



Commercial
Grilles, Registers & Diffusers
Edition 11

Table of Contents



LIGHT COMMERCIAL

		Product Information	Engineering Data
REGISTERS & GRILLES—STEEL			
800 Series	Curved Blade Steel One Through Four-Way	5	
821	Vertical Single Deflection, w/MS	6	77
831	Horizontal Single Deflection, w/MS	6	77
92HVO	Double Deflection Horizontal Face	7	77
92HVV	Double Deflection Horizontal Face, w/OB	7	77
92VHO	Double Deflection Vertical Face	8	77
92VHV	Double Deflection Vertical Face, w/OB	8	77
94HOV	Return Horizontal, w/OB	9	79
94A	Return Horizontal Deflected	9	79
94AHOV	Return Horizontal Deflected, w/OB	10	79
96AFB	Steel Fixed-Bar Filter Grille	10	79
92OOV	Opposed-Blade Damper	11	
PFG	Steel Perforated Face Grille	11	79
REGISTERS & GRILLES—ALUMINUM			
HX	Horizontal Single Deflection	12	80
HD	Horizontal Single Deflection, w/OB	12	80
HM	Horizontal Single Deflection, w/MS	13	80
HV	Double Deflection Horizontal Face	13	80
HVD	Double Deflection Horizontal Face, w/OB	14	80
VX	Vertical Single Deflection	14	80
VD	Vertical Single Deflection, w/OB	15	80
VM	Vertical Single Deflection, w/MS	15	80
VH	Double Deflection Vertical Face	16	80
VHD	Double Deflection Vertical Face, w/OB	16	80
CH1	Curved Blade One-Way Horizontal	17	82
CHD1	Curved Blade One-Way Horizontal, w/OB	17	82
CHM1	Curved Blade One-Way Horizontal, w/MS	17	82
CH2	Curved Blade Two-Way Horizontal	18	82
CHD2	Curved Blade Two-Way Horizontal, w/OB	18	82
CHM2	Curved Blade Two-Way Horizontal, w/MS	18	82
C3	Curved Blade Three-Way Horizontal	19	83
CD3	Curved Blade Three-Way Horizontal, w/OB	19	83
CM3	Curved Blade Three-Way Horizontal, w/MS	19	83
C4	Curved Blade Four-Way Horizontal	20	83
CD4	Curved Blade Four-Way Horizontal, w/OB	20	83
CM4	Curved Blade Four-Way Horizontal, w/MS	20	83
CH2CL	Two-Way Corner, Down and Left	21	82
CH2CR	Two-Way Corner, Down and Right	21	82
RCB/RCBD	Curved Blade Return , w/OB	22	84
RCBF	Curved Blade Filter Grille	22	84
RE5	1/2" Grid Core Return	23	85
RED5	1/2" Grid Core Return, w/OB	23	85
REF5	1/2" Grid Filter Grille	24	85
ER45	Extruded Aluminum Return Air Grille	24	
RH45	Fixed Horizontal Deflected	25	84
RHD45	Fixed Horizontal Deflected, w/OB	25	84
RHF45	Fixed Horizontal Deflected Filter Grille	25	84
RH90	Fixed Horizontal Return Grille	26	85
RHD90	Fixed Horizontal Return Grille, w/OB	26	85
TG/TGF	Transfer Grille and Frame	27	86

Table of Contents

LIGHT COMMERCIAL

Product Information Engineering Data
CEILING DIFFUSERS—STEEL

20	Round Adjustable	28	86
19	Round OB Damper	28	
24	Steel Square (Ceiling) Diffuser	29	86
21	Steel Square Mounting Frame	29	
22	Steel Butterfly Damper with Mounting Frame	29	
23	Steel Opposed Blade Damper	29	
SRE	Directional, Flat Frame	30	87
SR7	OB Damper	30	
SR/AR	Air Patterns and Listed Sizes	33	

