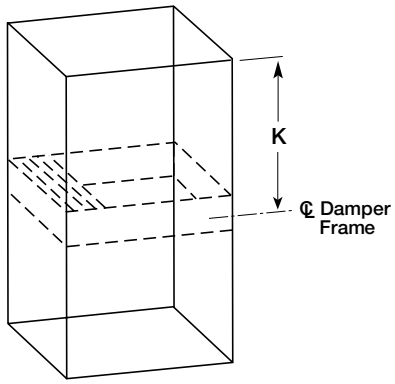


VERTICAL MOUNT

*These dimensions are furnished approximately ¼ in. (6mm) undersize.



When sealed option is selected, B transitions will need to be field sealed in the area where duct to sleeve connection is made.



HORIZONTAL MOUNT

Installation Instructions available at www.greeenheck.com

DFD-150X Type A & B

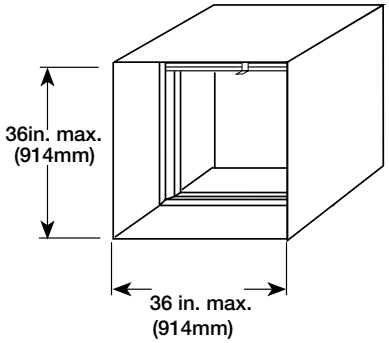
The following chart and illustrations show minimum and maximum damper section size.

SIZE LIMITATIONS

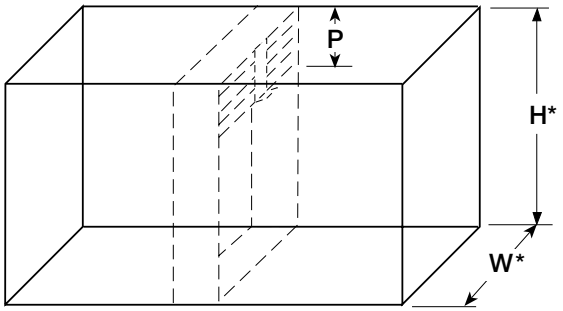
Inches (mm)	Type A		Type B	
	minimum	maximum	minimum	maximum
Single Section Vertical	6 x 4 (152 x 102)	36 x 36 (914 x 914)	6 x 6 (152 x 152)	36 x 31 (914 x 787)
Single Section Horizontal	6 x 4 (152 x 102)	30 x 30 (762 x 762)	6 x 6 (152 x 152)	30 x 26 (762 x 660)

Installation of sizes larger than the maximums shown requires approval of the authority having jurisdiction.

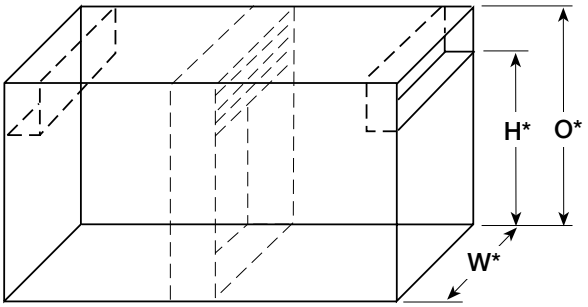
Type A Maximum Single Section Dimensions



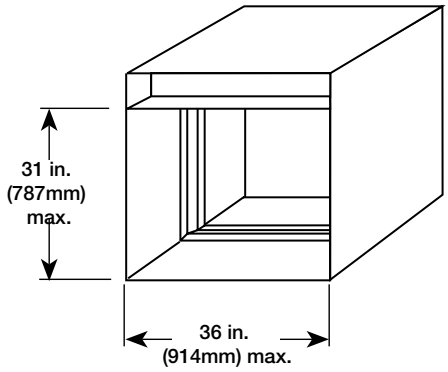
Type A



Type B Overall Damper Dimensions



Type B Maximum Single Section Dimensions



Vertical Mount

H*	O*		H*	O*
3 (76)	5 (127)		18 (457)	21 (533)
4 (102)	6 (152)		19 (483)	22 (559)
5 (127)	7 (178)		20 (508)	23 (584)
6 (152)	8 (203)		21 (533)	24 (610)
7 (178)	9 (229)		22 (559)	26 (660)
8 (203)	10 (254)		23 (584	27 (686)
9 (229)	11 (279)		24 (610)	28 (711))
10 (254)	12 (305)		25 (635)	29 (737)
11 (279)	13 (330)		26 (660)	30 (762)
12 (305)	14 (356)		27 (686)	31 (787)
13 (330)	15 (381)		28 (711)	32 (813)
14 (356)	16 (406)		29 (737)	33 (838)
15 (381)	18 (457)		30 (762)	34 (864)
16 (406)	19 (483)		31 (787)	36 (914)
17 (432)	20 (508)			

Horizontal Mount

H*	O*		H*	O*
3 (76)	5 (127)		19 (483)	22 (559)
4 (102)	6 (152)		20 (508)	23 (584)
5 (127)	7 (178)		21 (533)	24 (610)
6 (152)	8 (203)		22 (559)	26 (660)
7 (178)	9 (229)		23 (584)	27 (686)
8 (203)	10 (254)		24 (610)	28 (711)
9 (229)	11 (279)		25 (635)	29 (737)
10 (254)	12 (305)		26 (660)	30 (762)
11 (279)	13 (330)		27 (686)	31 (787)
12 (305)	14 (356)		28 (711)	31 (787)
13 (330)	15 (381)		29 (737)	32 (813)
14 (356)	16 (406)		30 (762)	33 (838)
15 (381)	18 (457)		31 (787)	34 (864)
16 (406)	19 (483)		32 (813)	35 (889)
17 (432)	20 (508)		33 (838)	36 (914)
18 (457)	21 (533)		-	

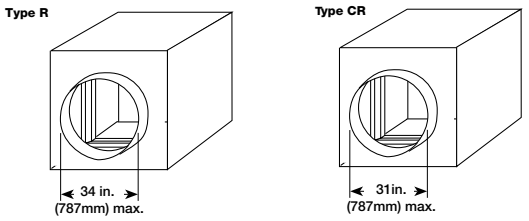
* These dimensions are furnished approximately 1/4 in. (6mm) undersize..

DFD-150X Types CR, CO & C

DFD-150X dampers with C, CO, CR, and R transitions are available only as single section dampers.
The following chart show minimum and maximum damper size. Dimensions are in inches (mm in parentheses).

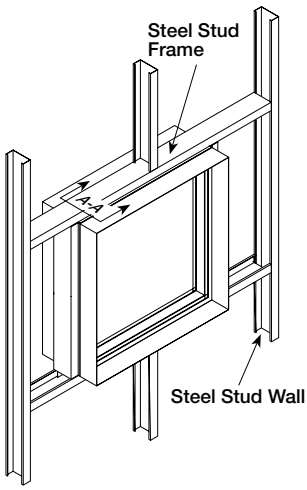
inches (mm)	Type CR		Type CO & C		Type R*1	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Single section Vertical	3 (76)	30 (762)	3 x 3 (76 x 76)	34 x 30 (864 x 762)	3 (76)	34 (864)
Single Section Horizontal	3 (76)	25 (635)	3 x 3 (76 x 76)	28 x 25 (711 x 635)	3 (76)	28 (711)

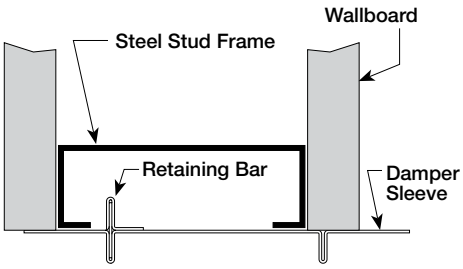
*1 With 2 in. (50mm) offset. Sizes adjust with 0 offset & 1 in. (25mm) offset.



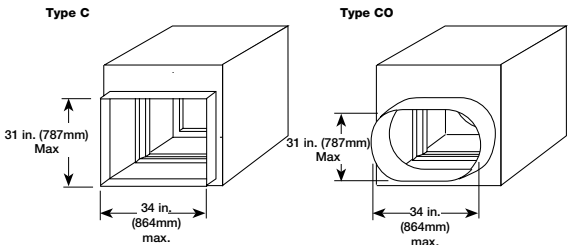
Steel Stud Connection (SSC) Option

The Steel Stud Connection (SSC) Option allows fastening of the damper sleeve (up to 36 in. W x 36 in. H [914mm x 914m]) directly to the wall's steel stud framing. This option replaces the angles that were previously required for wall installations.



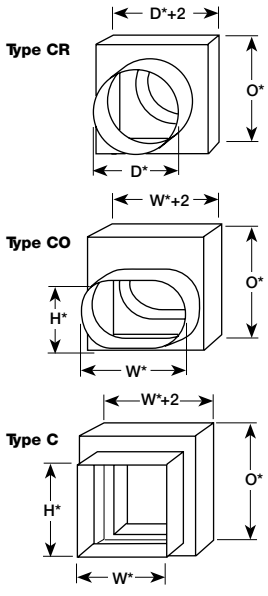


Cross-Section A-A



C, CO, CR transitions are positioned 1 in. (25mm) from bottom of sleeve.

Type C, CO & CR Overall Damper Dimensions



Vertical Mount

H* or D*	O*		H* or D*	O*
3 (76)	6 (152)		18 (457)	22 (559)
4 (102)	7 (178)		19 (483)	23 (584)
5 (127)	8 (203)		20 (508)	24 (610)
6 (152)	9 (229)		21 (533)	26 (660)
7 (178)	10 (254)		22 (559)	27 (686)
8 (203)	11 (279)		23 (584)	28 (711)
9 (229)	12 (305)		24 (610)	29 (737)
10 (254)	13 (330)		25 (635)	30 (762)
11 (279)	14 (356)		26 (660)	31 (787)
12 (305)	15 (381)		27 (686)	32 (813)
13 (330)	16 (406)		28 (711)	33 (838)
14 (356)	18 (457)		29 (737)	34 (864)
15 (381)	19 (483)		30 (762)	36 (914)
16 (406)	20 (508)			
17 (432)	21 (533)			

Horizontal Mount

H* or D*	O*		H* or D*	O*
3 (76)	6 (152)		18 (457)	22 (559)
4 (102)	7 (178)		19 (483)	23 (584)
5 (127)	8 (203)		20 (508)	24 (610)
6 (152)	9 (229)		21 (533)	26 (660)
7 (178)	10 (254)		22 (559)	27 (686)
8 (203)	11 (279)		23 (584)	28 (711)
9 (229)	12 (305)		24 (610)	29 (737)
10 (254)	13 (330)		25 (635)	30 (762)
11 (279)	14 (356)		26 (660)	31 (787)
12 (305)	15 (381)		27 (686)	31 (787)
13 (330)	16 (406)		28 (711)	32 (813)
14 (356)	18 (457)		29 (737)	33 (838)
15 (381)	19 (483)		30 (762)	34 (864)
16 (406)	20 (508)		31 (787)	35 (889)
17 (432)	21 (533)		32 (813)	36 (914)

* Dimension are in inches (mm). These dimensions are furnished approximately 1/4 in. (6mm) undersize.

GREENHECK
P.O. Box 410 • Schofield, WI 54476-0410 • 715.359.6171 • greenheck.com

GREENHECK

Model DFD-150

Dynamic Rated Fire Damper

1 1/2 Hour Fire Resistance Rating

APPLICATION

Model DFD-150 is approved for use in walls, floors and partitions with fire resistance ratings less than 3 hours. This model carries a 1 1/2 hour UL fire damper label. UL 555 classifies dynamic rated fire dampers for use in HVAC systems that are operational in the event of fire .

RATINGS

UL555 Fire Resistance Rating
Fire Rating: 1 1/2 hours
Dynamic closure rating
Maximum Velocity: 4000 fpm (20.3 m/s) vertical mount only, up to 24in. x 24 in. (610mm x 610mm) 2000 fpm (10.2 m/s) vertical or horizontal mount, on all sizes.
Maximum Pressure: 4 in. wg (1 kPa)

Construction	Standard	Optional
Frame Material	Galvanized Steel*	-
Frame Depth	3 11/16 in. (94mm)	-
Blade Material	Galvanized steel*	-
Closure Spring	Stainless Steel	-
Fusible Link	165°F (74°C)	212°F or 286°F (100°C) or (141°C)
Mounting	Vertical	Horizontal
*** in gauges required by UL listing R-13317**		

Model DFD-150 meets the requirements for fire dampers established by:

National Fire Protection Association
(NFPA Standards 80, 90A & 101)

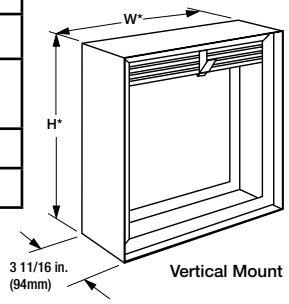
Underwriters Laboratories Standard 555 (Listing #R-13317)

IBC International Building Codes

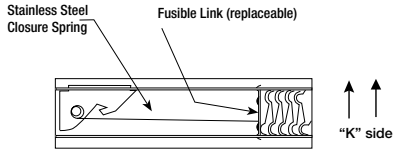
New York City (MEA listing #260-91-M)
California State Fire Marshall
(Listing #3225-981:102)

"UL CLASSIFIED (see complete marking on product)"
"UL CLASSIFIED to Canadian safety standards (see complete marking on product)"
Standard 555 (Listing #R13317)

FM Approvals
SPECIFICATION TESTED PRODUCT
(OPTION)



Vertical Mount



Horizontal Mount

* These dimensions are furnished approximately 1/4in. (6mm) undersize.

OPTIONAL FEATURES

- Sealed transitions and sleeves
- Security bars
- One piece retaining angles (POC)
- Transitions (B, B2, C, CO, CR, R)

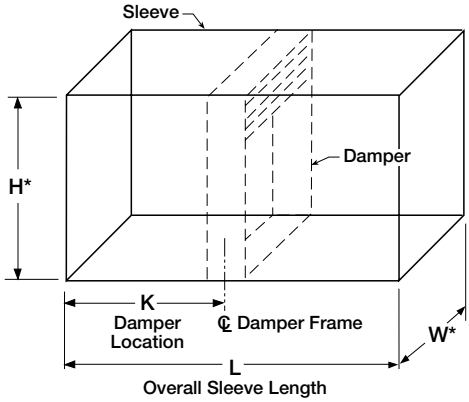
INSTALLATION

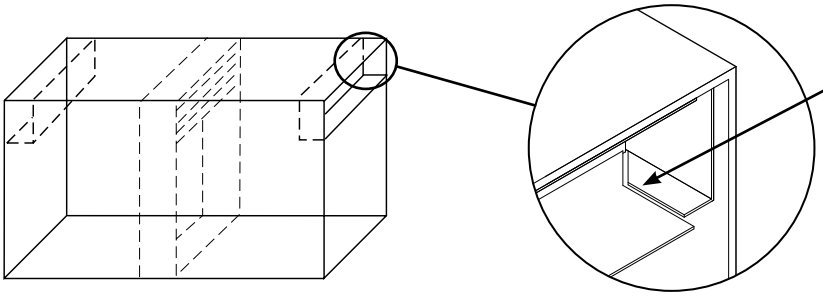
All fire damper installations require the use of sleeves, angles and methods described in Greenheck Fire Damper Installation Instructions #452763, included with every damper shipment. Sleeves can be field fabricated or factory furnished as a complete damper/sleeve assembly. See Factory Sleeve Option below for details.

FACTORY SLEEVE OPTION

DFD-150 Fire Dampers are available in factory furnished sleeves. Sleeves are galvanized steel and are available in 10 thru 20 ga. (1mm- 3.5mm) thicknesses and lengths up to 36 in. (914mm).

"K" dimension specifies location of damper within the sleeve. Minimum is 4 in. (102mm), maximum is "L" less 4 in. (102mm), which allows for mounting angle installation and duct connection at each end of the sleeve. If "K" dimension is not specified, it will be provided as one half of "L" dimension (damper centered in sleeve). ***Note:*** If using access doors, the door should be installed on the "K" side of the damper.




Type B with sleeve

Type B corner profile

When sealed option is selected, B transitions will need to be field sealed in the area where duct to sleeve connection is made.

Installation instructions available at www.greenheck.com

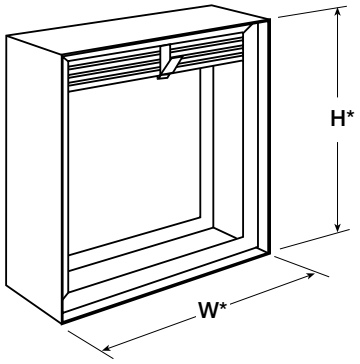
DFD-150 Type A

Dampers larger than maximum single section size are supplied in 2 or more sections of equal size. If ordered with a factory sleeve, multi-section dampers are factory assembled ready for installation. If ordered without a factory sleeve, multi-section dampers require field assembly. (See Greenheck Fire Damper Installation Instructions #452763)

The following chart shows minimum and maximum damper sizes. Dimensions are in inches (mm in parentheses).

Size Limitations

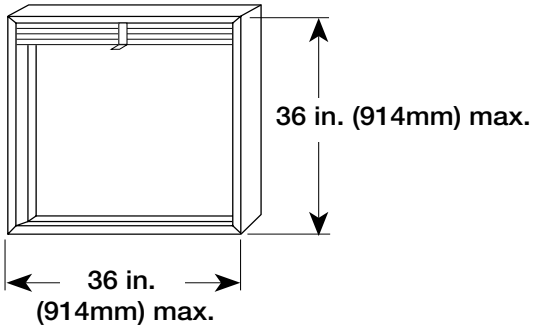
Inches (mm)	Type A		Type B & B2	
	Minimum	Maximum	Minimum	Maximum
Single Section Vertical	4 x 4 (102 x102)	36 x 36 (914 x 914)	4 x 3 (102 x 76)	36 x 31 (914 x 787)
Mulit Section** Vertical	NA	72 x 48 (1829 x 1219), 60 x 60 (1524 x 1524) or 120 x 30 (3048 x 762)	NA	72 x45 (1829 x 1143), 60 x 56 (1524 x 1422) or 120 x 26 (3048 x 660)
Single Section Horizontal	4 x 4 (102 x 102)	30 x 30 (762 x 762)	4 x 3 (102 x 76)	30 x 26 (762 x 762)
Multi Section** Horizontal	NA	48 x 36 (1219 x 914)	NA	48 x 33 (1219 x 838)



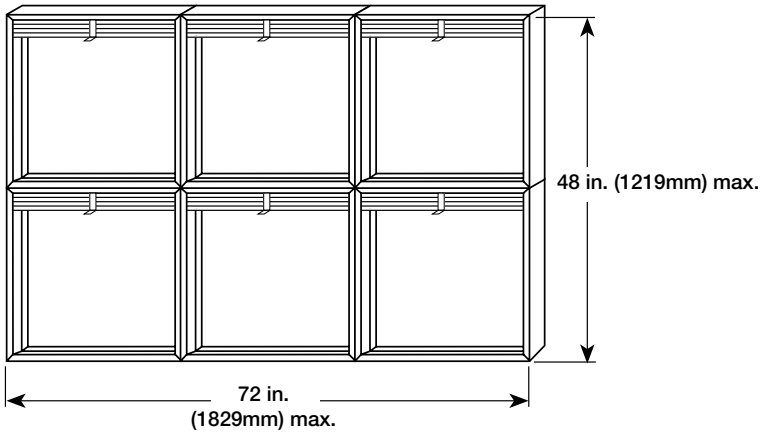
**Consult factory for number of sections.