CEILING DIFFUSERS—ALUMINUM

ARE	Directional, Flat Frame	31	87
ARF	Directional, Flush Frame	31	87
ARS	Directional, Step Frame	32	87
AR6	Control Grid	32	
AR7	OB Damper	32	
SR/AR	Air Patterns and Listed Sizes	33	
ASRE	Supply/Return, Flat Frame	34	93
ASRS	Supply/Return, Step Frame	34	93
MCD	Modular Diffuser, Flat Frame	35	95
MCDD	Modular Diffuser with OBD, Flat Frame	35	95
MCDS	Modular Diffuser, Step Frame	35	95
MCDS	Modular Diffuser with OBD, Step Frame	36	95
MCDS	T-Bar Panel	36	95

SPIRAL DIFFUSERS

SV	Single-Deflection Diffuser	37	99
SVH	Double-Deflection Diffuser	37	99
USV	Single-Deflection Universal Diffuser	37	99
USVH	Double-Deflection Universal Diffuser	38	99
SS	Linear Face Diffuser	38	97

LINEAR & SLOT DIFFUSERS

	L Series	39	100
	S Series	42	102
DP	Distribution Plenum	46	

LOUVERS

DL	Drum Louver	47	106
BV	Brick/Block Vents	48	
4ABC	Adjustable Louver	49	108
1530	Stationary Louvers	49	108
1545	Stationary Louvers	49	108
245	Stationary Louvers	50	108
445	Stationary Louvers	50	108
645	Stationary Louvers	50	108

T-BAR CONSTRUCTION FEATURES	51
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T-BAR GRILLES & DIFFUSERS

		Product Information	Engineering Data
T-BAR RETURN AIR FILTER GRILLES			
659T	Steel—Lanced Face	52	112
659TI	Steel—Lanced Face with Fiberglass Back	52	112
673T	Steel—Filter Grille	52	
673TI	Steel - Filter Grille with Fiberglass Back.....	52	
673TPI R6	Steel—Filter Grille with Steel Plenum, R6 Insulation	53	112
	Molded Fiberglass Back Features	53	
96AFBT	Steel—Fixed-Bar Face.....	53	112
96AFBTI	Steel—Fixed-Bar Face with Fiberglass Back.....	54	112
RHF45T	Extruded Aluminum—Fixed Bar Face.....	54	112
RCBFT	Extruded Aluminum—Curved Blade Face	54	
REF5T	Extruded Aluminum—½" Core Grid Face.....	55	112
REF5TI	Extruded Aluminum—½" Core Grid Face with Insulation.....	55	112
PFT	Steel—Perforated Face	55	112
PFTI	Steel—Perforated Face with Fiberglass Back	55	112
T-BAR RETURN AIR GRILLES			
94AT	Steel—Fixed-Bar Face.....	56	112
RH45T	Extruded Aluminum—Fixed-Bar Face.....	56	112
RCBT	Extruded Aluminum—Curved-Blade Face	56	
RE5T	Extruded Aluminum—½" Core Grid Face.....	57	112
RE5TI	Extruded Aluminum—½" Core Grid Face with Fiberglass Back.....	57	112
T-BAR SURFAIRE/RENOVATOR DIFFUSER			
444, 441-445	Aluminum—One-Piece Stamped Face	58	112
REN4	Aluminum—One-Piece Stamped Face with Fiberglass Back	58	113
REZZIN™ DIFFUSERS			
4-Way T-Bar	Rezzin™ Plastic T-Bar Directional Diffuser	59	109
Mod Core	Rezzin™ Plastic T-Bar Modular Core Diffuser	59	109
Back Panel	Rezzin™ Plastic Back Panel	59	
Sq to Rd	Rezzin™ Plastic Square-to-Round Back Panel	59	
RZ-Square	Rezzin™ Plastic Square Ceiling Diffuser	60	111
RZ-Round	Rezzin™ Plastic Round Ceiling Diffuser	60	111
Egg Crate	Rezzin™ Plastic T-Bar Egg Crate Filter Grille	57	112
T-BAR FIXED-PATTERN DIFFUSER			
HVS	Steel—Square Three-Core Face with Insulation Options.....	61	113
FPD	Steel—Square Two-Core Face, Fixed. Collar, R6 Insulation Option	61	113
AFPD	Aluminum—Square Two-Core Face, Fixed Collar, R6 Insulation Option.....	61	113
FPD12	Steel—Square Two-Core Face, Fixed Collar for 1 x 1 Tbar	62	116
FPD3	Steel—Square Three-Core Face, Fixed Collar, R6 Insulation Option.....	62	113
DPD	Steel—Detachable Plate Diffuser, Fixed Collar, R6 Insulation Option	63	113
ADPD	Aluminum—Detachable Plate Diffuser, Fixed Collar	63	113
DPD12	Steel—Detachable Plate Diffuser for 1' x 1'	63	116
T-BAR PERFORATED SUPPLY/RETURN			
RENPS	Steel—Perforated Face with Deflector, R6 Insulation Option.....	64	113
ARENPS	Aluminum—Perforated Face with Fiberglass Back	64	113
RENPS	Steel—Perforated Face	64	114
CBPS	Steel—Perforated Face with Curved Blade Deflection	65	115
CBPR	Steel—Perforated Face	65	116