Type A

Maximum Single Section Dimensions



Multi-Section Limitations
Maximum damper height is 48 in. (1219mm) when combination width is 72 in. (1829mm) or less

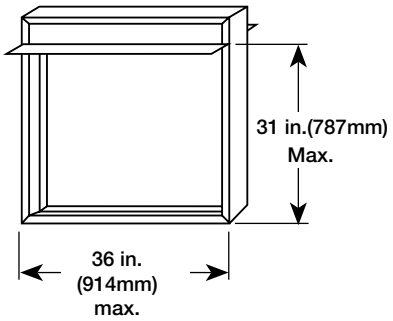


DFD-150 Type B & B2

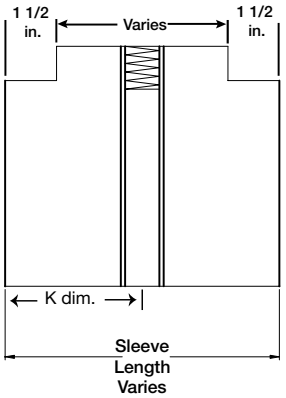
Dampers larger than maximum single section size are supplied in 2 or more sections of equal size. *Note: All multiple section dampers with transitions, will include a factory installed sleeve.*

Type B

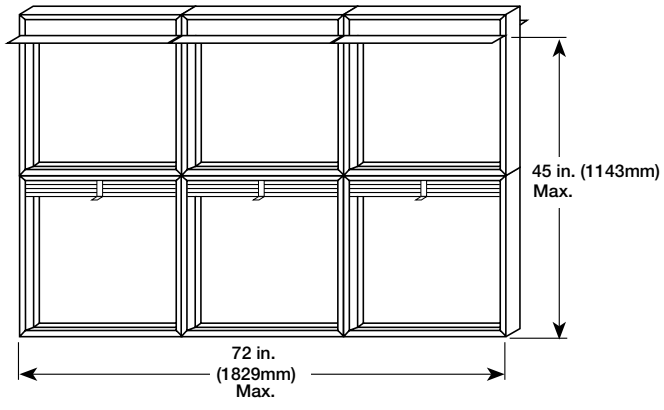
Maximum Single Section Dimensions



Type B2 side view



Multi Section Limitations
Maximum damper height is 45 in. (1143mm) when combination width is 72 in. (1829mm) or less.

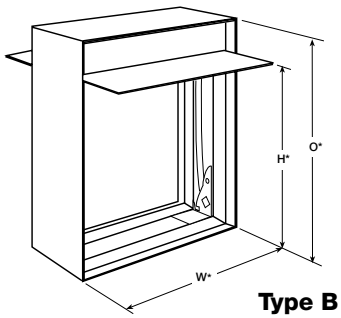


DFD-150 Type B & B2 cont.....

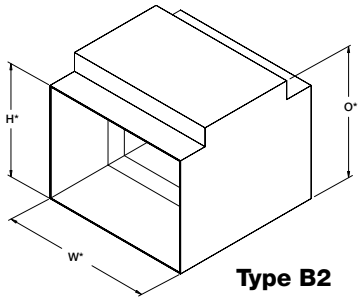
Vertical Mount

H*	O*		H*	O*
3 (76)	5 (127)		30 (762)	34 (864)
4 (102)	6 (152)		31 (787)	36 (914)
5 (127)	7 (178)		32 (813)	37 (940)
6 (152)	8 (203)		33 (838)	37 (940)
7 (178)	9 (229)		34 (864)	37 (940)
8 (203)	10 (254)		35 (889)	38 (965)
9 (229)	11 (279)		36 (914)	39 (991)
10 (254)	12 (305)		37 (940)	40 (1016)
11 (279)	13 (330)		38 (965)	41 (1041)
12 (305)	14 (356)		39 (991)	42 (1067)
13 (330)	15 (381)		40 (1016)	43 (1092)
14 (356)	16 (406)		41 (1041)	44 (1118)
15 (381)	18 (457)		42 (1067)	45 (1143)
16 (406)	19 (483)		43 (1092)	46 (1168)
17 (432)	20 (508)		44 (1118)	47 (1194)
18 (457)	21 (533)		45 (1143)	48 (1219)
19 (483)	22 (559)		46 (1168)	50 (1270)
20 (508)	23 (584)		47 (1194)	51 (1295)
21 (533)	24 (610)		48 (1219)	52 (1321)
22 (559)	26 (660)		49 (1245)	53 (1346)
23 (584)	27 (686)		50 (1270)	54 (1372)
24 (610)	28 (711)		51 (1295)	55 (1397)
25 (635)	29 (737)		52 (1321)	56 (1422)
26 (660)	30 (762)		53 (1346)	57 (1448)
27 (686)	31 (787)		54 (1372)	58 (1473)
28 (711)	32 (813)		55 (1397)	59 (1499)
29 (737)	33 (838)		56 (1422)	60 (1524)

Type B & B2 Overall Damper Dimensions



Type B



Type B2

Horizontal Mount

H*	O*		H*	O*
3 (76)	5 (127)		19 (483)	22 (559)
4 (102)	6 (152)		20 (508)	23 (584)
5 (127)	7 (178)		21 (533)	24 (610)
6 (152)	8 (203)		22 (559)	26 (660)
7 (178)	9 (229)		23 (584)	27 (686)
8 (203)	10 (254)		24 (610)	28 (711)
9 (229)	11 (279)		25 (635)	29 (737)
10 (254)	12 (305)		26 (660)	30 (762)
11 (279)	13 (330)		27 (686)	31 (787)
12 (305)	14 (356)		28 (711)	31 (787)
13 (330)	15 (381)		29 (737)	32 (813)
14 (356)	16 (406)		30 (762)	33 (838)
15 (381)	18 (457)		31 (787)	34 (864)
16 (406)	19 (483)		32 (813)	35 (889)
17 (432)	20 (508)		33 (838)	36 (914)
18 (457)	21 (533)		-	

* Dimensions in inches (mm).These dimensions are furnished approximately 1/4 in. (6mm) undersize. (All 'H' dimensions larger than single section height are two sections high. Refer to chart.The top section is a Type B and the bottom sections are Type A).

DFD-150 Type CR, CO, C, & R

Dampers larger than maximum single section size are supplied in 2 or more sections of equal size. *Note: All multiple section dampers with transitions, will include a factory installed sleeve.*

The following chart show minimum and maximum damper size. Dimensions are in inches (mm in parentheses).

inches (mm)	Type CR		Type CO & C		Type R*[1]	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Single section Vertical	3 (76)	30 (762)	3 x 3 (76 x 76)	34 x 30 (864 x 762)	3 (76)	34 (864)
Multi Section** Vertical	NA	55 (1397)	NA	70 x 44 (1778 x 1118), 58 x 55 (1473 x 1397) or 118 x 25 (2997 x 635)	NA	58 (1473)
Single Section Horizontal	3 (76)	25 (635)	3 x 3 (76 x 76)	28 x 25 (711 x 635)	3 (76)	28 (711)
Multi Section** Horizontal	NA	32 (813)	NA	46 x 32 (1163 x 787)	NA	34 (864)

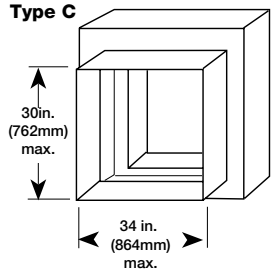
*1 With 2 in. (50mm) offset. Sizes adjust with 0 offset & 1 in. (25mm) offset.

** Consult factory for number of sections.

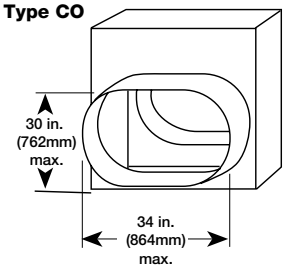
DFD-150 Type CR, CO, C, & R cont....

Maximum Single Section Dimensions

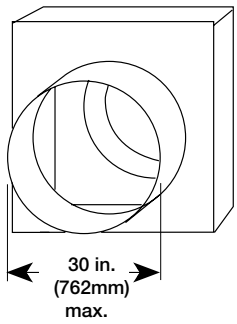
Type C



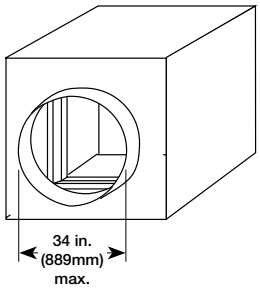
Type CO



Type CR



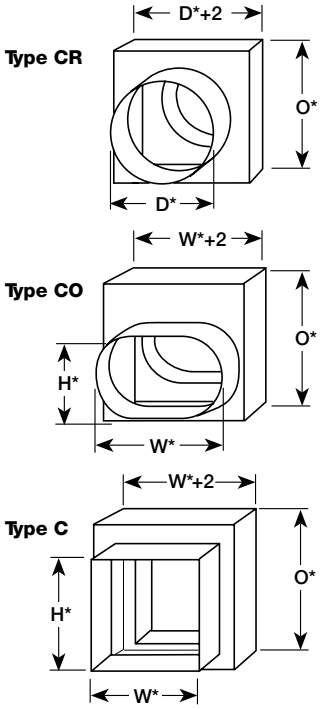
Type R



Type R transition is centered on damper frame.
(Dimensions are with 2 in. (50mm) offset.)

C, CO, CR transitions are positioned 1 in.(25mm) from bottom of sleeve.

Overall Damper Dimensions



Vertical Mount

H* or D*	O*	H* or D*	O*	H* or D*	O*
3 (76)	6 (152)	21 (533)	26 (660)	39 (991)	43 (1092)
4 (102)	7 (178)	22 (559)	27 (686)	40 (1016)	44 (1118)
5 (127)	8 (203)	23 (584)	28 (711)	41 (1041)	45 (1143)
6 (152)	9 (229)	24 (610)	29 (737)	42 (1067)	46 (1168)
7 (178)	10 (254)	25 (635)	30 (762)	43 (1092)	47 (1194)
8 (203)	11 (279)	26 (660)	31 (787)	44 (1118)	48 (1219)
9 (229)	12 (305)	27 (686)	32 (813)	45 (1143)	50 (1270)
10 (254)	13 (330)	28 (711)	33 (838)	46 (1168)	51 (1295)
11 (279)	14 (356)	29 (737)	34 (864)	47 (1194)	52 (1321)
12 (305)	15 (381)	30 (762)	36 (914)	48 (1219)	53 (1346)
13 (330)	16 (406)	31 (787)	37 (940)	49 (1245)	54 (1372)
14 (356)	18 (457)	32 (813)	37 (940)	50 (1270)	55 (1397)
15 (381)	19 (483)	33 (838)	37 (940)	51 (1295)	56 (1422)
16 (406)	20 (508)	34 (864)	38 (965)	52 (1321)	57 (1448)
17 (432)	21 (533)	35 (889)	39 (991)	53 (1346)	58 (1473)
18 (457)	22 (559)	36 (914)	40 (1016)	54 (1372)	59 (1499)
19 (483)	23 (584)	37 (940	41 (1041)	55 (1397)	60 (1524)
20 (508)	24 (610)	38 (965)	42 (1067)	-	

Horizontal Mount

H* or D*	O*	H* or D*	O*
3 (76)	6 (152)	18 (457)	22 (559)
4 (102)	7 (178)	19 (483)	23 (584)
5 (127)	8 (203)	20 (508)	24 (610)
6 (152)	9 (229)	21 (533)	26 (660)
7 (178)	10 (254)	22 (559)	27 (686)
8 (203)	11 (279)	23 (584)	28 (711)
9 (229)	12 (305)	24 (610)	29 (737)
10 (254)	13 (330)	25 (635)	30 (762)
11 (279)	14 (356)	26 (660)	31 (787)
12 (305)	15 (381)	27 (686)	31 (787)
13 (330)	16 (406)	28 (711)	32 (813)
14 (356)	18 (457)	29 (737)	33 (838)
15 (381)	19 (483)	30 (762)	34 (864)
16 (406)	20 (508)	31 (787)	35 (889)
17 (432)	21 (533)	32 (813)	36 (914)

*Dimensions are in inches (mm in parentheses). These dimensions are furnished approximately 1/4 in. (6mm) undersize. (All 'H' dimensions larger than single section height are two sections high. Refer to chart.)

GREENHECK
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GREENHECK

Model FSD-211

Combination FIRE SMOKE DAMPERS

Steel 3-V Blades
UL 555S Leakage Class I
UL555 1½ Hour Fire Resistance Rating

APPLICATION

Model FSD-211 is a combination fire smoke damper with 3V style blades. The FSD-211 has been qualified to 2000 fpm (10.2 m/s) and 6 in. wg (1.5 kPa) for operation and dynamic closure in emergency fire smoke situations. Model FSD-211 may be installed vertically (with blades running horizontal) or horizontally and is rated for airflow and leakage in either direction.

RATINGS

UL 555 Fire Resistance Rating

Fire Rating: 1½ Hours
Dynamic Closure Rating: Actual limits are size dependent
Maximum Velocity: 2000 fpm (10.2 m/s)
Maximum Pressure: 6 in. wg (1.5 kPa)
Maximum Temperature: 350ºF (177°C) -- Depending on actuator

UL 555S Leakage Rating

Leakage Class: I
Operational Rating: Actual limits are actuator dependent
Maximum Velocity: 2000 fpm (10.2 m/s)
Maximum Pressure: 6 in. wg (1.5 kPa)
Maximum Temperature: 350ºF (177°C) - Depending on actuator

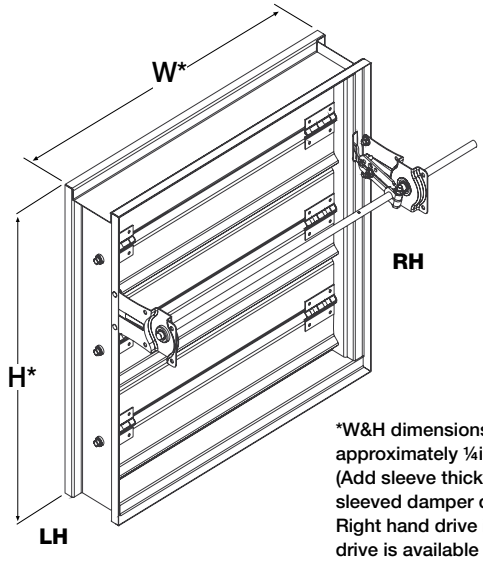
Model FSD-211 meets the requirements for fire dampers, smoke dampers and combination fire smoke dampers established by:

National Fire Protection Association
NFPA Standards 80, 90A, 92A, 92B, 101 & 105
IBC International Building Codes
CSFM California State Fire Marshal
Fire Damper Listing (#3225-0981:103)
Leakage (Smoke) Damper Listing (#3230-0981:104)
New York City (MEA listing #260-91-M)

"UL CLASSIFIED (see complete marking on product)"
"UL CLASSIFIED to Canadian safety standards (see complete marking on product)"
Standard 555 & 555S (Listing #R13317)

Construction	Standard	Optional
Frame Material	Galvanized steel	-
Frame Material Thickness	16 ga. (1.5mm)	-
Frame Type	5 in. x 1in. (127mm x 25mm) hat channel	-
Blade Material	Galvanized steel	-
Blade Material Thickness	16 ga. (1.5mm)	-
Blade Type	3V	-
Linkage	Plated steel out of airstream, concealed in jamb	304SS
Axle Bearings	Bronze	304SS
Axle Material	Plated steel	304SS
Blade Seals	Silicone	-
Jamb Seals	304SS	-
Closure Device	RRL	RRL/OCI, TOR, PRV, or Fusible Link
Closure Temperature	165°F (74°C)	212°F (100°C), 250°F (121°C), 350°F (177°C)

FM Approvals
SPECIFICATION TESTED PRODUCT (OPTION)



*W&H dimensions furnished approximately ¼in. (6mm) undersize. (Add sleeve thickness for overall sleeved damper dimension)
Right hand drive is shown. Left hand drive is available upon request.

W x H	*Minimum Size*	*Maximum Size*		
		Single Section	*Multiple Section*	
			Horizontal	*Vertical*
4 in. wg (1 kPa) pressure				
Inches	8 x 6	32 x 50 or 36 x 48	144 x 96	128 x 100
mm	203 x 152	813 x 1270 or 914 x 1219	3658 x 2438	3251 x 2540
6 in. wg (1.5 kPa) pressure				
Inches	8 x 6	36 x 48	144 x 48	128 x 48
mm	203 x 152	914 x 1219	3658 x 1219	3251 x 1219

FEATURES:

- Frames are constructed with reinforced corners. Low profile head and sill are used on sizes less than 17 in. high (432mm).
- Blades are reinforced with 3 longitudinal structurally designed vee's.

Installation instructions available at www.greenheck.com

Options & Pressure Drop Data FSD-211

Options available on FSD-211:

- Actuators: 120V, 24V, 230V, pneumatic
- Factory mounted accessories
  - Retaining angles
  - Quick connect breakaway connections
  - S & drive connections
  - Access doors
- Greenheck test switches (GTS-1, -2, -3, -4)
- Momentary test switch
- POC retaining angles
- RRL/OCI (Open closed indication switches)
- TOR (Temperature limited override)
- Sealed transitions and sleeves
- Security bars
- Smoke detectors
- Transitions: R, C, O

Pressure Drop Data

This pressure drop testing was conducted in accordance with AMCA Standard 500-D using the three configurations shown. All data has been corrected to represent standard air at a density of .075 lb/ft^3 (1.201 kg/m^3).

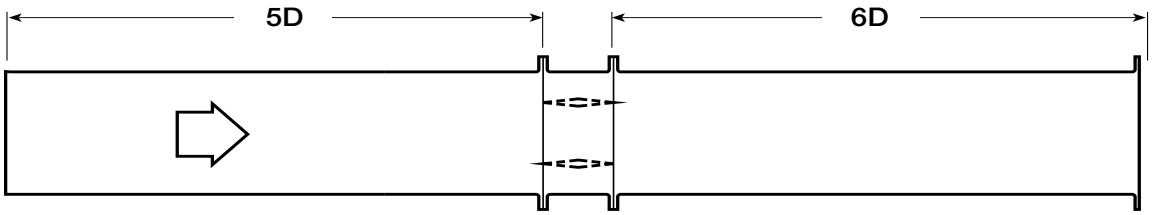
Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

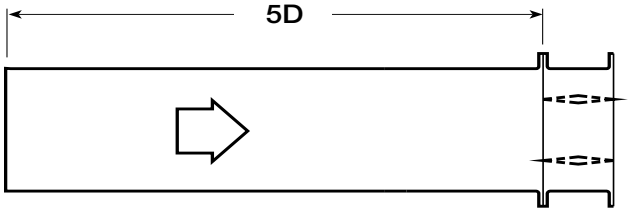
AMCA Test Figures

Figure 5.3 Illustrates a fully ducted damper. This configuration has the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

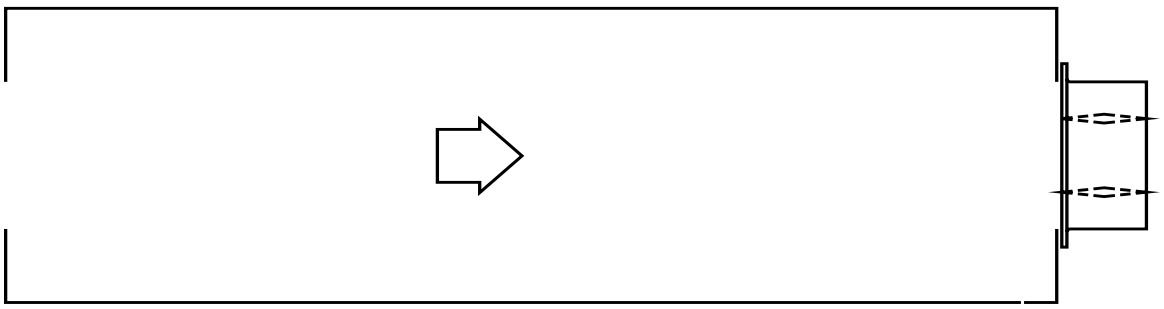
Figure 5.2 Illustrates a ducted damper exhausting air into an open area. This configuration has a lower pressure drop than Figure 5.5 because entrance losses are minimized by a straight duct run upstream of the damper.