Table of Contents

T-BAR GRILLES & DIFFUSERS

		Product Information	Engineering Data
SBP	Steel—Perforated Face Shallow Back	65	114
PDS	Steel—Perforated Face with Fixed Deflector	66	113
PDS D	Steel—Perforated Face with Adjustable Deflector	66	113
PDR	Steel—Perforated Face	67	114
PD	Perforated Face Only	67	114

T-BAR DIRECTIONAL/MODULAR DIFFUSER

ART	Extruded Aluminum—Square Neck	68	87
MCDST	Extruded Aluminum—Curved-Blade Face	68	95
MCDSDT	Extruded Aluminum—Curved-Blade Face with Damper	69	95
A500P	Steel—Panel Extruded Aluminum Face	70	

T-BAR ACCESSORIES

6400	Tab Collar	71
5400	Snap-In Collar Ring	71
5400PP	Push Pins	71
3800	Adjustable Butterfly Damper	71
T19	Steel—Multi-Blade Damper	72
RD	Radial Blade Damper	72
SMF	Extruded Aluminum—Surface Mount Frame	72
P Panel	Filler Panel	73

MISCELLANEOUS

AD	Damper	73
DT	Air Diverter	73
FT	Flexiturn	74
APF	Aluminum Plaster Frame	74

ENGINEERING DATA

Engineering Data	75
Steel Screw Hole Chart	117
Extruded Aluminum Screw Hole Chart	118
Suggested Specifications	121
Glossary of Terms	122
Alpha-Numeric Index	123

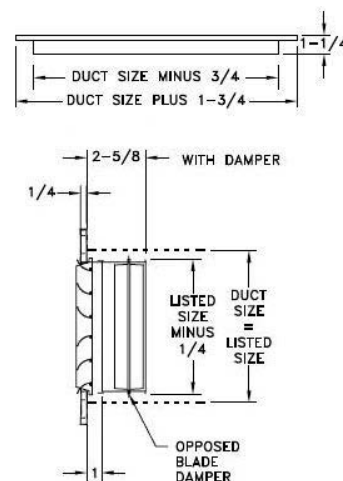
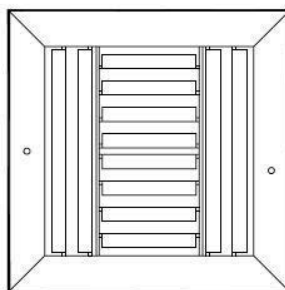


800 Series

- Steel construction
- Curved Blade design
- 1 - 4-way or 2-way corner air diffusion
- Available with or without damper
- Damper options: Multi-Shutter or Opposed Blade
- Individually adjustable bars for easy positive setting
- Opposed Blade damper is screwdriver operated
- Bright White finish