Figure 5.5 Illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.





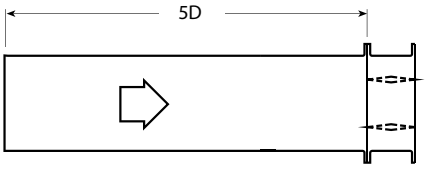
$$D \sqrt{\frac{4\,(W)\,(H)}{3.14}}$$



Pressure Drop

FSD-211

AMCA Figure 5.2



12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.04
1000	0.14
1500	0.31
2000	0.55
2500	0.86
3000	1.24
3500	1.69
4000	2.20

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.07
1500	0.16
2000	0.29
2500	0.45
3000	0.65
3500	0.89
4000	1.16

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.09
2000	0.16
2500	0.25
3000	0.36
3500	0.49
4000	0.64

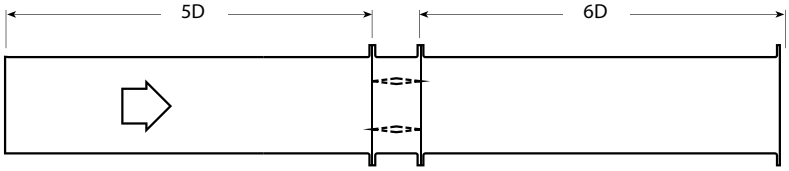
12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.06
1500	0.13
2000	0.23
2500	0.36
3000	0.52
3500	0.70
4000	0.92

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.10
1500	0.23
2000	0.41
2500	0.63
3000	0.91
3500	1.24
4000	1.62

AMCA Figure 5.3



12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.09
1500	0.20
2000	0.36
2500	0.56
3000	0.81
3500	1.10
4000	1.44

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.09
2000	0.16
2500	0.25
3000	0.35
3500	0.48
4000	0.63

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.03
1500	0.06
2000	0.11
2500	0.17
3000	0.24
3500	0.33
4000	0.42

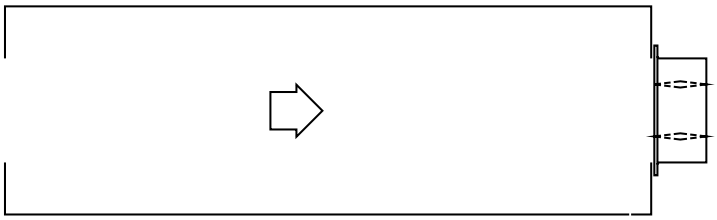
12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.10
2000	0.17
2500	0.27
3000	0.39
3500	0.53
4000	0.70

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.07
1500	0.16
2000	0.29
2500	0.45
3000	0.64
3500	0.88
4000	1.14

AMCA Figure 5.5



12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.06
1000	0.22
1500	0.50
2000	0.89
2500	1.39
3000	2.00
3500	2.72
4000	3.55

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.14
1500	0.31
2000	0.54
2500	0.85
3000	1.22
3500	1.66
4000	2.17

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.12
1500	0.26
2000	0.46
2500	0.73
3000	1.05
3500	1.42
4000	1.86

12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.13
1500	0.30
2000	0.53
2500	0.83
3000	1.19
3500	1.62
4000	2.11

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.04
1000	0.17
1500	0.38
2000	0.67
2500	1.04
3000	1.50
3500	2.05
4000	2.67

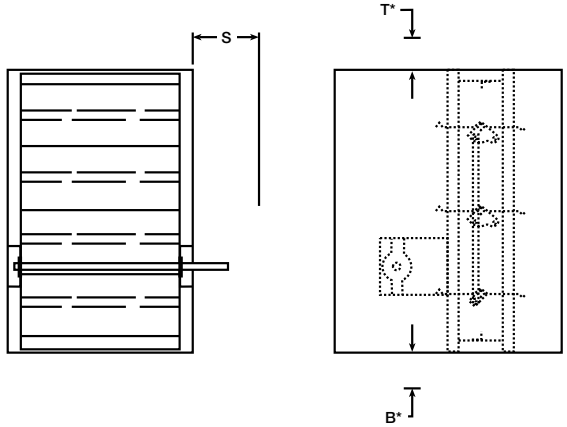
Greenheck Fan Corporation certifies that the model FSD-211 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Programs. The AMCA Certified Ratings Seal applies to air performance ratings only.

Actuators and Accessories

Space Envelopes

Externally mounted actuators always require space outside of the damper sleeve. The "S" dimension illustrates the clearance required for various available actuators.

On dampers less than 18 in. (457mm) high, actuators may also require clearances above and/or below the sleeve. "B" and "T" dimensions are ***worst*** case clearance requirements for some dampers less than 18 in. (457mm) high. All damper sizes under 18 in. (457mm) high do not require these worst case clearances. If space availability above or below the damper sleeve is limited, each damper size should be individually evaluated.



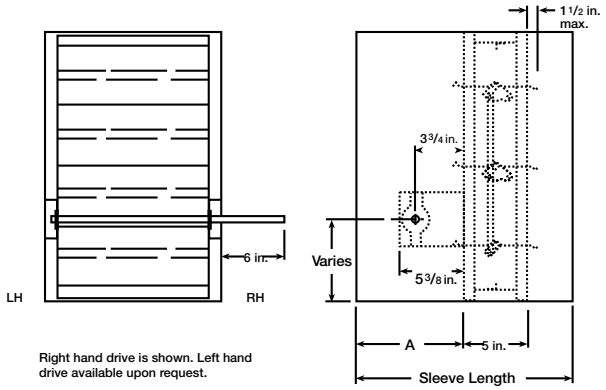
Actuator Type/Model	B*	T*	S	
	With RRL, RRL/OCI, or TOR	With RRL, RRL/OCI, or TOR	PiggyBack	
			No	Yes
120 Volt AC				
FSLF120 (-S) Belimo	3 1/2 in (89mm)	0	6 in. (152mm)	NA
FSNF120 (-S) Belimo	12 3/4 in. (324mm)	0	6 in. (152mm)	9 in. (229mm)
FSTF120 (-S) Belimo	3 1/2 in. (89mm)	0	6 in. (152mm)	NA
ML4XXX Series Honeywell	4 3/4 in. (121mm)	0	6 in. (152mm)	NA
MS4X09 Series Honeywell	4 3/4 in. (121mm)	0	6 in. (152mm)	NA
MS4120 Series Honeywell	12 3/4 in. (324mm)	0	6 in. (152mm)	9 in. (229mm)
GND-22X.1 Siemens	12 3/4 in. (324mm)	0	6 in. (152mm)	NA
24 Volt AC				
FSAF24 (-S) Belimo	12 3/4 in. (324mm)	0	6 in. (152mm)	NA
FSAF24-BAL (-S) Belimo	12 3/4 in. (324mm)	0	6 in. (152mm)	NA
FSLF24 (-S) Belimo	3 1/2 in (89mm)	0	6 in. (152mm)	NA
FSNF24 (-S) Belimo	12 3/4 in. (324mm)	0	6 in. (152mm)	9 in. (229mm)
ML8XXX Series Honeywell	4 3/4 in. (121mm)	0	6 in. (152mm)	NA
MS8X09 Series Honeywell	4 3/4 in. (121mm)	0	6 in. (152mm)	NA
MS8120 Series Honeywell	12 3/4 in. (324mm)	0	6 in. (152mm)	9 in. (229m)
GND-12X.1 Siemens	12 3/4 in. (324mm)	0	6 in. (152mm)	NA
230 Volt AC				
FSLF230 (-S) Belimo	3 1/2 in (89mm)	0	6 in. (152mm)	NA
FSNF230 (-S) Belimo	12 3/4 in. (324mm)	0	6 in. (152mm)	9 in. (229mm)
ML4XXX Series Honeywell	4 3/4 in. (121mm)	0	6 in. (152mm)	NA
MS4X09 Series Honeywell	4 3/4 in. (121mm)	0	6 in. (152mm)	NA
MS4620 Series Honeywell	12 3/4 in. (324mm)	0	6 in. (152mm)	9 in. (229mm)
GND 321.1 Siemens	12 3/4 in. (324mm)	0	6 in. (152mm)	NA
Pneumatic (25 psi min.)				
331-4551 Siemans	7 1/2 in. (191mm)	0	6 in. (152mm)	NA
331-2976 Siemens	12 3/4 in. (324mm)	0	6 in. (152mm)	NA
331-2856 Siemens	2 1/2 in. (64mm)	0	9 in. (229mm)	NA
MK2-7121 TAC (Invensys)	2 1/2 in. (64mm)	0	9 in. (229mm)	NA

* For dampers 18 in. (457mm) or more in height these dimensions are 0 in. .

Damper Sleeve Dimensional Data

The drawings below and corresponding table show the position of the FSD-211 damper when mounted in a factory sleeve. The standard mounting locations provide enough space for the mounting of actuators, controls and allow space for installation of retaining angles and duct connections.

The standard location of a damper mounted in a factory sleeve ("A" dimension) is shown below. The damper can be positioned at other locations within a range of 6 in. (152mm) to 12 in. (305mm) for the "A" dimension.



Right hand drive is shown. Left hand drive available upon request.

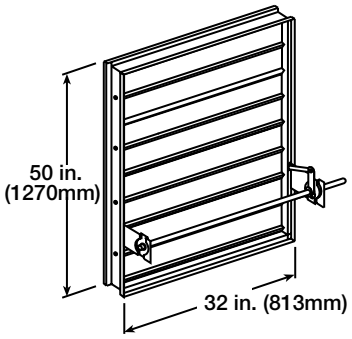
in. (mm)	"A" Dimension	
	Standard	Maximum
All Dampers*	7 3/16 (183)	12 (305)
When H is 11 in. (279mm) or less with OCI, RRL, or TOR	12 (305)	12 (305)

*With the exception of dampers 10 in. high (254mm) or less.
NOTE: Entire damper frame is not required to be installed within the wall. The damper blades, when closed should be contained within the wall.

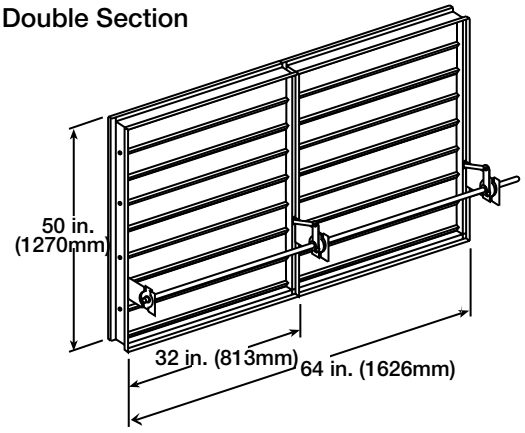
Damper Sizing Information

Dampers larger than maximum single section size are supplied as a factory assembly of two or more sections of equal size. The following figures show maximum damper section size and assembly configurations for multi-section dampers.

Single Section

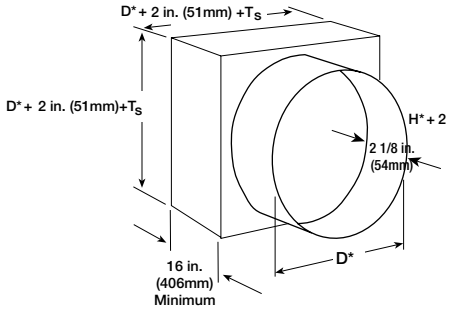


Double Section

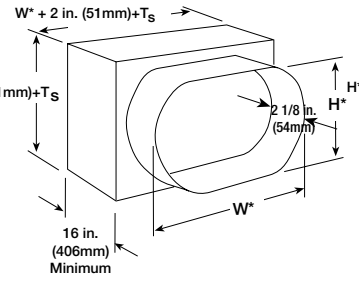


Transitioned Damper Dimensions

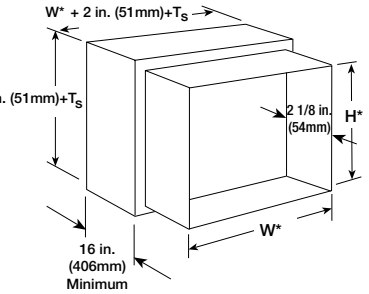
When a fire/smoke damper is being used in conjunction with round or oval ductwork, the FSD-211 can be supplied in a factory sleeve with round or oval transitions on both ends of the sleeve. Dampers should be ordered to the duct dimensions. Drawings below show overall damper size.



TYPE R



TYPE O



TYPE C

* These dimensions are furnished approximately 1/4 in. (6mm) undersize, except round and oval dimensions which are approximately 1/8 in. (3mm) undersize.

T_S = (2)(Sleeve Thickness)

Specifications

Combination Fire Smoke Dampers meeting the following specifications shall be furnished and installed where shown on plans and/or as described in schedules. Dampers shall meet the requirements of NFPA 80, 90A, 92A, 92B, 101 & 105 and further shall be tested, rated and labeled in accordance with the latest edition of UL Standards 555 and 555S. Dampers shall have a UL555 fire rating of 1½ hours and be of low leakage design qualified to UL 555S Leakage Class I.

Each damper/actuator combination shall have a UL555S elevated temperature rating of 250°F (121°C) minimum and shall be operational and dynamic rated to operate at maximum design air flow at its installed location. Each damper shall be supplied with an appropriate actuator installed by the damper manufacturer at the time of damper fabrication. Damper actuator shall be (specifier select one of the following) electric type for 120 (24 or 230) volt operation *or* pneumatic type for 25 psi minimum (30 psi maximum) operation.

Damper blades shall be 16 ga. (1.5mm) galvanized steel 3V type with three longitudinal grooves for reinforcement. Damper frame shall be galvanized steel formed into a structural hat channel shape with reinforced corners. Bearings shall be sintered bronze sleeve type rotating in extruded holes in the damper frame. Blade edge seals shall be silicone rubber designed to inflate and provide a tighter seal against leakage as pressure on either side of the damper increases. Jamb seals shall be stainless steel compression type. Blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow in either direction or pressure on either side of the damper.

The Damper Manufacturer's submittal data shall certify all air performance pressure drop data is licensed in accordance with the AMCA Certified Ratings Program for Test Figures 5.2, 5.3, and 5.5. Damper air performance data shall be developed in accordance with the latest edition of AMCA Standard 500-D. Dampers shall be labeled with the AMCA Air Performance Seal.

Damper must be rated for mounting vertically (with blades running horizontal) or horizontally and be UL 555S rated for leakage and airflow in either direction through the damper. Each damper shall be supplied with a 165°F (74°C) RRL. The basis of design is Greenheck Model FSD-211.

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Drive Arrangement Definition

On multi-blade dampers (except vertical blade and Face & Bypass), they are given a drive arrangement code that helps describe the construction of the damper. The following breaks down what each number and letter represents.

22-2FEL-2

① ② ③ ④ ⑤ ⑥ ⑦

① Number of sections wide

② Number of sections high

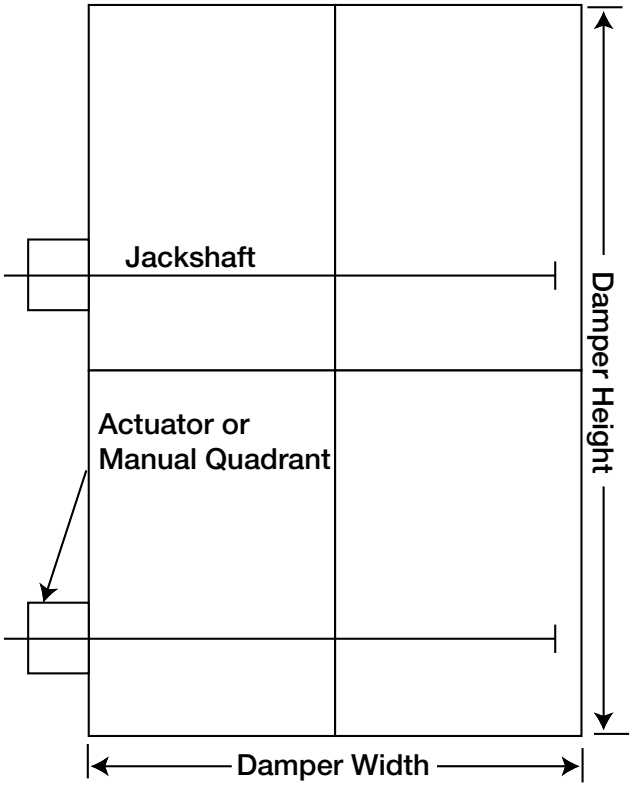
③ Number of actuators or manual quadrants

④ Who supplies the actuators or manual quadrants
- F - Factory
- C - Customer Supplied (field mounted)

⑤ Actuator or manual quadrant mounting
- E - External
- I - Internal
- B - Both internal and external

⑥ Actuator or manual quadrant location
- L - Left hand drive
- R - Right hand drive
- B - Both right and left

⑦ Number of jackshafts



On vertical blade and face & bypass dampers, they are given a configuration ID number that helps describe the construction of the damper. See the following examples:

Model	Drive Arrangement Prefix
AMD-23, 33, 42	AMD
AMD-42V	VB
DFD-210, 230; DFDAF-310; DFDTF-210; SEDFD-210	MLS
FBH & FBV	FB
FSD, OFSD, CFSD, SMD, SEFSD, SSFSD, SESMD, SSSMD series (except vertical blade models)	MLS
FSD-311V, SMD-301V	VB
GFSD series	GFSD
ICD series	CC
IMO series	MLS
MBD-15 & VCD series (except vertical blade models)	CC
VCD-xxV (vertical blade models)	VB

RRL/OCI Option

Resettable Link Option with Blade Indicator for Combination Fire Smoke Dampers

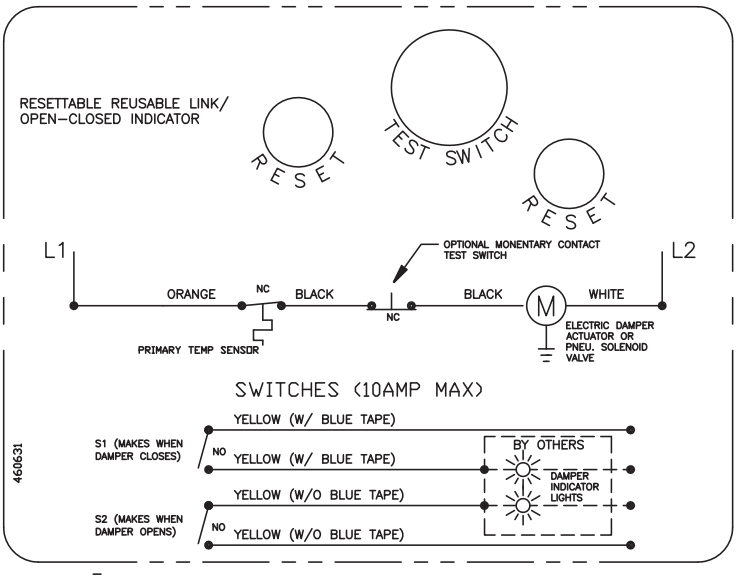
Application

The RRL/OCI option performs the function of resettable link and also open or close blade indicator. The RRL option replaces the fusible link on a combination fire smoke damper with an electric sensor (thermostat). The sensor has a fixed temperature setting (165°F, 212°F, 250°F or 350°F [74°C, 100°C, 121°C, 177°C]) and performs the same function as the fusible link that it replaces. The sensor interrupts power to the actuator and the actuator's spring return mechanism causes the damper to close. The sensor can be reset after the temperature has cooled down below the sensor set point.