800 Series Available Sizes (in.)																
HT	WIDTH															
	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
32	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
34	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
36	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

X Available in one-way and 2-way only



- 811 one-way no damper
- 811MS one-way with multi-shutter damper
- 811OB one-way with opposed blade damper

- 812 two-way no damper
- 812MS two-way with multi-shutter damper
- 812OB two-way with opposed blade damper

- 812C two-way corner no damper
- 812CMS two-way corner with multi-shutter damper
- 812COB two-way corner with opposed blade damper

- 813 three-way no damper
- 813MS three-way with multi-shutter damper
- 813OB three-way with opposed blade damper

- 814 four-way no damper
- 814MS four-way with multi-shutter damper
- 814OB four-way with opposed blade damper

Registers & Grilles - Steel

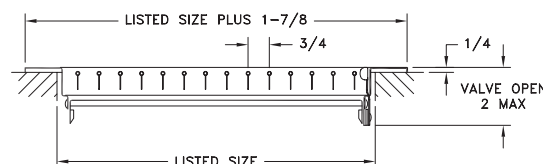


821

- All-steel construction
- Vertical adjustable face bars
- Horizontal multi-shutter valve
- Bright White finish

821 Available Sizes (in.)											
HT	WIDTH										
	6	8	10	12	14	16	18	20	24	30	36
4	X	X	X	X	X	X	X	X	X	X	
5			X	X	X						
6	X	X	X	X	X	X	X	X	X	X	X
8		X	X	X	X	X	X	X	X	X	X
10			X	X	X	X	X	X	X	X	X
12				X	X	X	X	X	X	X	X
14					X	X	X	X	X	X	X
16						X	X	X	X	X	
18							X	X	X	X	
20								X			
24									X		

Note: Screw hole location details on page 119

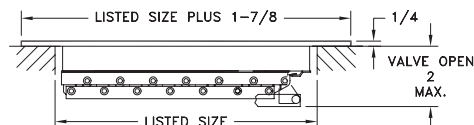


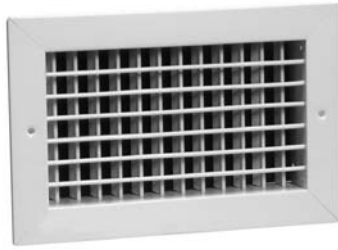
831

- All-steel construction
- Horizontal adjustable face bars
- Vertical valve
- Adjustable multi-shutter valve
- Bright White finish
- 3/4" fin spacing

831 Available Sizes (in.)											
HT	WIDTH										
	8	10	12	14	16	20	24	30	32	36	
4	X	X	X	X							
6	X	X	X	X	X	X	X	X			
8		X	X	X	X	X	X	X			
10			X			X	X				
12							X			X	
14						X			X		

Note: Screw hole location details on page 119

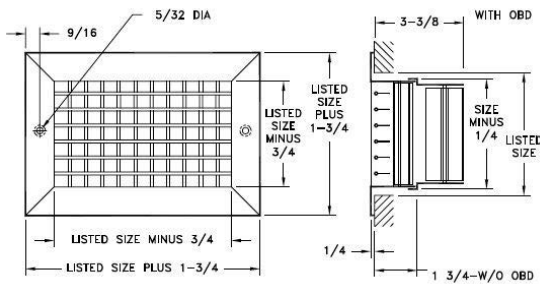




92HVO Register

- All-steel construction
- Adjustable face bars may be set to any desired deflection
- Horizontal front bars
- Vertical second bars
- Larger sizes available in multiple-piece construction
- Bright White finish

Note: Screw hole location details on page 119



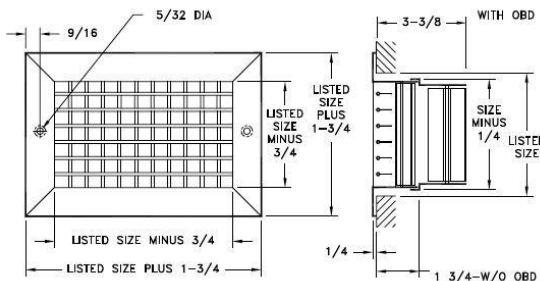
92HVO Available Sizes (in.)																	
HT	WIDTH																
	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12				X	X	X	X	X	X	X	X	X	X	X	X	X	
14					X	X	X	X	X	X	X	X	X	X	X	X	
16						X	X	X	X	X	X	X	X	X	X	X	
18							X	X	X	X	X	X	X	X	X	X	
20								X	X	X	X	X	X	X	X	X	
22									X	X	X	X	X	X	X	X	
24										X	X	X	X	X	X	X	
26											X	X	X	X	X	X	
28												X	X	X	X	X	
30													X	X	X	X	
32														X	X	X	
34															X	X	
36																X	



92HVV Register

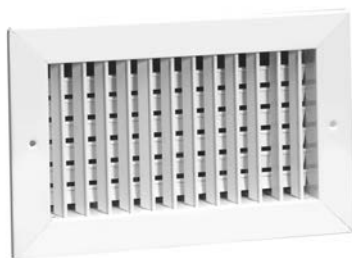
- All-steel construction
- Horizontal front bars
- Vertical second bars
- Opposed-blade damper
- Adjustable face bars may be set to any desired deflection
- Larger sizes available in multiple-piece construction
- Bright White finish

Note: Screw hole location details on page 119



		92HVV Available Sizes (in.)																
HT	WIDTH																	
	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36		
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X		
12				X	X	X	X	X	X	X	X	X	X	X	X	X		
14					X	X	X	X	X	X	X	X	X	X	X	X		
16						X	X	X	X	X	X	X	X	X	X	X		
18							X	X	X	X	X	X	X	X	X	X		
20								X	X	X	X	X	X	X	X	X		
22									X	X	X	X	X	X	X	X		
24										X	X	X	X	X	X	X		
26											X	X	X	X	X	X		
28												X	X	X	X	X		
30													X	X	X	X		
32														X	X	X		
34															X	X		
36																X		

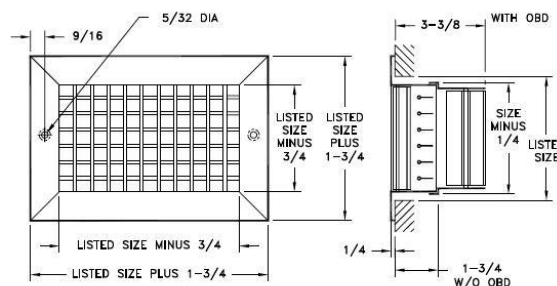
Registers & Grilles - Steel



92VHO Register

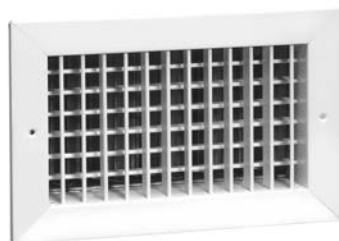
- All-steel construction
- Vertical front bars
- Horizontal second bars
- Adjustable face bars may be set to any desired deflection
- Larger sizes available in multiple-piece construction
- Bright White finish

Note: Screw hole location details on page 119



92VHO Available Sizes (in.)

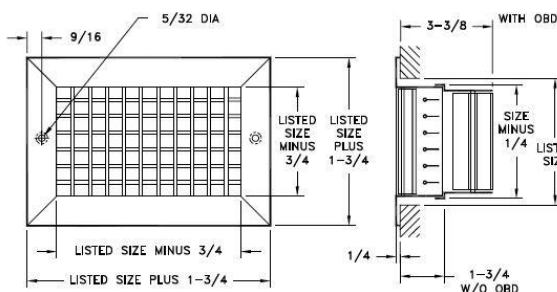
HT	WIDTH															
	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X
12				X	X	X	X	X	X	X	X	X	X	X	X	X
14					X	X	X	X	X	X	X	X	X	X	X	X
16						X	X	X	X	X	X	X	X	X	X	X
18							X	X	X	X	X	X	X	X	X	X
20								X	X	X	X	X	X	X	X	X
22									X	X	X	X	X	X	X	X
24										X	X	X	X	X	X	X
26											X	X	X	X	X	X
28												X	X	X	X	X
30													X	X	X	X
32														X	X	X
34															X	X
36																X