Before resetting any sensor, a careful inspection of the damper and sensor should be made as exposure to actual fire conditions may render these devices unusable.

Second, the OCI assembly contains a single pole, double throw switch used to indicate damper blade position. The switch provides a positive open or closed signal when used in conjunction with remote indicator lights (furnished by others). OCI assemblies are used in active smoke control applications to positively indicate the status of all smoke and combination fire smoke dampers in the building. This single pole/single throw switch assembly may also be used to provide a start/stop control circuit for remote fan installations.

To meet UL requirements, factory installation of the damper actuator and factory wiring of the electric sensor is required. If the damper is equipped with a pneumatic actuator, an EP switch is required with an appropriate electric power circuit, to allow the electric thermostat to control the pneumatic actuator.



GREENHECK

Model GFSD-211

Combination FIRE SMOKE DAMPERS

Grille Access
Steel 3-V Blades
UL 555S Leakage Class I
UL555 1½ Hour Fire Resistance Rating

APPLICATION

Model GFSD-211 is a combination fire smoke damper with 3V style blades designed for easy access through the grille to the damper, closure device and the actuator. A separate compartment on the side of the damper houses the actuator. The GFSD-211 has been qualified to 2000 fpm (10.2 m/s) and 4 in. wg (1 kPa) for operation and dynamic closure in emergency fire smoke situations. Model GFSD-211 may be installed vertically (with blades running horizontal) or horizontally and is rated for airflow and leakage in either direction.

Model GFSD-211 meets the requirements for fire dampers, smoke dampers and combination fire smoke dampers established by:

National Fire Protection Association
NFPA Standards 80, 90A, 92A, 92B, 101 & 105
IBC International Building Codes
CSFM California State Fire Marshal
Leakage Damper Listing (3230-0981:0104)
Fire Damper Listing (3225-0981:0103)

"UL CLASSIFIED (see complete marking on product)"
"UL CLASSIFIED to Canadian safety standards (see complete marking on product)"
Standard 555 & 555S (Listing #R13317)

RATINGS

UL 555 Fire Resistance Rating

Fire Rating: 1½ Hours
Dynamic Closure Rating: Actual ratings are size dependent
Maximum Velocity: 2000 fpm (10.2 m/s)
Maximum Pressure: 4 in. wg (1 kPa)
Maximum Temperature: 350ºF (177°C) -- Depending on actuator

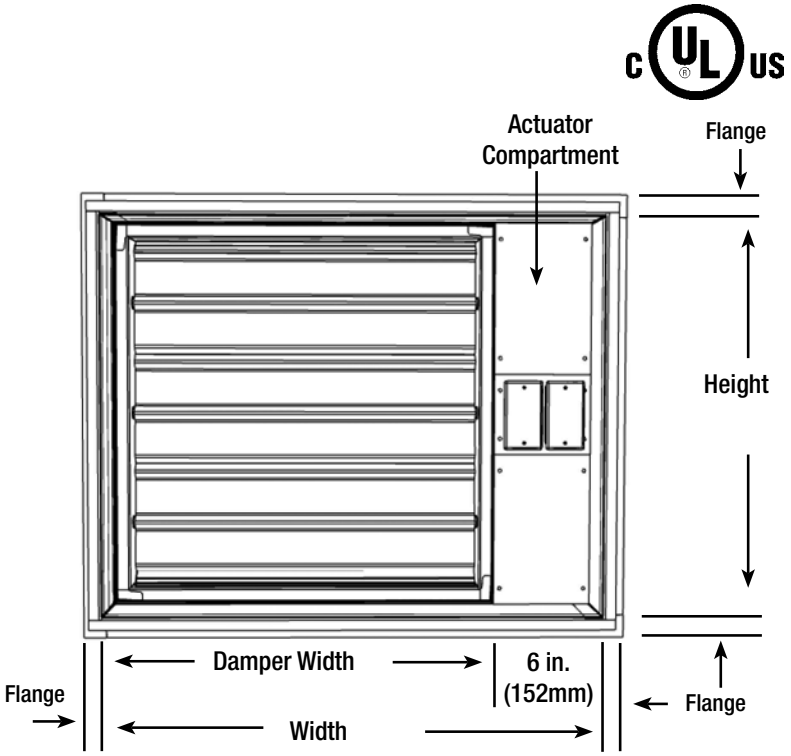
UL 555S Leakage Rating

Leakage Class: I
Operational Rating: Actual ratings are actuator dependent
Maximum Velocity: 2000 fpm (10.2 m/s)
Maximum Pressure: 4 in. wg (1 kPa)
Maximum Temperature: 350ºF (177°C) - Depending on actuator

Construction	Standard	Optional
Frame Material	Galvanized steel	-
Frame Material Thickness	16 ga. (1.5mm)	-
Frame Type	5 in. x 1 in. (127mm x 25mm) hat channel	-
Blade Material	Galvanized steel	-
Blade Material Thickness	16 ga. (1.5mm)	-
Blade Type	3V	-
Linkage	Plated steel out of airstream, concealed in jamb	304SS
Axle Bearings	Bronze	304SS
Axle Material	Plated steel	304SS
Blade Seals	Silicone	-
Jamb Seals	304SS	-
Closure Device	RRL	RRL/OCI, TOR, PRV, or Fusible Link
Closure Temperature	165°F (74°C)	212°F (100°C), 250°F (121°C), 350°F (177°C)

W x H	*Minimum Size*	*Maximum Size*	
		Single Section	*Multiple Section*
Inches	14 x 12	42 x 48	48 x 48
mm	356 x 305	1067 x 1219	1219 x 1219

Installation installations available at www.greenheck.com



*W&H dimensions furnished approximately ¼in. (6mm) undersize.
(Add sleeve thickness for overall sleeved damper dimension)

FEATURES:

- Frames are constructed with reinforced corners. Low profile head and sill are used on sizes less than 17 in. high (432mm).
- Blades are reinforced with 3 longitudinal structurally designed vee's.

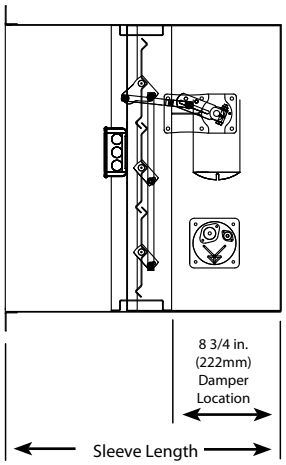
Options & Damper Sizing Information

Options

- Actuators: 120V, 24V, 230V, Pneumatic
- Factory mounted accessories
  - Retaining angles
  - Quick connect breakaway connections
  - S & drive connections
- Smoke detectors - ship loose
- Greenheck test switches (GTS-1, -2, -3, -4)
- POC retaining angles
- RRL/OCI (Open closed indication switches)
- TOR (Temperature limited override)
- Sealed sleeves

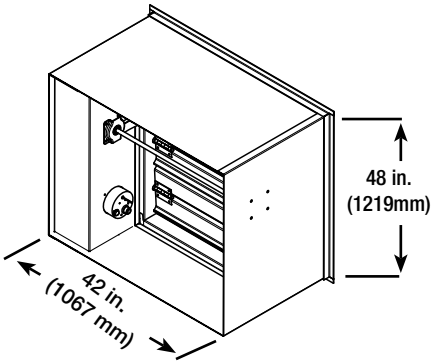
Damper Sizing

The drawing to the right shows the position of the GFSD-211 damper when mounted in a factory sleeve. The standard mounting location provide enough space for the mounting of actuators, controls and allow space for installation of retaining angles and duct connections.

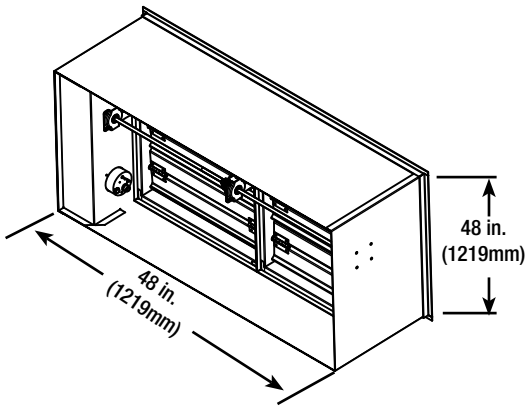


Dampers larger than maximum single section size are supplied as a factory assembly of two or more sections of equal size. The following figures show maximum damper section size and assembly configurations for multi-section dampers.

Single Section



Double Section



Specifications

Combination Fire Smoke Dampers meeting the following specifications shall be furnished and installed where shown on plans and/or as described in schedules. Dampers shall meet the requirements of NFPA 80, 90A, 92A, 92B, 101 & 105 and further shall be tested, rated and labeled in accordance with the latest edition of UL Standards 555 and 555S. Dampers shall have a UL555 fire rating of 1½ hours and be of low leakage design qualified to UL 555S Leakage Class I.

Each damper/actuator combination shall have a UL555S elevated temperature rating of 250°F (121°C) minimum and shall be operational and dynamic rated to operate at maximum design air flow at its installed location. Each damper shall be supplied with an appropriate actuator installed by the damper manufacturer at the time of damper fabrication. Damper actuator shall be (specifier select one of the following) electric type for 120 (24 or 230) volt operation.

Damper blades shall be 16 ga. (1.5mm) galvanized steel 3V type with three longitudinal grooves for reinforcement. Damper frame shall be galvanized steel formed into a structural hat channel shape with reinforced corners. Bearings shall be sintered bronze sleeve type rotating in extruded holes in the damper frame. Blade edge seals shall be silicone rubber designed to inflate and provide a tighter seal against leakage as pressure on either side of the damper increases. Jamb seals shall be stainless steel compression type. Blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow in either direction or pressure on either side of the damper. Actuator compartment shall be attached to the damper frame with sleeve surrounding damper and compartment.

Damper must be rated for mounting vertically (with blades running horizontal) or horizontally and be UL 555S rated for leakage and airflow in either direction through the damper. Each damper shall be supplied with a 165°F (74°C) RRL.

The basis of design is Greenheck Model GFSD-211.

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Grilles/Registers/Diffusers Submittals

Job Name: PRESS HOTEL
Job Location: PORTLAND, MAINE
Date Printed: 2/12/2014

Contact: Ed Sawyer
498B WOODFORD STREET
PORTLAND, ME 04103

Phone: 207-773-0078
Fax: 207-773-0074
Email: esawyer@buckleyonline.com

All-In-One
Detailed Submittal Schedule
Grilles/Registers/Diffusers

Date Printed: 2/12/2014
Job Name: PRESS HOTEL

#	Qty	Model	Tag	Unit Sz.	Border	Pattern	Panel Sz.	Finish	Accessories	Static Submittal
1	7	AMD	S14	12, 12	3PA	4A	24, 24	B12	3	218791, 219285
Desc.: 3PA - Alum T-Bar Panel Lay-In 1" (25) | 4A - 4-Way - Style A for Square Inlet Neck | B12 - White - Powder Coat | 3 - Steel Opposed Blade Damper |										
2	2	AMD	S14	15, 15	3PA	4A	24, 24	B12	3	218791, 219285
Desc.: 3PA - Alum T-Bar Panel Lay-In 1" (25) | 4A - 4-Way - Style A for Square Inlet Neck | B12 - White - Powder Coat | 3 - Steel Opposed Blade Damper |										
3	7	AMD	S22	9, 9	3PA	2S	24, 24	B12	3	218791, 219285
Desc.: 3PA - Alum T-Bar Panel Lay-In 1" (25) | 2S - 2-Way - Style S for Square Inlet Neck | B12 - White - Powder Coat | 3 - Steel Opposed Blade Damper |										
4	1	AMD	S23	9, 9	3PA	3A	24, 24	B12	3	218791, 219285
Desc.: 3PA - Alum T-Bar Panel Lay-In 1" (25) | 3A - 3-Way - Style A for Square Inlet Neck | B12 - White - Powder Coat | 3 - Steel Opposed Blade Damper |										
5	3	AMD	S24	12, 12	3PA	4A	24, 24	B12	3	218791, 219285
Desc.: 3PA - Alum T-Bar Panel Lay-In 1" (25) | 4A - 4-Way - Style A for Square Inlet Neck | B12 - White - Powder Coat | 3 - Steel Opposed Blade Damper |										
6	11	APF	S22,23,24				24, 24	B12		228804
Desc.: 24 - 24 Inches | 24 - 24 Inches | B12 - White - Powder Coat |										
7	8	620D	SW	8.000, 4.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
8	3	620D	SW	10.000, 4.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
9	2	620D	SW	10.000, 6.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
10	1	620D	SW	12.000, 4.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
11	8	620D	SW	12.000, 6.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
12	1	620D	SW	12.000, 6.000	F	L		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
13	1	620D	SW	14.000, 6.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
14	1	620D	SW	16.000, 6.000	F	L		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
15	3	620D	SW	18.000, 4.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
16	1	620D	SW	24.000, 4.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
17	114	620D	SW	24.000, 6.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
18	4	620D	SW	28.000, 4.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
19	1	620D	SW	28.000, 6.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
20	4	620D	SW	32.000, 4.000	F	S		B12	SW	219704

All-In-One
Detailed Submittal Schedule
Grilles/Registers/Diffusers

Date Printed: 2/12/2014
Job Name: PRESS HOTEL

#	Qty	Model	Tag	Unit Sz.	Border	Pattern	Panel Sz.	Finish	Accessories	Static Submittal
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
21	1	620D	SW	38.000, 8.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
22	1	LBP	SL	12.0000, 2.0000	1000	16B		B12		210581
Desc.: 1000 - 1" (25) Border | 16B - 15° Deflection - 1/8" Bars - 1/2" On Center Spacing | B12 - White - Powder Coat |										
23	1	LBP	SL	18.0000, 2.0000	1000	16B		B12		210581
Desc.: 1000 - 1" (25) Border | 16B - 15° Deflection - 1/8" Bars - 1/2" On Center Spacing | B12 - White - Powder Coat |										
24	1	LBP	SL	24.0000, 2.0000	1000	16B		B12		210581
Desc.: 1000 - 1" (25) Border | 16B - 15° Deflection - 1/8" Bars - 1/2" On Center Spacing | B12 - White - Powder Coat |										
25	1	LBP	SL	30.0000, 2.0000	1000	16B		B12		210581
Desc.: 1000 - 1" (25) Border | 16B - 15° Deflection - 1/8" Bars - 1/2" On Center Spacing | B12 - White - Powder Coat |										
26	2	LBP	SL	36.0000, 2.0000	1000	16B		B12		210581
Desc.: 1000 - 1" (25) Border | 16B - 15° Deflection - 1/8" Bars - 1/2" On Center Spacing | B12 - White - Powder Coat |										
27	1	LBP	SL	60.0000, 3.0000	1000	16B		B12		210581
Desc.: 1000 - 1" (25) Border | 16B - 15° Deflection - 1/8" Bars - 1/2" On Center Spacing | B12 - White - Powder Coat |										
28	2	LBPH	SLF	6.000, 6.000	1000	16A		AC		210582
Desc.: 1000 - 1" (25) Border | 16A - 15° Deflection - 1/8" Bars - 1/4" On Center Spacing | AC - Clear Anodized |										
29	7	LBPH	SLF	14.000, 6.000	1000	16A		AC		210582
Desc.: 1000 - 1" (25) Border | 16A - 15° Deflection - 1/8" Bars - 1/4" On Center Spacing | AC - Clear Anodized |										
30	3	LBPH	SLF	18.000, 6.000	1000	16A		AC		210582
Desc.: 1000 - 1" (25) Border | 16A - 15° Deflection - 1/8" Bars - 1/4" On Center Spacing | AC - Clear Anodized |										
31	2	630D	R1	22.000, 22.000	F	L		B12	LI	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | LI - T-Bar Lay-In |										
32	2	630D	R2	8.000, 8.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
33	1	630D	R2	10.000, 6.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
34	1	630D	R2	12.000, 6.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
35	5	630D	R2	12.000, 12.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
36	3	630D	R2	16.000, 12.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
37	2	630D	R2	18.000, 12.000	F	S		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades Parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
38	1	630D	R2	18.000, 18.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
39	1	630D	R2	20.000, 20.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
40	226	630	R2	18.000, 12.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
41	1	630D	R2	24.000, 24.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										

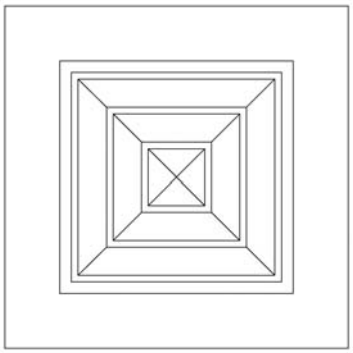
All-In-One
Detailed Submittal Schedule
Grilles/Registers/Diffusers

Date Printed: 2/12/2014
Job Name: PRESS HOTEL

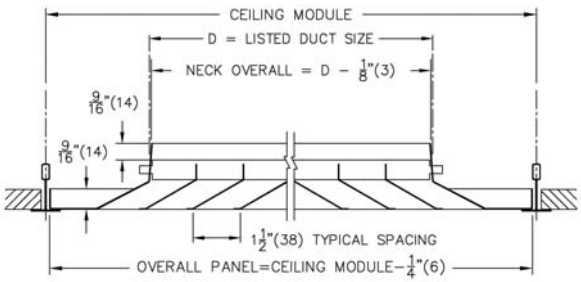
#	Qty	Model	Tag	Unit Sz.	Border	Pattern	Panel Sz.	Finish	Accessories	Static Submittal
42	1	98	R2	80.000, 14.000		S		B12		222008
Desc.: S - Louver Blades parallel to Short Dimension | B12 - White - Powder Coat |										
43	1	LBPH	R3F	12.000, 6.000	1000	15A		AC		210582
Desc.: 1000 - 1" (25) Border | 15A - 0° Deflection - 3/32" Bars - 1/4" On Center Spacing | AC - Clear Anodized |										
44	2	LBPH	R3F	30.000, 6.000	1000	15A		AC		210582
Desc.: 1000 - 1" (25) Border | 15A - 0° Deflection - 3/32" Bars - 1/4" On Center Spacing | AC - Clear Anodized |										
45	3	630D	E2	8.000, 8.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
46	3	630D	E2	12.000, 12.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
47	1	630D	E2	20.000, 8.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
48	1	630D	E2	30.000, 16.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
49	1	630D	E2	36.000, 12.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										
50	6	630D	E2	36.000, 20.000	F	S		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades Parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
51	1	ATGH	DG	24.000, 12.000	BF			B15		210426
Desc.: BF - 1 1/4" (32) Bevelled Border Both sides | B15 - Aluminum - Powder Coat |										
52	113	630FF	FG	0, 0	SM	L	24.000, 12.000	B12	2, HL	239549
Desc.: SM - Sidewall Application Surface Mount Border | L - Louver Blades parallel to Long Dimension | B12 - White - Powder Coat | 2 - 2" Filter | HL - Hinge Parallel to Long Dimension |										
53	9	620D	SW	14.000, 12.000	F	S		B12	SW	219704
Desc.: F - 1 1/4" (32) Flat Frame | S - Front Louver Blades parallel to Short Dimension | B12 - White - Powder Coat | SW - Sidewall |										
54	1	ATGH	DG	24.000, 24.000	BF			B15		210426
Desc.: BF - 1 1/4" (32) Bevelled Border Both sides | B15 - Aluminum - Powder Coat |										
55	3	630D	E2	10.000, 10.000	F	L		B12	SW	219705
Desc.: F - 1 1/4" (32) Flat Frame | L - Front Louver Blades Parallel to Long Dimension | B12 - White - Powder Coat | SW - Sidewall |										