92VHV Register

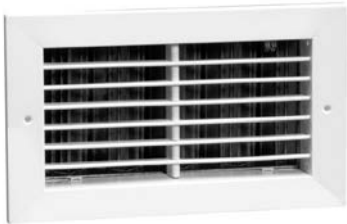
- All-steel construction
- Vertical front bars
- Horizontal second bars
- Adjustable face bars may be set to any desired deflection
- Opposed-blade damper
- Larger sizes available in multiple-piece construction
- Bright White finish

Note: Screw hole location details on page 119



92VHV Available Sizes (in.)

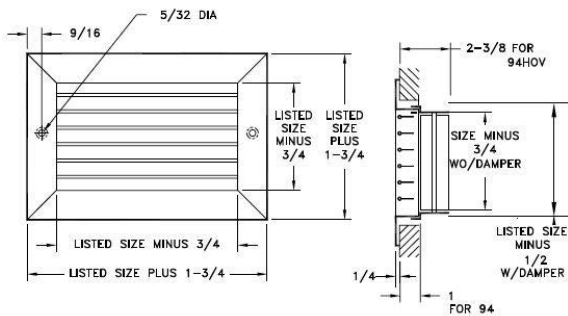
HT	WIDTH															
	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X
12				X	X	X	X	X	X	X	X	X	X	X	X	X
14					X	X	X	X	X	X	X	X	X	X	X	X
16						X	X	X	X	X	X	X	X	X	X	X
18							X	X	X	X	X	X	X	X	X	X
20								X	X	X	X	X	X	X	X	X
22									X	X	X	X	X	X	X	X
24										X	X	X	X	X	X	X
26											X	X	X	X	X	X
28												X	X	X	X	X
30													X	X	X	X
32														X	X	X
34															X	X
36																X



94HOV Register

- All-steel construction
- Horizontal face bars set straight
- Face bars permanently fixed into a heavy steel frame at 90-degree angle from face
- Opposed-blade damper
- Larger sizes available in multiple-piece construction
- Bright White finish

Note: Screw hole location details on page 119

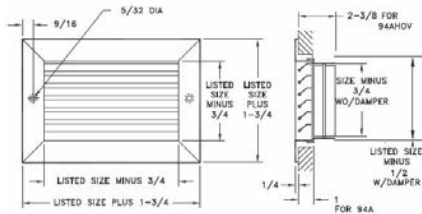


		94HOV Available Sizes (in.)															
HT		WIDTH															
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
4		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10				X	X	X	X	X	X	X	X	X	X	X	X	X	X
12					X	X	X	X	X	X	X	X	X	X	X	X	X
14						X	X	X	X	X	X	X	X	X	X	X	X
16							X	X	X	X	X	X	X	X	X	X	X
18								X	X	X	X	X	X	X	X	X	X
20									X	X	X	X	X	X	X	X	X
22										X	X	X	X	X	X	X	X
24											X	X	X	X	X	X	X
26												X	X	X	X	X	X
28													X	X	X	X	X
30														X	X	X	X
32															X	X	X
34																X	X
36																	X



94A Grille (No Damper)

- All-steel construction
- 3/4" spaced fins set at 35°, horizontal face bars set at 35°
- Larger sizes available in multiple-piece construction
- Also available as 94AT T-Bar Return Grille (see page 57)
- Bright White finish