AMD Aluminum Modular Directional Diffuser

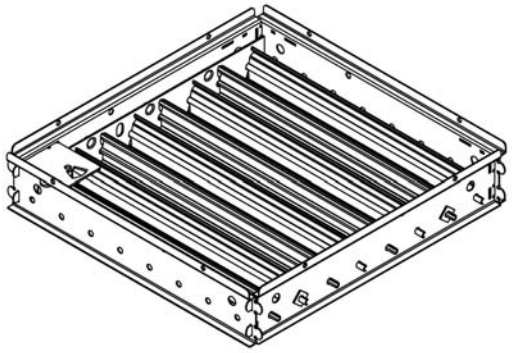
Core Style: 4A 4-Way, Style A for Square Inlet Neck



Border: 3PA Aluminum T-Bar Panel Lay-In 1" (25)



Accessory: VCS3 Opposed Blade Damper



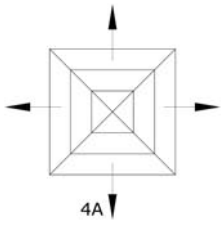
Notes:

- Cores sized in increments of 3" (76) in both directions
- Opposed Blade damper is face operable, shipped mounted
- Directional core removable at diffuser face
- Factory tolerance ± 1/32" (1)

Material:

- Aluminum Construction
- Panel: Aluminum
- Damper: Steel

Plan View:



Finish:

- B12: White Powder Coat

PROJECT: PRESS HOTEL
ENGINEER:
DESCRIPTION: Aluminum Louvered Directional Diffuser
AMD//I/12,15/12,15/3PA/4A/24/24/3///B12

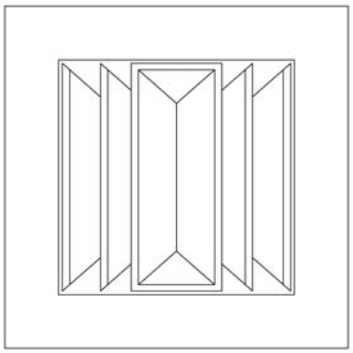
SUBMITTAL NO: 258515
CUSTOMER:

SUBMITTAL DATE: 2/12/2014

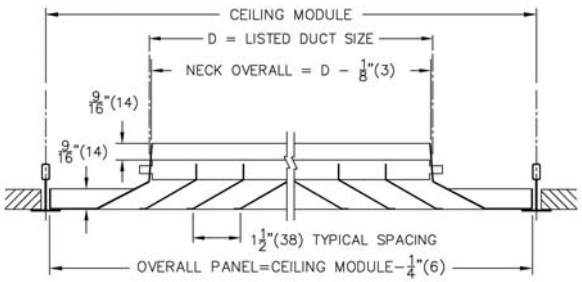
All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

AMD Aluminum Modular Directional Diffuser

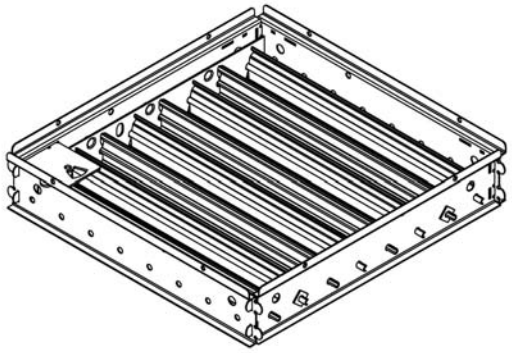
Core Style: 2S 2-Way, Style S for Square Inlet Neck



Border: 3PA Aluminum T-Bar Panel Lay-In 1" (25)



Accessory: VCS3 Opposed Blade Damper



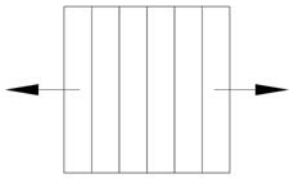
Notes:

- Cores sized in increments of 3" (76) in both directions
- Opposed Blade damper is face operable, shipped mounted
- Directional core removable at diffuser face
- Factory tolerance ± 1/32" (1)

Material:

- Aluminum Construction
- Panel: Aluminum
- Damper: Steel

Plan View:



2S

Finish:

- B12: White Powder Coat

PROJECT: PRESS HOTEL
ENGINEER:
DESCRIPTION: Aluminum Louvered Directional Diffuser
AMD//I/9/9/3PA/2S/24/24/3///B12

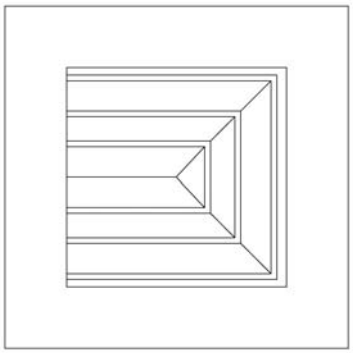
SUBMITTAL NO: 258515
CUSTOMER:

SUBMITTAL DATE: 2/12/2014

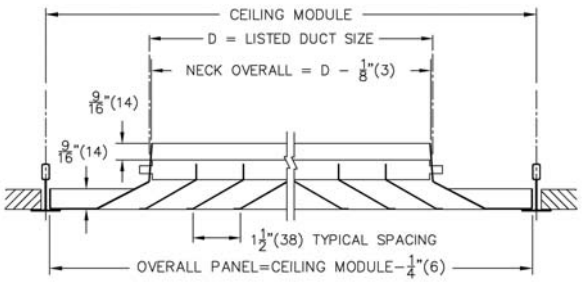
All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

AMD Aluminum Modular Directional Diffuser

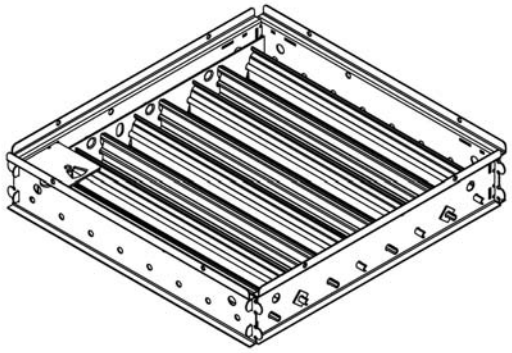
Core Style: 3A 3-Way, Style A for Square Inlet Neck



Border: 3PA Aluminum T-Bar Panel Lay-In 1" (25)



Accessory: VCS3 Opposed Blade Damper



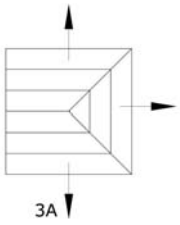
Notes:

- Cores sized in increments of 3" (76) in both directions
- Opposed Blade damper is face operable, shipped mounted
- Directional core removable at diffuser face
- Factory tolerance ± 1/32" (1)

Material:

- Aluminum Construction
- Panel: Aluminum
- Damper: Steel

Plan View:



Finish:

- B12: White Powder Coat

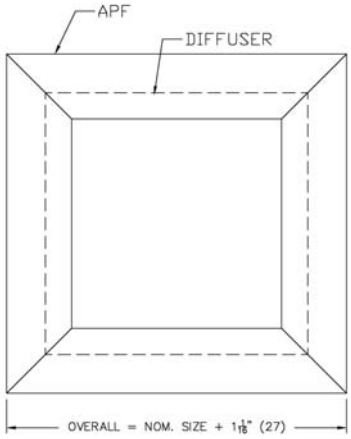
PROJECT: PRESS HOTEL
ENGINEER:
DESCRIPTION: Aluminum Louvered Directional Diffuser
AMD//I/9/9/3PA/3A/24/24/3///B12

SUBMITTAL NO: 258515
CUSTOMER:

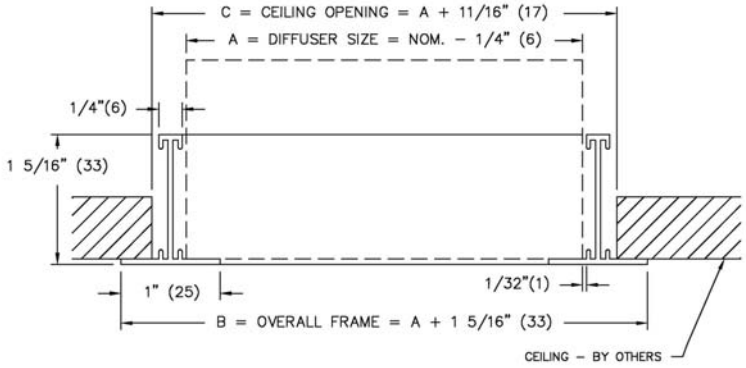
SUBMITTAL DATE: 2/12/2014

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

APF Aluminum Plaster Frame



Nom. Diffuser Size	A	B	C
24" X 24"	23 3/4" X 23 3/4"	25 1/16" X 25 1/16"	24 7/16" X 24 7/16"



Notes:

- Factory Tolerance ± 1/32" (1)

Material:

- Extruded Aluminum

Finish:

- B12: White Powder Coat

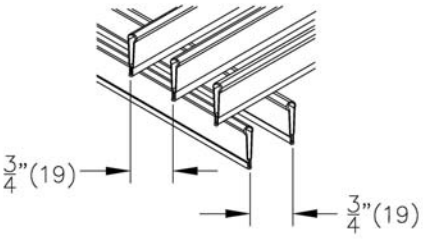
PROJECT: PRESS HOTEL
SUBMITTAL NO: 261481
SUBMITTAL DATE: 2/12/2014
ENGINEER:
CUSTOMER:
DESCRIPTION: Aluminum Plaster Frame, Extrud Alum- Ceiling Appl
APF//I/CD////24/24////B12

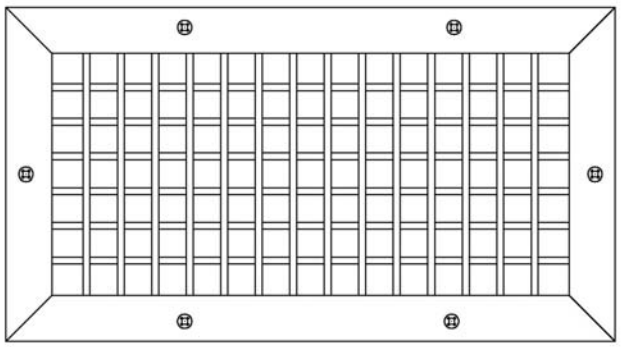
All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

620D Louvered Aluminum Supply Register – 3/4" Blade Spacing, Double Deflection

Core Style:

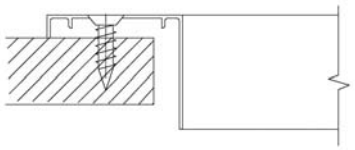
Double Deflection





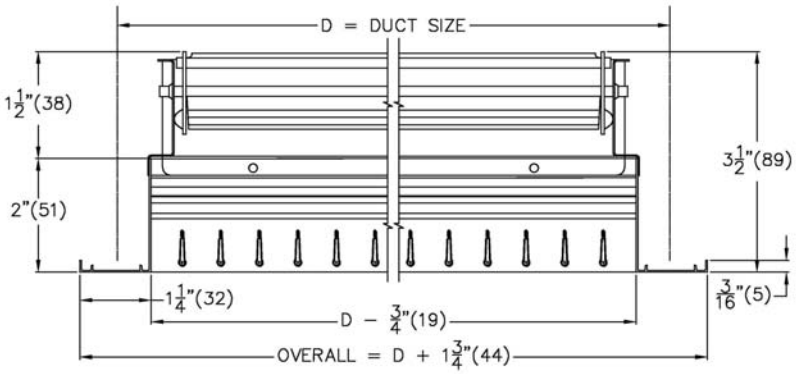
Fastening:

A: Countersunk Screwholes with Screw



Border: F

1 1/4" (32) Flat Frame



Material:

- Aluminum

Finish:

- B12 - White Powder Coat

Notes:

- Front blades parallel to Short dimension
- Individually adjustable roll formed blades on 3/4" (19) centers
- VCS3 opposed blade damper, coated steel
- Factory tolerance ± 1/32" (1)
- Grilles may be constructed with mullions depending on size and options ordered.

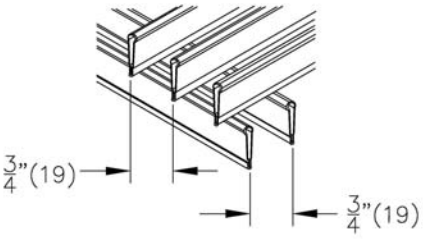
PROJECT: PRESS HOTEL **SUBMITTAL NO:** 258310 **SUBMITTAL DATE:** 2/12/2014
ENGINEER: **CUSTOMER:**
DESCRIPTION: Louvered Alum Dbl Deflec Regis W/Damp,3/4" Spacing
620D//I/8.000,10.000,12.000,14.000,18.000,24.000,28.000,32.000,38.000/4.000,6.000,8.000,12.000/F/S////A/SW/B12

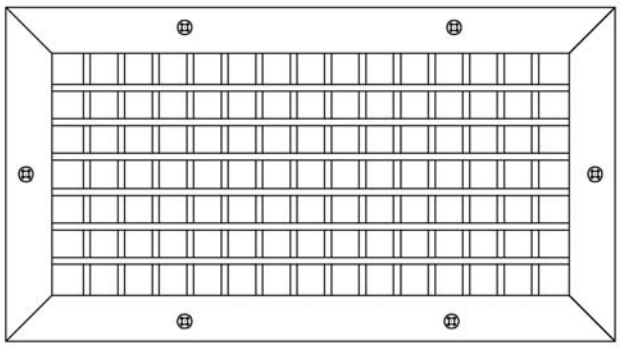
Marketing Release version: 1.37.1.2, All In One version: 3.1.5
All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

620D Louvered Aluminum Supply Register – 3/4" Blade Spacing, Double Deflection

Core Style:

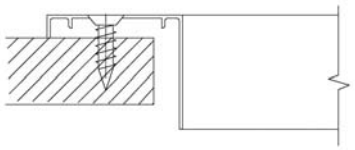
Double Deflection





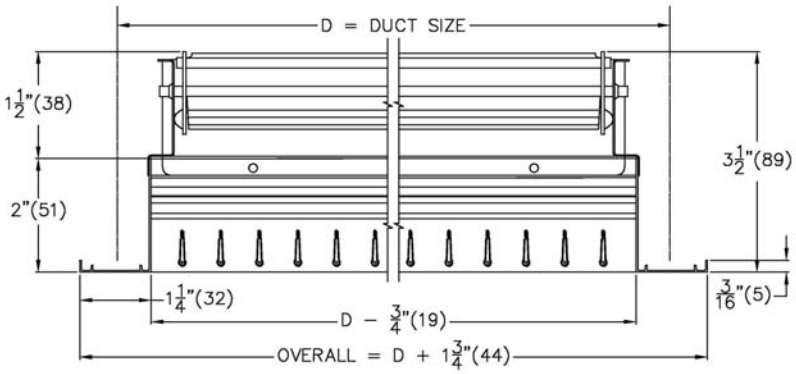
Fastening:

A: Countersunk Screwholes with Screw



Border: F

1 1/4" (32) Flat Frame



Material:

- Aluminum

Finish:

- B12 - White Powder Coat

Notes:

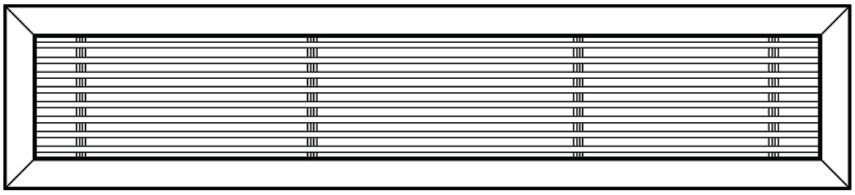
- Front blades parallel to Long dimension
- Individually adjustable roll formed blades on 3/4" (19) centers
- VCS3 opposed blade damper, coated steel
- Factory tolerance ± 1/32" (1)
- Grilles may be constructed with mullions depending on size and options ordered.

PROJECT: PRESS HOTEL
SUBMITTAL NO: 258310
SUBMITTAL DATE: 2/12/2014
ENGINEER:
CUSTOMER:
DESCRIPTION: Louvered Alum Dbl Deflec Regis W/Damp,3/4" Spacing
620D//I/12.000,16.000/6.000/F/L////A/SW/B12

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

price® **Submittal Sheet**

LBP Linear Bar Grille
Item Tag: SL



Nom Length (in inches) :	12.0000, 18.0000, 24.0000, 30.0000, 36.0000
Nom Width (in inches) :	2.0000

End Conditions:

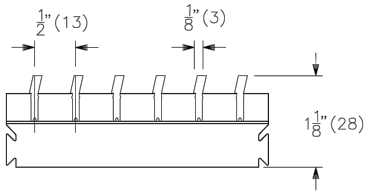
XX Both Mitred Ends

Finish:

B12 White - Powder Coat

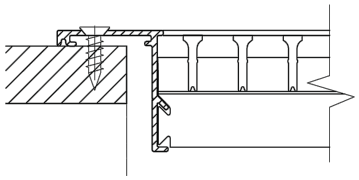
Core

16B 15 Degree Deflection - 1/8" Bars - 1/2" On Center Spacing



Fastening

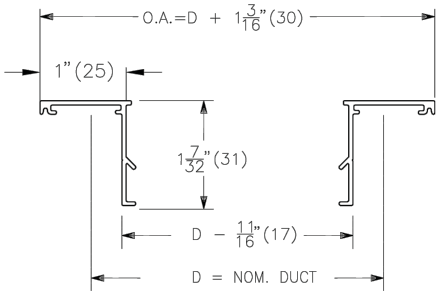
A Countersunk Screw holes



- For ceiling, wall & sill application

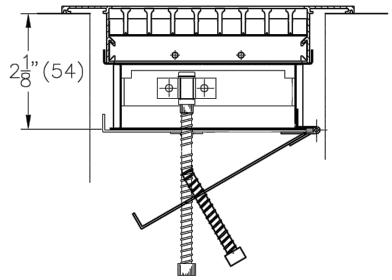
Border

1000 1" (25) Border



Accessories Included

VCS2



VCS2 Flap damper screw driver operator on 3" (76) through 8" (203) nom. widths. Friction hinge on 1.5" (38) through 2.5" (64) nom. widths.

PROJECT: PRESS HOTEL
SUBMITTAL NO: 258151
SUBMITTAL DATE: 2/12/2014
ENGINEER:
CUSTOMER:
DESCRIPTION: Linear Bar Grille
LBP//I/12.0000,18.0000,24.0000,30.0000,36.0000/2.0000/16B/1000///XX/2/A//B12

Marketing Release version: 1.37.1.2, All In One version: 3.1.5
All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

Notes

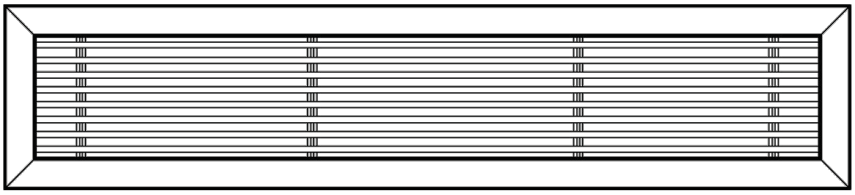
- Extruded aluminum construction
- Sections can be joined for continuous appearance
- Factory tolerance: ± 1/32" (1) per grille section
- Maximum length for one piece construction = 72"
- Bars are fixed and parallel to long dimension
- Screw mounting holes per factory standard
- Not suitable for floor application
- Units wider than 24" are supplied in multiple sections with mounting channel(s)

PROJECT: PRESS HOTEL
SUBMITTAL NO: 258151
SUBMITTAL DATE: 2/12/2014
ENGINEER:
CUSTOMER:
DESCRIPTION: Linear Bar Grille
LBP//I/12.0000,18.0000,24.0000,30.0000,36.0000/2.0000/16B/1000///XX/2/A//B12

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

Submittal Sheet

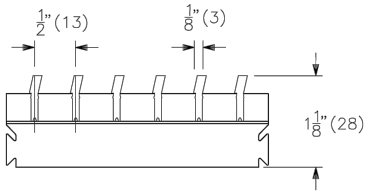
LBP Linear Bar Grille
Item Tag: SL



Nom Length (in inches) : 60.0000
Nom Width (in inches) : 3.0000
End Conditions:
XX Both Mitred Ends
Finish:
B12 White - Powder Coat

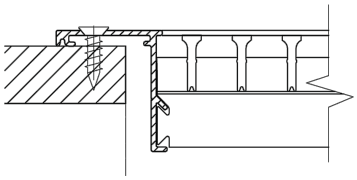
Core

16B 15 Degree Deflection - 1/8" Bars - 1/2" On Center Spacing



Fastening

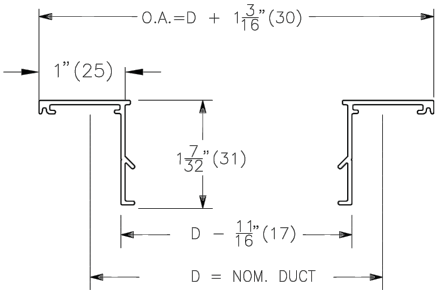
A Countersunk Screw holes



- For ceiling, wall & sill application

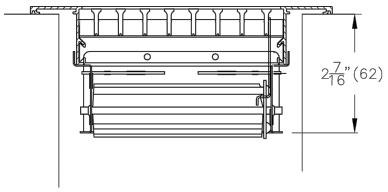
Border

1000 1" (25) Border



Accessories Included

VCS3



VCS3 opposed blade damper
Min. nom. width = 2.5" (64)

Notes

- Extruded aluminum construction
- Sections can be joined for continuous appearance
- Factory tolerance: ± 1/32" (1) per grille section
- Maximum length for one piece construction = 72"
- Bars are fixed and parallel to long dimension
- Screw mounting holes per factory standard
- Not suitable for floor application
- Units wider than 24" are supplied in multiple sections with mounting channel(s)

PROJECT: PRESS HOTEL
ENGINEER:
DESCRIPTION: Linear Bar Grille
LBP//I/60.0000/3.0000/16B/1000///XX/3/A//B12

SUBMITTAL NO: 258151
CUSTOMER:

SUBMITTAL DATE: 2/12/2014

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

Submittal Sheet

LBPH Linear Bar Grille

Item Tag: SLF

Nom Length (in inches) : 6.000, 14.000, 18.000

Nom Width (in inches) : 6.000

End Conditions:

XX Both Mitred Ends

Finish:

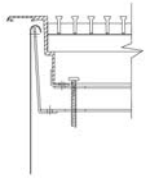
AC Clear Anodized

Core

Floor

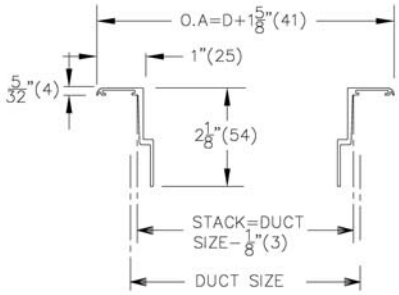
Fastening

C Concealed Mounting



Border

1000 1" (25) Border



Notes

- Extruded aluminum construction
- Sections can be joined for continuous appearance
- Maximum length for one piece construction = 72"
- Removeable Core held in place with clips
- Bars are fixed and parallel to long dimension
- Factory tolerance: ± 1/32" (1) per grille section
- Units wider than 24" are supplied in multiple sections with mounting channel(s)

PROJECT: PRESS HOTEL
ENGINEER:
DESCRIPTION: Heavy Duty Linear Bar Grille
LBPH//I/6.000,14.000,18.000/6.000/Floor/1000/16A//XX/2/C/////AC

SUBMITTAL NO: 258245-B-1
CUSTOMER:

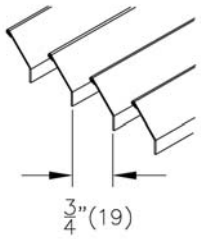
SUBMITTAL DATE: 2/12/2014

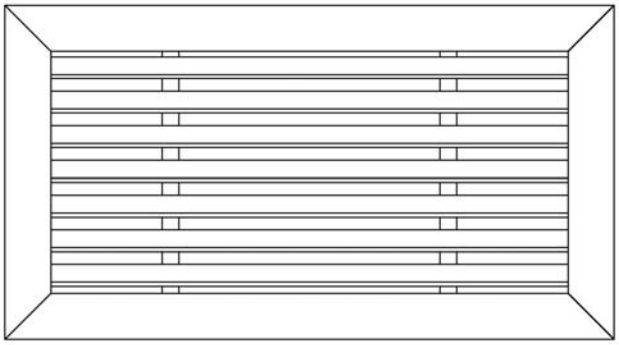
All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

630D Louvered Aluminum Return Register – 3/4" Blade Spacing, 45° Single Deflection

Core Style:

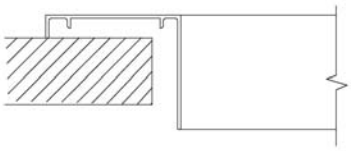
Single Deflection





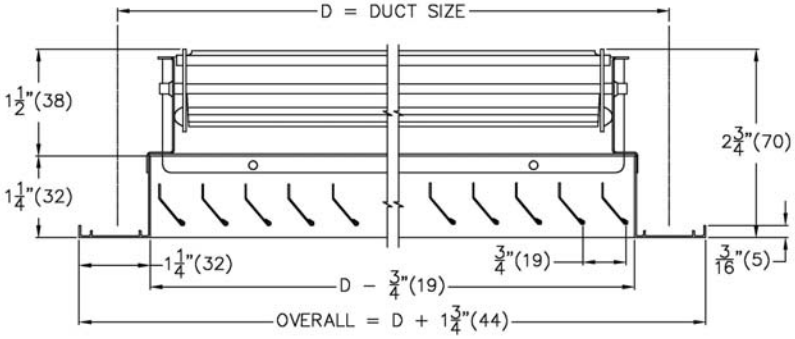
Fastening:

0: No screwholes, fastening by others



Border: F

1 1/4" (32) Flat Frame



Material:

- Aluminum

Finish:

- B12 - White Powder Coat

Notes:

- Blades parallel to Long dimension
- 45° Deflection roll formed blades on 3/4" (19) centers
- VCS3 opposed blade damper, coated steel
- Factory tolerance ± 1/32" (1)

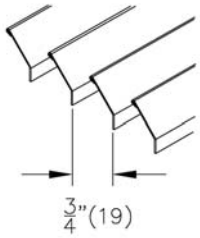
PROJECT: PRESS HOTEL
SUBMITTAL NO: 258310
SUBMITTAL DATE: 2/12/2014
ENGINEER:
CUSTOMER:
DESCRIPTION: Alum Return Grille W/Damp,45° Blades, 3/4" Spacing
630D//I/22.000/22.000/F/L////0//LI/B12

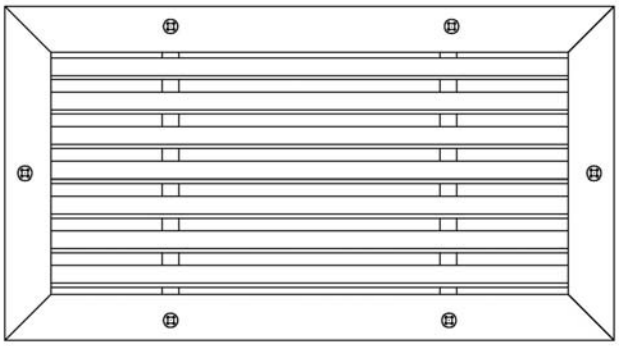
All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

630D Louvered Aluminum Return Register – 3/4" Blade Spacing, 45° Single Deflection

Core Style:

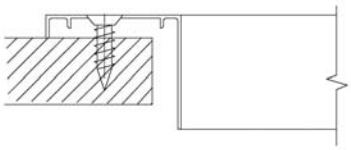
Single Deflection





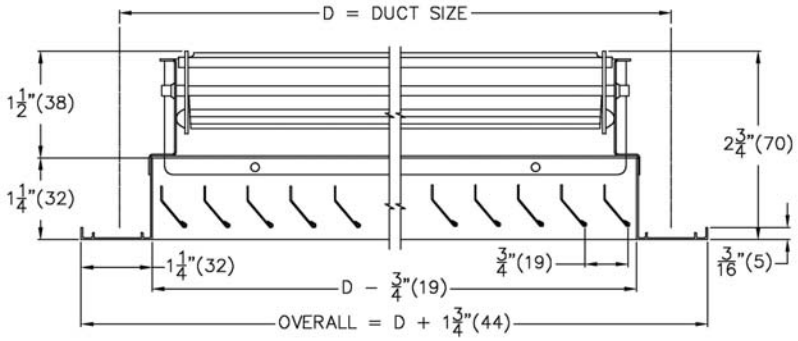
Fastening:

A: Countersunk Screwholes with Screw



Border: F

1 1/4" (32) Flat Frame



Material:

- Aluminum

Finish:

- B12 - White Powder Coat

Notes:

- Blades parallel to Long dimension
- 45° Deflection roll formed blades on 3/4" (19) centers
- VCS3 opposed blade damper, coated steel
- Factory tolerance ± 1/32" (1)

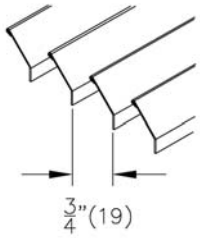
PROJECT: PRESS HOTEL **SUBMITTAL NO:** 258310 **SUBMITTAL DATE:** 2/12/2014
ENGINEER: **CUSTOMER:**
DESCRIPTION: Alum Return Grille W/Damp,45° Blades, 3/4" Spacing
630D//I/8.000,10.000,12.000,16.000,18.000,20.000,24.000,30.000,36.000/8.000,6.000,12.000,18.000,20.000,24.000,16.000,10.000/F/L////A//SW/B12

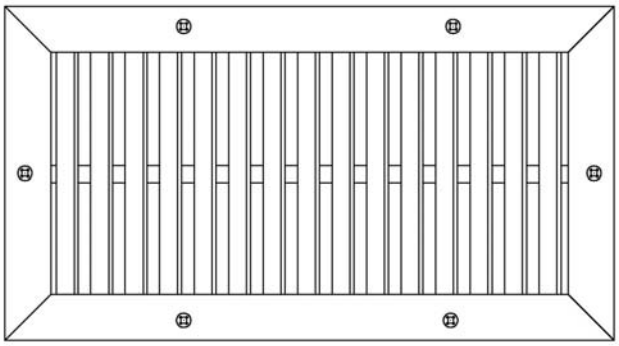
Marketing Release version: 1.37.1.2, All In One version: 3.1.5
All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

630D Louvered Aluminum Return Register – 3/4" Blade Spacing, 45° Single Deflection

Core Style:

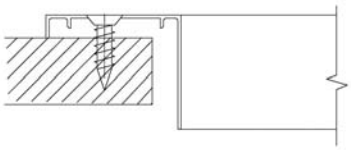
Single Deflection





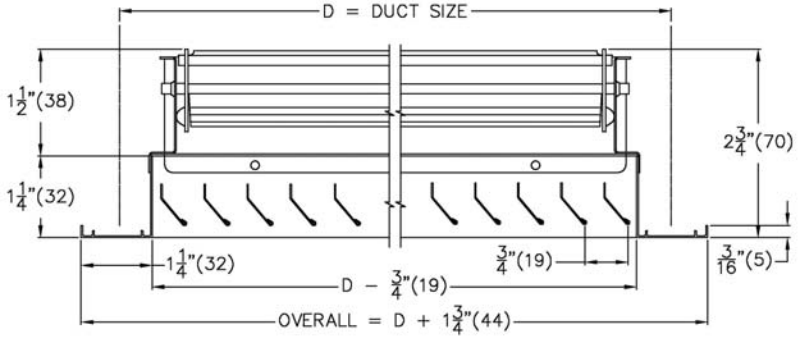
Fastening:

A: Countersunk Screwholes with Screw



Border: F

1 1/4" (32) Flat Frame



Material:

- Aluminum

Finish:

- B12 - White Powder Coat

Notes:

- Blades parallel to Short dimension
- 45° Deflection roll formed blades on 3/4" (19) centers
- VCS3 opposed blade damper, coated steel
- Factory tolerance ± 1/32" (1)

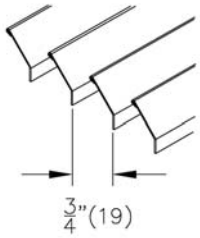
PROJECT: PRESS HOTEL
SUBMITTAL NO: 258310
SUBMITTAL DATE: 2/12/2014
ENGINEER:
CUSTOMER:
DESCRIPTION: Alum Return Grille W/Damp,45° Blades, 3/4" Spacing
630D//I/18.000,36.000/12.000,20.000/F/S////A//SW/B12

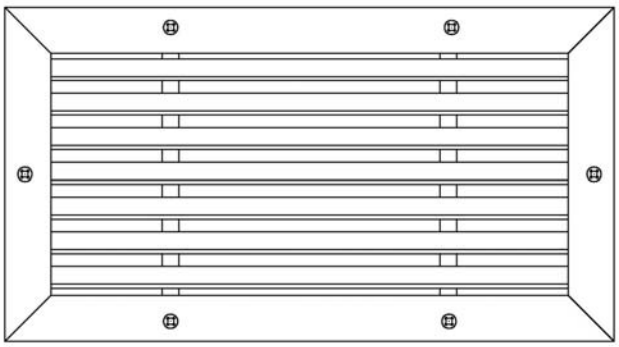
All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

630 Louvered Aluminum Return Grille – 3/4" Blade Spacing, 45° Single Deflection

Core Style:

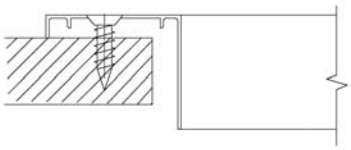
Single Deflection





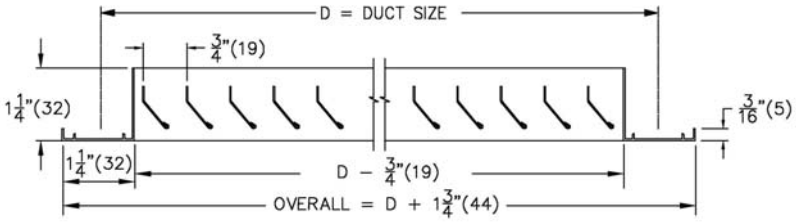
Fastening:

A: Countersunk Screwholes with Screw



Border: F

1 1/4" (32) Flat Frame



Material:

- Aluminum

Finish:

- B12 - White Powder Coat

Notes:

- Blades parallel to Long dimension
- 45° Deflection roll formed blades on 3/4" (19) centers
- Factory tolerance ± 1/32" (1)

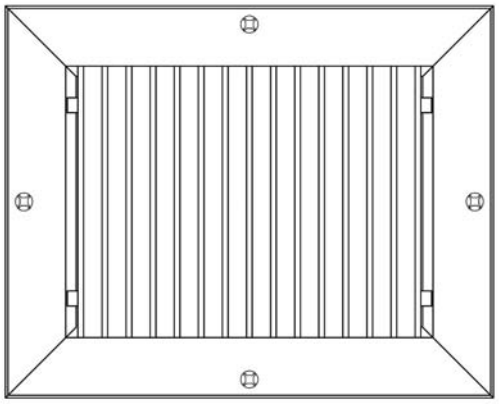
PROJECT: PRESS HOTEL
ENGINEER:
DESCRIPTION: Aluminum Return Grille, 45° Blades, 3/4" Spacing
630//I/18.000/12.000/F/L////A//SW/B12

SUBMITTAL NO: 258310
CUSTOMER:

SUBMITTAL DATE: 2/12/2014

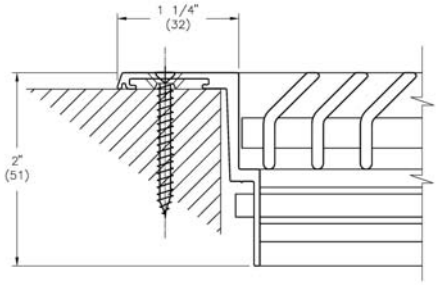
All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

98 Aluminum Gymnasium Grille – 45° Deflection, 1/2" Blade Spacing



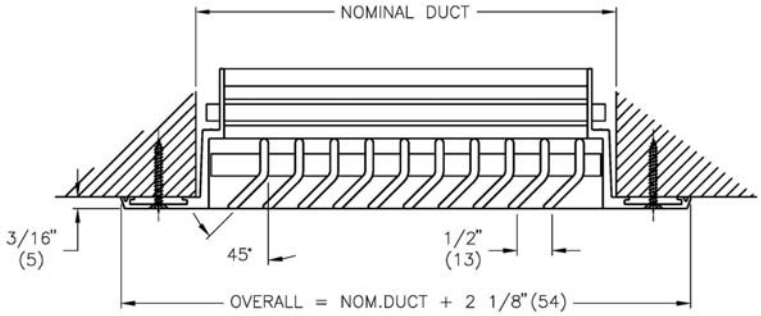
Fastening:

A: Countersunk screwholes with standard screws



Border: F

1 1/4"(32) Flat Frame



Material:

- Frame: Extruded Aluminum
- Blades: Extruded Aluminum

Finish:

- B12: White Powder Coat

Notes:

- Heavy duty mandrel tube construction
- Continuously welded border
- Louver blades are parallel to the short dimension
- 45° deflection blades are fixed on 1/2" centers
- Oversized units are supplied with duct mounting channels
- Factory tolerance ± 1/32" (1)

PROJECT: PRESS HOTEL
ENGINEER:
DESCRIPTION: Aluminum Gym Grille, 45° Angle, 1/2" Spacing
98//I/80.000/14.000//S////A//B12