		94A Available Sizes (in.)															
HT		WIDTH															
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
4		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10				X	X	X	X	X	X	X	X	X	X	X	X	X	X
12					X	X	X	X	X	X	X	X	X	X	X	X	X
14						X	X	X	X	X	X	X	X	X	X	X	X
16							X	X	X	X	X	X	X	X	X	X	X
18								X	X	X	X	X	X	X	X	X	X
20									X	X	X	X	X	X	X	X	X
22										X	X	X	X	X	X	X	X
24											X	X	X	X	X	X	X
26												X	X	X	X	X	X
28													X	X	X	X	X
30														X	X	X	X
32															X	X	X
34																X	X
36																	X

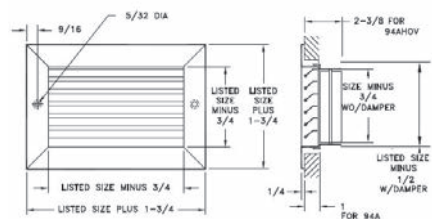
Note: Screw hole location details on page 119

Registers & Grilles - Steel



94AHOV Register

- All-steel construction
- 3/4" spaced fins set at 35°, horizontal face bars set at 35°
- Opposed-blade damper
- Larger sizes available in multiple-piece construction
- Bright White finish



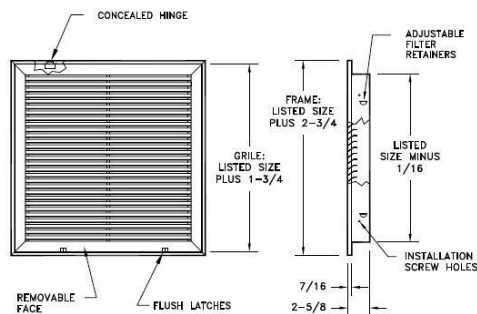
		94AHOV Available Sizes (in.)																
HT	WIDTH																	
	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36		
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X		
12				X	X	X	X	X	X	X	X	X	X	X	X	X		
14					X	X	X	X	X	X	X	X	X	X	X	X		
16						X	X	X	X	X	X	X	X	X	X	X		
18							X	X	X	X	X	X	X	X	X	X		
20								X	X	X	X	X	X	X	X	X		
22									X	X	X	X	X	X	X	X		
24										X	X	X	X	X	X	X		
26											X	X	X	X	X	X		
28												X	X	X	X	X		
30													X	X	X	X		
32														X	X	X		
34															X	X		
36																X		

Note: Screw hole location details on page 119



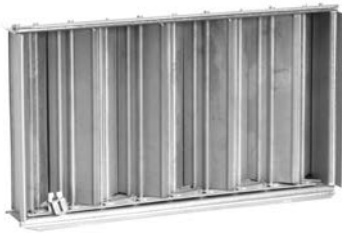
96AFB Fixed-Bar Filter Grille

- Steel construction
- Simplifies contractor installation
- Flush, removable face with concealed hinges
- Uses nominal 1" thick disposable filters (not included)



- 96AFB2 uses 2" thick disposable filters and is available by special order
- Equipped with adjustable filter retainers
- 3/4" spaced fins set at 35°
- Also available as 96AFBT T-Bar Fixed Bar Filter Grille (see page 54)
- Bright White finish

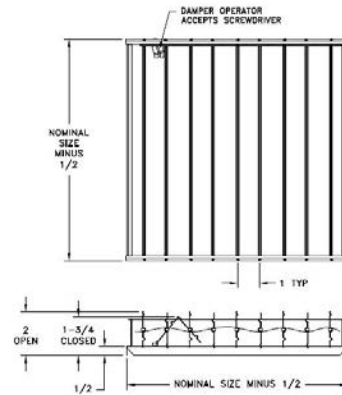
		96AFB Standard Sizes (in.)									
HT		WIDTH									
		10	12	14	16	18	20	24	25	30	36
10							X	X		X	
12			X				X	X	X	X	
14				X			X	X	X	X	
16					X		X	X	X		
18						X	X	X	X	X	
20	X	X	X	X	X		X	X	X	X	
24		X	X			X		X		X	X
25			X	X			X		X		
30			X				X	X		X	X
36											X