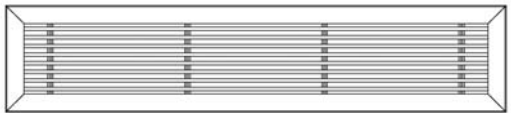
SUBMITTAL NO: 261092
CUSTOMER:

SUBMITTAL DATE: 2/12/2014

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

price® **Submittal Sheet**

LBPH Linear Bar Grille
Item Tag: R3F



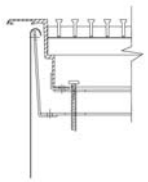
Nom Length (in inches) : 12.000, 30.000
Nom Width (in inches) : 6.000
End Conditions:
XX Both Mitred Ends
Finish:
AC Clear Anodized

Core

Floor

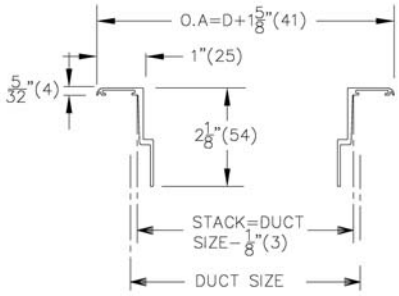
Fastening

C Concealed Mounting



Border

1000 1" (25) Border



Notes

- Extruded aluminum construction
- Sections can be joined for continuous appearance
- Maximum length for one piece construction = 72"
- Removeable Core held in place with clips
- Bars are fixed and parallel to long dimension
- Factory tolerance: ± 1/32" (1) per grille section
- Units wider than 24" are supplied in multiple sections with mounting channel(s)

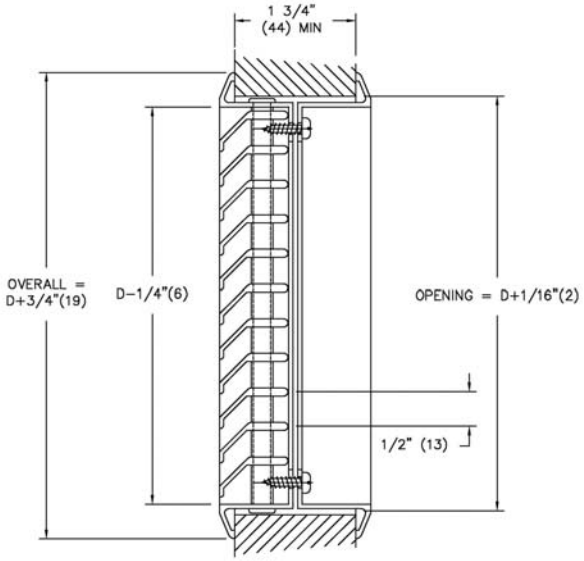
PROJECT: PRESS HOTEL
ENGINEER:
DESCRIPTION: Heavy Duty Linear Bar Grille
LBPH//I/12.000,30.000/6.000/Floor/1000/15A//XX/3/C//////AC

SUBMITTAL NO: 258245-B-1
CUSTOMER:

SUBMITTAL DATE: 2/12/2014

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

ATGH Heavy Duty Aluminum Transfer Grille



Notes:

- Rugged Mandrel Tube Construction
- Border BF: Border on both sides
- Factory tolerance ± 1/32" (1)

Material:

- Blades and Frames: Heavy Gauge Extruded Aluminum

Finish:

- B15: Aluminum Powder Coat

PROJECT: PRESS HOTEL
ENGINEER:
DESCRIPTION: Alum. Transfer/Door Grille,Sightproof,Heavy Duty
ATGH///I/24.000/12.000,24.000/BF///////B15

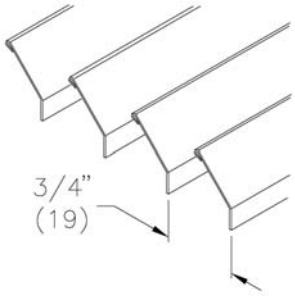
SUBMITTAL NO: 261379
CUSTOMER:

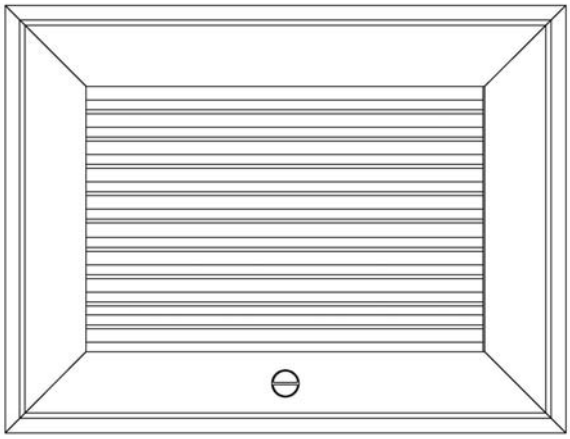
SUBMITTAL DATE: 2/12/2014

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

630FF Aluminum Filter Grille - 3/4" Blade Spacing

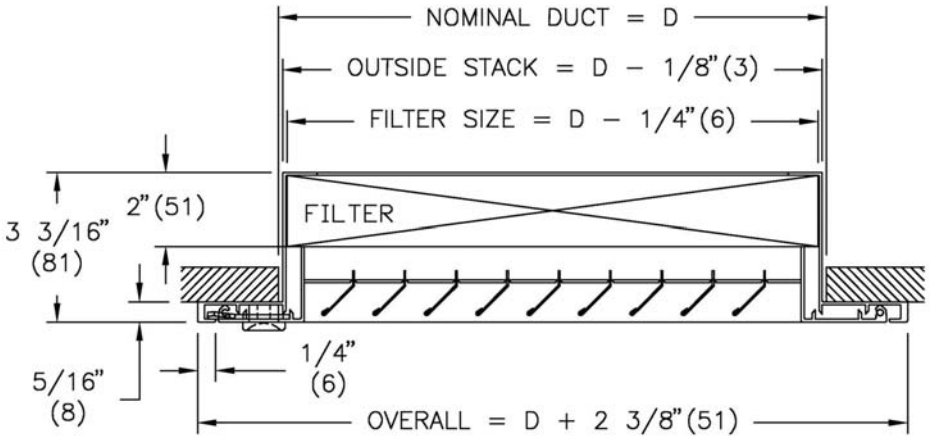
Core Style:





Border: SM

Sidewall Application Surface Mount Border



Notes:

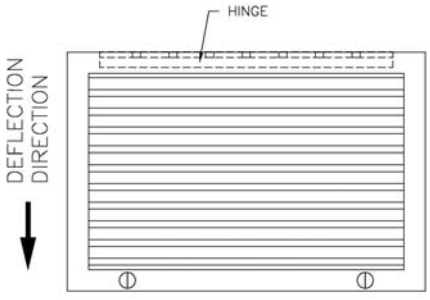
- Filter frame accepts 2" filter
- Filter media supplied by others
- Blades are on 3/4" (19) spacing
- Blades are parallel to the long dimension
- Hinge tabs are parallel to the long dimension
- For sidewall installation, hinge tabs must be at top
- Quarter turn fastener location per factory standard
- Mounting holes in filter frame by installer
- Nominal duct size listed
- Factory tolerance: ± 1/32"(1)

Material:

- Aluminum Construction

Finish:

- B12: White Powder Coat



PROJECT: PRESS HOTEL
ENGINEER:
DESCRIPTION: Aluminum Filter Return Grille, 45° Blades
630FF//I/24.000/12.000/SM/L/0/0/2/HL//B12

SUBMITTAL NO: 261073
CUSTOMER:

SUBMITTAL DATE: 2/12/2014

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.

112 REQUIRED @ 6X6 W/ 4" INLET

AIRFLOW & ZONE CONTROLS

CSR-R-II

Constant Supply Register for Round Ducting

PRODUCT SPECIFICATIONS & TECHNICAL DATA

GENERAL

Model CSR-R-II Constant Supply Register incorporates a modulating orifice that automatically regulates airflows in duct systems to constant levels. The passive control element in the CSR-R-II responds to duct pressure and requires no electric or pneumatic sensors or controls.

The CSR-R-II compensates for changes in duct pressure caused by thermal stack effect, building pressure, dust-clogged filters, etc. The CSR-R-II also eliminates the need for on-site balancing in supply air duct systems.

The active control element of the CSR-R-II is a unique aerofoil (CAR-II). Using Bernoulli's Principle, the aero-wing damper lifts in response to increasing static pressure. This operation regulates the free-area opening through the control, resulting in maintenance of velocity and specific airflow set points. Each CAR-II is designed and produced for control of air in temperatures ranging from -25° to 140°F (-32° to 60°C.)

CONSTRUCTION

The CSR-R-II single-deflection grille face is constructed of heavy-gauge extruded aluminum to prevent rusting in moist environments such as bathrooms, showers, etc. The CAR-II regulating element is integral to the grille, and it is secured in an air-tight mounting plate. The entire assembly is designed to be attached directly to round ducting.

PERFORMANCE

The CAR-II controls airflow accurately to within 10% of rated flow (15% for units 50 CFM or less) throughout the target operating pressure range of 0.2 to 0.8 in. w.g. (50 to 200 Pa). Each CAR-II is factory tested and calibrated to the rated set point before shipping. Each CAR-II is available in multiple factory-calibrated set points (see performance curves).

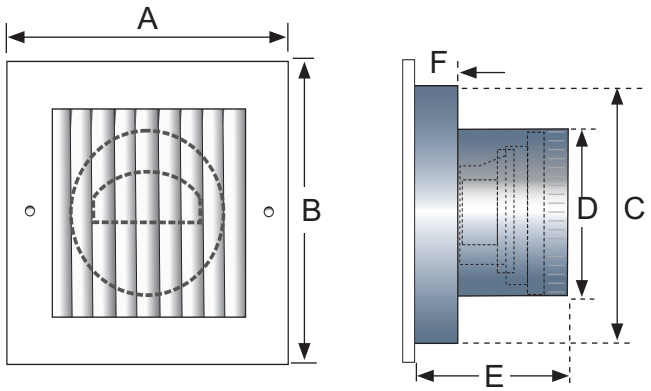
MAINTENANCE

The CAR-II needs no maintenance when used in normal conditions. There is no risk of dust deposit or obstruction because the CAR-II has no airways subject to clogging.

WARRANTY

Guaranteed for five years, from date of shipment, against all defects in material or workmanship, provided that the material has been installed and utilized under normal conditions. This warranty is limited to the repair or replacement of the material.

CSR-R-II Dimensions



FRONT **SIDE**

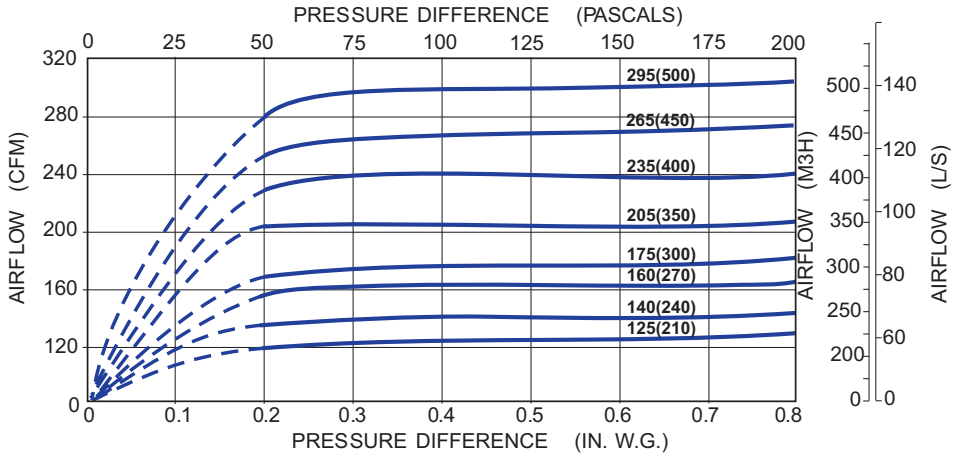
PART NUMBER	SIZE* (NOMINAL)	REGULATOR (NOMINAL)	A	B	C	D	E	F
18 802	6″ x 6″	4″	7.5″	7.5″	5.6″	3.9″	4.5″	1.6″
18 803	6″ x 6″	5″	7.5″	7.5″	5.6″	4.9″	5.6″	1.6″
18 805	8″ x 8″	4″	9.5″	9.5″	7.6″	3.9″	4.5″	1.6″
18 806	8″ x 8″	5″	9.5″	9.5″	7.6″	4.9″	5.6″	1.6″
18 807	8″ x 8″	6″	9.5″	9.5″	7.6″	5.8″	5.6″	1.6″
18 809	10″ x 10″	4″	11.5″	11.5″	9.6″	3.9″	4.5″	1.6″
18 810	10″ x 10″	5″	11.5″	11.5″	9.6″	4.9″	5.6″	1.6″
18 811	10″ x 10″	6″	11.5″	11.5″	9.6″	5.8″	5.6″	1.6″
18 812	10″ x 10″	8″	11.5″	11.5″	9.6″	7.8″	5.6″	1.6″
18 814	12″ x 12″	4″	13.5″	13.5″	11.6″	3.9″	5.6″	1.6″
18 815	12″ x 12″	5″	13.5″	13.5″	11.6″	4.9″	5.6″	1.6″
18 816	12″ x 12″	6″	13.5″	13.5″	11.6″	5.8″	5.6″	1.6″
18 817	12″ x 12″	8″	13.5″	13.5″	11.6″	7.8″	5.6″	1.6″
18 818	12″ x 12″	10″	13.5″	13.5″	11.6″	9.7″	5.9″	1.6″

*Standard grille sizes shown. Contact factory for custom sizes.

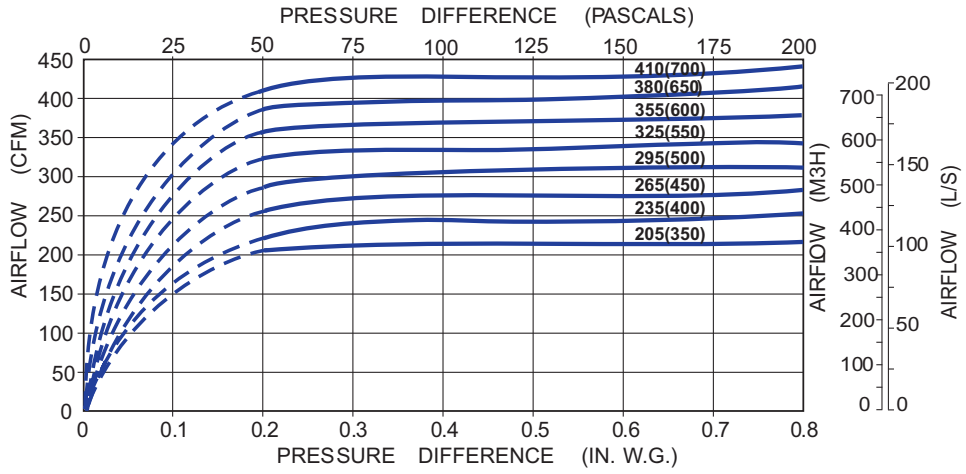
CER-R-II Airflow Performance Data

Performance charts reflect airflow measurements taken at 68°F (20°C) at 1 atmosphere pressure. The CER-R-II is designed for system pressures between 0.2 and 0.8 in. w.g. Models are also available for applications with system pressures between 0.1 and 0.42 in. w.g (CER-LP-R-II).

8" DIAMETER (200 mm) REGULATING ELEMENT



10" DIAMETER (250 mm) REGULATING ELEMENT



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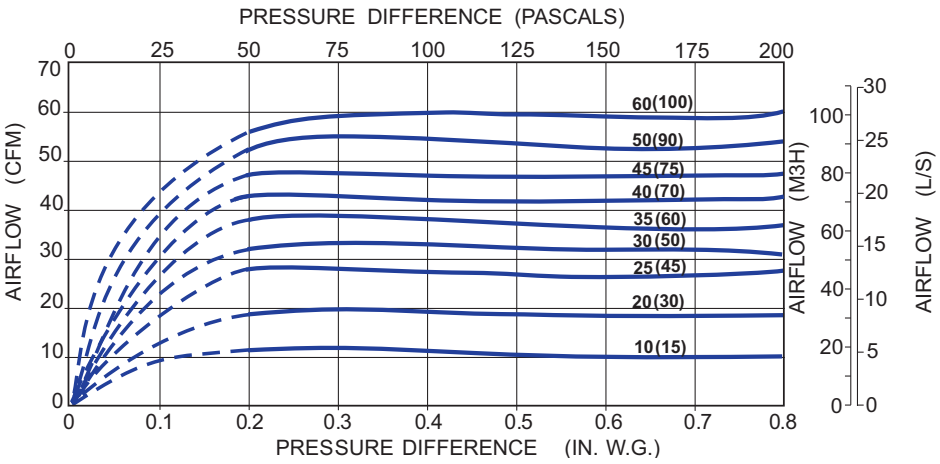
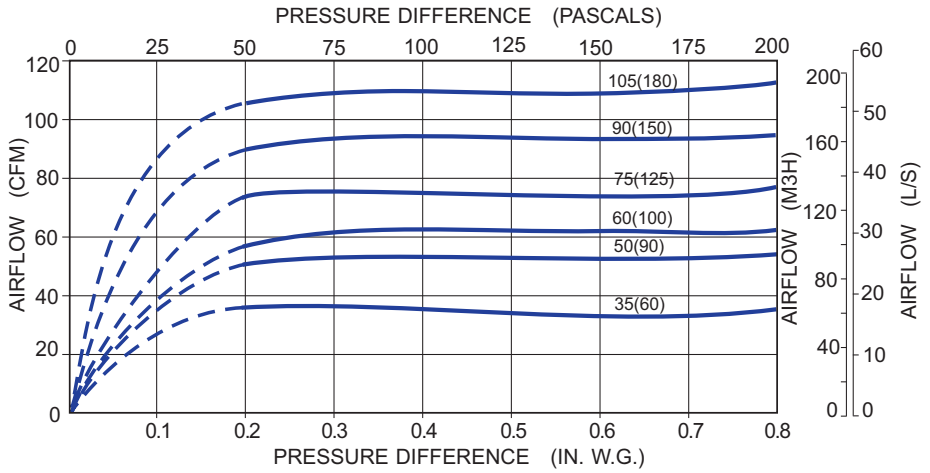
CER-R-II Airflow Performance Data

Performance charts reflect airflow measurements taken at 68°F (20°C) at 1 atmosphere pressure. The CER-R-II is designed for system pressures between 0.2 and 0.8 in. w.g. Models are also available for applications with system pressures between 0.1 and 0.42 in. w.g (CER-LP-R-II).

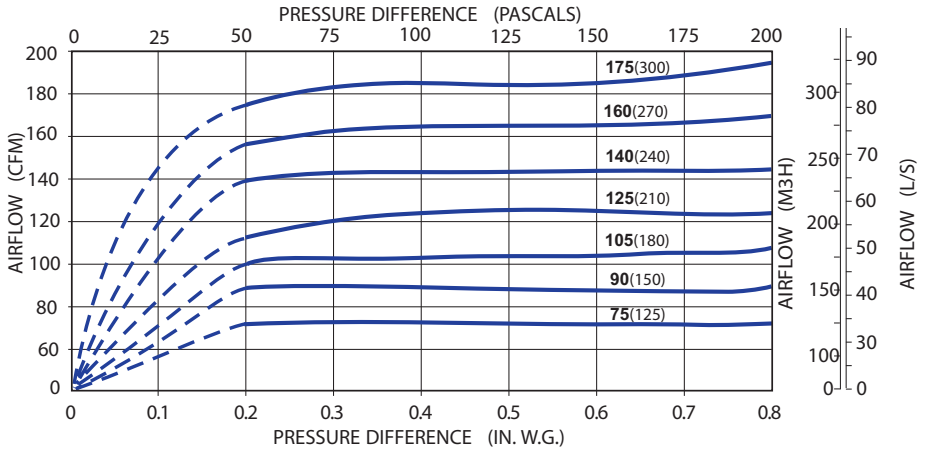
4" DIAMETER (100 mm) REGULATING ELEMENT



5" DIAMETER (125 mm) REGULATING ELEMENT

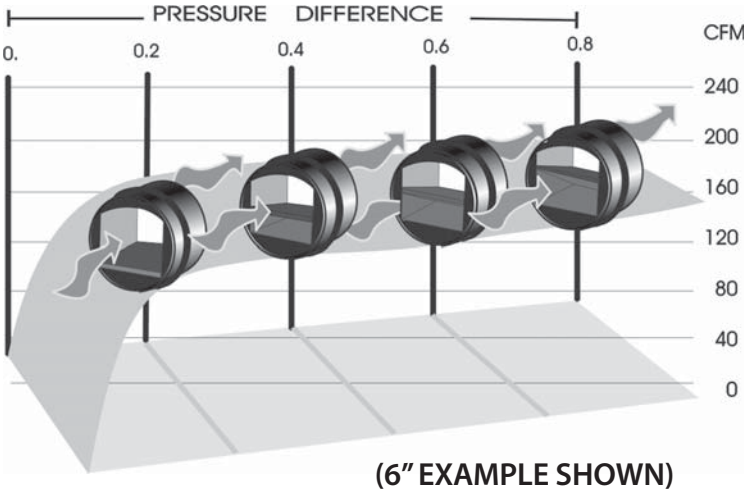


6" DIAMETER (150 mm) REGULATING ELEMENT



How the CAR-II Works

Constant airflow is achieved by controlling the free area through the device. At minimum static pressure, the aero-wing is parallel to the air stream. As the static pressure increases, the aero-wing lifts, reducing the amount of free area through the regulator. At the same time, higher static pressure increases the air velocity resulting in CONSTANT AIRFLOW. This occurs regardless of pressure differences in the range of 0.2 to 0.8 in. w.g. (50 to 200 Pa). The air velocity in the duct is in the range of 60 to 700 ft/min. (0.3 to 3.5 m/s).



(6" EXAMPLE SHOWN)

Typical CER-R-II Applications

- **Return and exhaust air systems.**
- **Balancing exhaust airflows in high-rise building duct risers.**
- **Bathroom exhaust in nursing homes, hotels, motels, dormitories, apartment buildings, offices, etc.**

Typical Specification

Model CER-R-II Constant Exhaust Registers by American ALDES Ventilation Corporation, Bradenton, Florida, shall solely operate on duct pressure and require no external power supply. Each register shall be pre-set and factory calibrated, requiring no field adjustment to the airflows as indicated on the schedule, and shall be rated for use in air temperatures ranging from -25° to 140°F (-32° to 60°C.)

Constant Exhaust Registers shall be capable of maintaining constant airflow within +/- 10% of scheduled flow rates (15% for units 50 CFM or less), within the operating range of 0.2 to 0.8 in. w.g. differential pressure, or 0.1 to 0.42 in. w.g. on low-pressure models (CER-LP-R-II). Registers shall be provided as an assembly consisting of an all-aluminum grille and UL2043 classified and labeled airflow regulator. All Constant Exhaust Registers will require no maintenance and must be warranted for a period of no less than five years. Constant Exhaust Registers shall be installed in tight ducting systems in accordance with all applicable codes and manufacturer's instructions.

108 REQUIRED @ 6X6 W/ 4" OUTLET

AIRFLOW & ZONE CONTROLS

CER-R-II

Constant Exhaust Register for Round Ducting

PRODUCT SPECIFICATIONS & TECHNICAL DATA

CER-R-II Sleeve Assembly

Aluminum Exhaust/ Return Air Grille

GENERAL

Model CER-R-II Constant Exhaust Register incorporates a modulating orifice that automatically regulates airflows in duct systems to constant levels. The passive control element in the CER-R-II responds to duct pressure and requires no electric or pneumatic sensors or controls.

The CER-R-II compensates for changes in duct pressure caused by thermal stack effect, building pressure, dust-clogged filters, etc. The CER-R-II also eliminates the need for on-site balancing in exhaust and return air duct systems.

The active control element of the CER-R-II is a unique aerofoil (CAR-II). Using Bernoulli's Principle, the aero-wing damper lifts in response to increasing static pressure. This operation regulates the free-area opening through the control, resulting in maintenance of velocity and specific airflow set points. Each CAR-II is designed and produced for control of air in temperatures ranging from -25° to 140°F (-32° to 60°C.)

CONSTRUCTION

The CER-R-II grille face is constructed of heavy-gauge extruded aluminum to prevent rusting in moist environments such as bathrooms, showers, etc. The CAR-II regulating element is integral to the grille, and it is secured in an air-tight mounting plate. The entire assembly is designed to be attached directly to round ducting.

PERFORMANCE

The CAR-II controls airflow accurately to within 10% of rated flow (15% for units 50 CFM or less) throughout the target operating pressure range of 0.2 to 0.8 in. w.g. (50 to 200 Pa). Each CAR-II is factory tested and calibrated to the rated set point before shipping. Each CAR-II is available in multiple factory-calibrated set points (see performance curves).

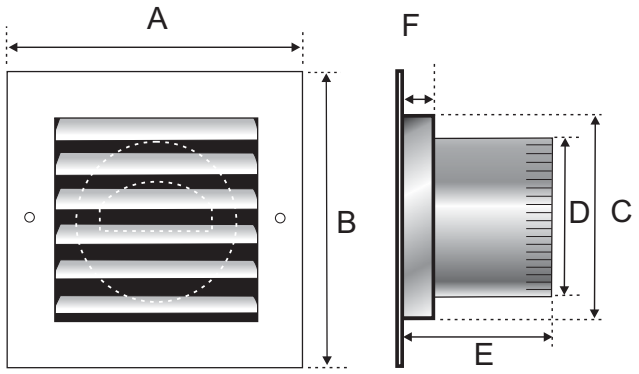
MAINTENANCE

The CAR-II needs no maintenance when used in normal conditions. There is no risk of dust deposit or obstruction because the CAR-II has no airways subject to clogging.

WARRANTY

Guaranteed for five years, from date of shipment, against all defects in material or workmanship, provided that the material has been installed and utilized under normal conditions. This warranty is limited to the repair or replacement of the material.

CER-R-II Dimensions



FRONT **SIDE**

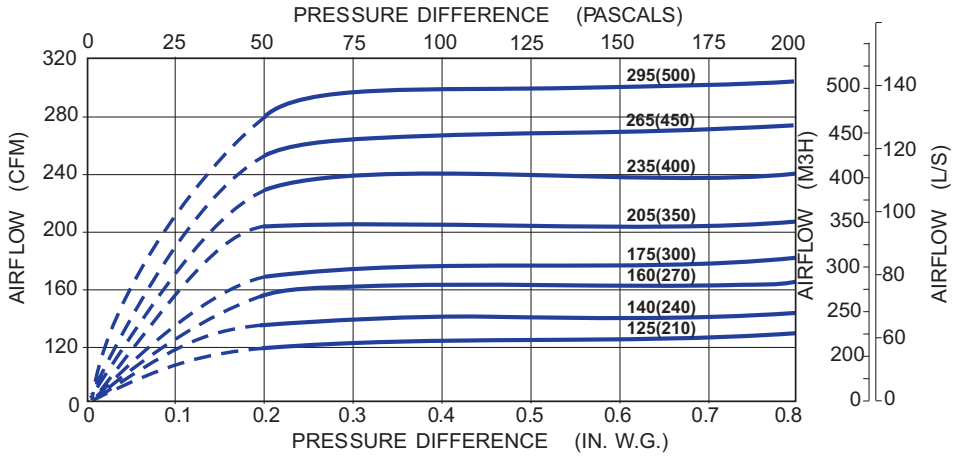
PART NUMBER	SIZE* (NOMINAL)	REGULATOR (NOMINAL)	A	B	C	D	E	F
18 622	6″ x 6″	4″	7.5″	7.5″	5.6″	3.9″	4.5″	1.6″
18 623	6″ x 6″	5″	7.5″	7.5″	5.6″	4.9″	5.6″	1.6″
18 625	8″ x 8″	4″	9.5″	9.5″	7.6″	3.9″	4.5″	1.6″
18 626	8″ x 8″	5″	9.5″	9.5″	7.6″	4.9″	5.6″	1.6″
18 627	8″ x 8″	6″	9.5″	9.5″	7.6″	5.8″	5.6″	1.6″
18 629	10″ x 10″	4″	11.5″	11.5″	9.6″	3.9″	4.5″	1.6″
18 630	10″ x 10″	5″	11.5″	11.5″	9.6″	4.9″	5.6″	1.6″
18 631	10″ x 10″	6″	11.5″	11.5″	9.6″	5.8″	5.6″	1.6″
18 632	10″ x 10″	8″	11.5″	11.5″	9.6″	7.8″	5.6″	1.6″
18 634	12″ x 12″	4″	13.5″	13.5″	11.6″	3.9″	4.5″	1.6″
18 635	12″ x 12″	5″	13.5″	13.5″	11.6″	4.9″	5.6″	1.6″
18 636	12″ x 12″	6″	13.5″	13.5″	11.6″	5.8″	5.6″	1.6″
18 637	12″ x 12″	8″	13.5″	13.5″	11.6″	7.8″	5.6″	1.6″
18 638	12″ x 12″	10″	13.5″	13.5″	11.6″	9.7″	5.9″	1.6″

*Standard grille sizes shown. Contact factory for custom sizes.

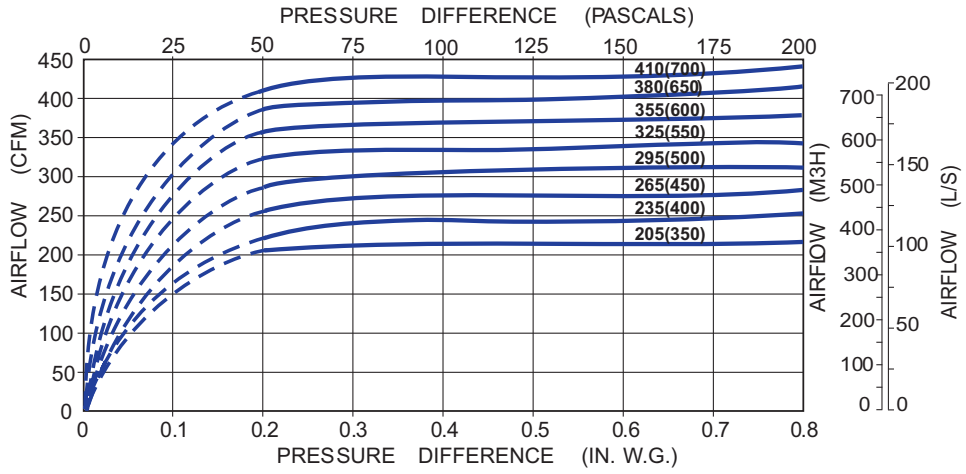
CSR-R-II Airflow Performance Data

Performance charts reflect airflow measurements taken at 68°F (20°C) at 1 atmosphere pressure. The CSR-R-II is designed for system pressures between 0.2 and 0.8 in. w.g. Models are also available for applications with system pressures between 0.1 and 0.42 in. w.g (CSR-LP-R-II).

8" DIAMETER (200 mm) REGULATING ELEMENT



10" DIAMETER (250 mm) REGULATING ELEMENT



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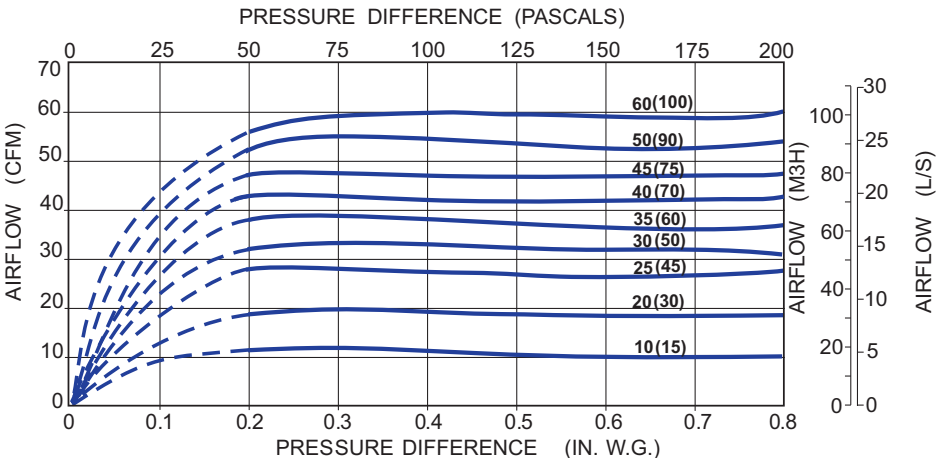
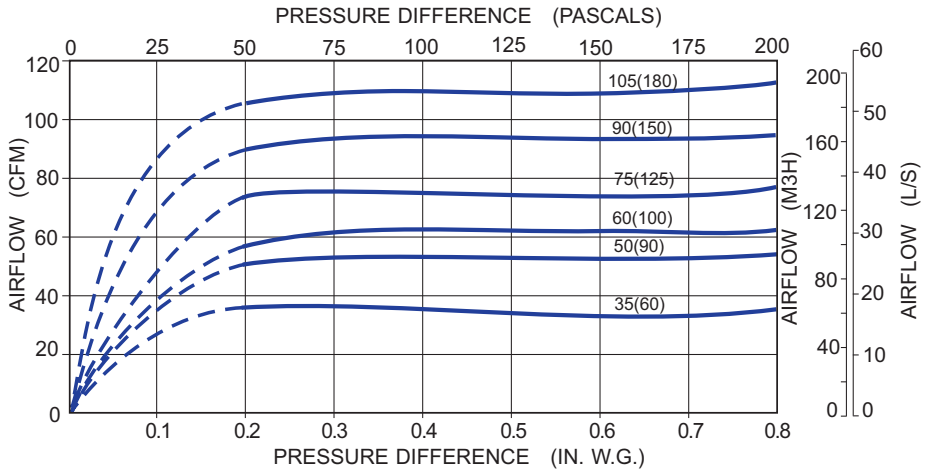
CSR-R-II Airflow Performance Data

Performance charts reflect airflow measurements taken at 68°F (20°C) at 1 atmosphere pressure. The CSR-R-II is designed for system pressures between 0.2 and 0.8 in. w.g. Models are also available for applications with system pressures between 0.1 and 0.42 in. w.g (CSR-LP-R-II).

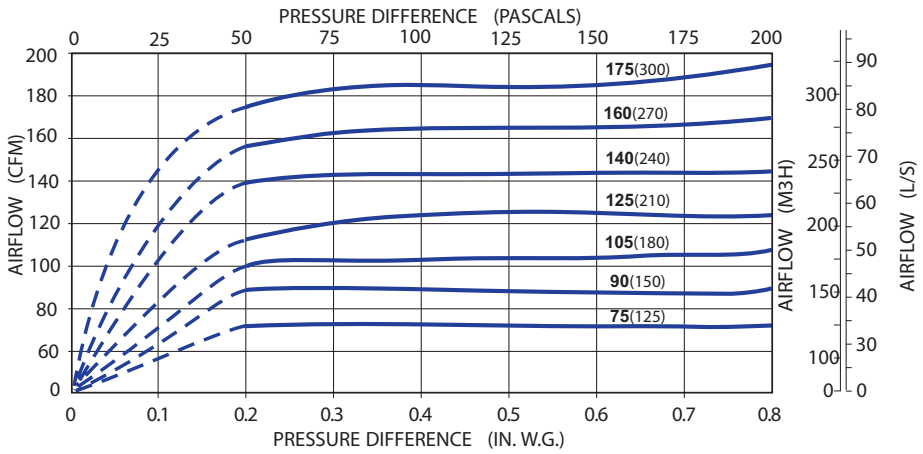
4" DIAMETER (100 mm) REGULATING ELEMENT



5" DIAMETER (125 mm) REGULATING ELEMENT

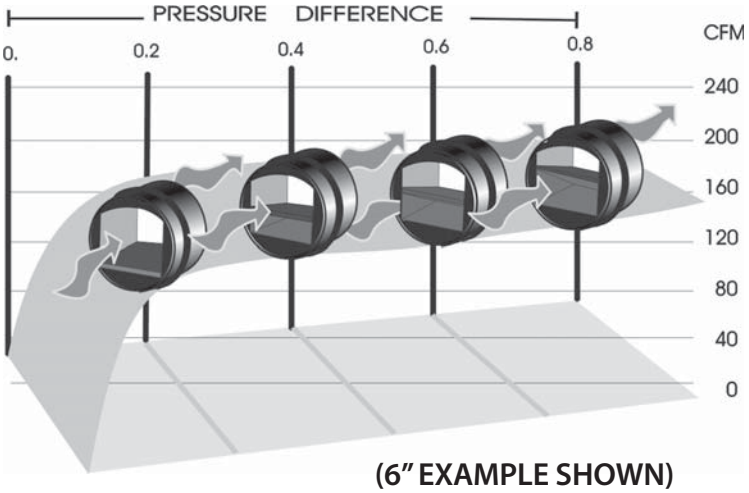


6" DIAMETER (150 mm) REGULATING ELEMENT



How the CAR-II Works

Constant airflow is achieved by controlling the free area through the device. At minimum static pressure, the aero-wing is parallel to the air stream. As the static pressure increases, the aero-wing lifts, reducing the amount of free area through the regulator. At the same time, higher static pressure increases the air velocity resulting in CONSTANT AIRFLOW. This occurs regardless of pressure differences in the range of 0.2 to 0.8 in. w.g. (50 to 200 Pa). The air velocity in the duct is in the range of 60 to 700 ft/min. (0.3 to 3.5 m/s).



(6" EXAMPLE SHOWN)

Typical CSR-R-II Applications

- **Supply air systems.**
- **Balancing supply airflows in high-rise building duct risers.**
- **Regulated air supply in nursing homes, hotels, motels, dormitories, apartment buildings, offices, etc.**

Typical Specification

Model CSR-R-II Constant Supply Registers by American ALDES Ventilation Corporation, Bradenton, Florida, shall solely operate on duct pressure and require no external power supply. Each register shall be pre-set and factory calibrated, requiring no field adjustment to the airflows as indicated on the schedule, and shall be rated for use in air temperatures ranging from -25° to 140°F (-32° to 60°C.)

Constant Supply Registers shall be capable of maintaining constant airflow within +/- 10% of scheduled flow rates (15% for units 50 CFM or less), within the operating range of 0.2 to 0.8 in. w.g. differential pressure, or 0.1 to 0.42 in. w.g. on low-pressure models (CSR-LP-R-II). Registers shall be provided as an assembly consisting of an all-aluminum single-deflection grille and UL2043 classified and labeled airflow regulator. All Constant Supply Registers will require no maintenance and must be warranted for a period of no less than five years. Constant Supply Registers shall be installed in tight ducting systems in accordance with all applicable codes and manufacturer's instructions.