9200V Damper

- Steel construction
- Opposed-blade damper
- Controls the air volume from full flow to shut-off
- Mill finish
- For use with:
 - 92
 - 94
 - RE5
 - PFG

9200V Available Sizes (in.)
Minimum: 6" x 4"
Maximum: 24" x 24" One Piece

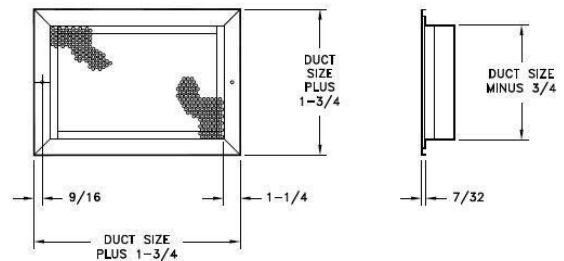
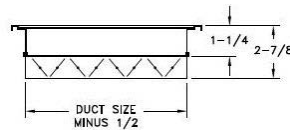


PFG Perforated Face Grille

- All steel construction
- Perforated face
- Optional opposed blade damper
- Optional T-Bar lay-in frames
- Bright white finish

PFG Available Sizes (in.)
Minimum: 6" x 4"
Maximum: 48" x 48" One Piece

Note: Screw hole location details on page 119

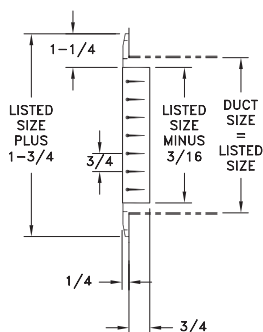




HX Grille

- Extruded aluminum construction
- Horizontal front bars
- Single row of individually adjustable horizontal face bars
- Pivoted bars for easy positive setting
- Bright White or Satin Anodized finish

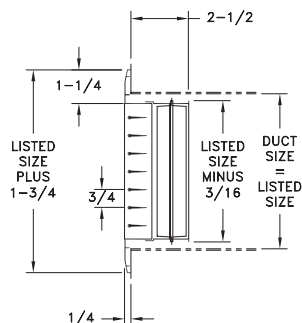
Note: Screw hole location details on page 120

[illegible]

HD Register

- Extruded aluminum construction
- Single row of individually adjustable horizontal face bars
- Pivoted bars for easy positive setting
- Opposed-blade damper
- Bright White or Satin Anodized finish

Note: Screw hole location details on page 120

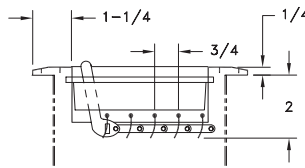
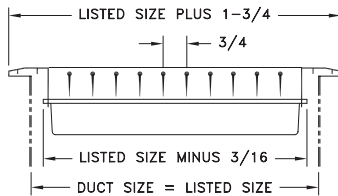
[illegible]



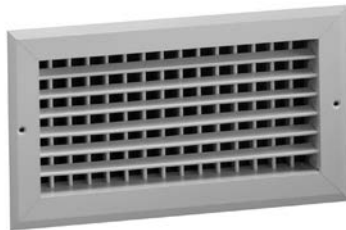
HM Register

- Extruded aluminum construction
- Single row of individually adjustable horizontal face bars
- Pivoted bars for easy positive setting
- Lever-operated, multi-shutter valve
- Bright White or Satin Anodized finish

Note: Screw hole location details on page 120



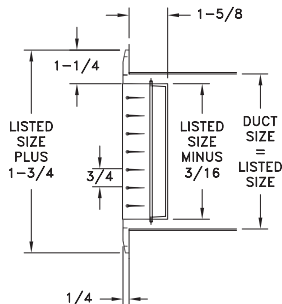
HM Available Sizes (in.)	
HT	WIDTH
4	6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36
5	X X X X X X X X X X X X X X X X
6	X X X X X X X X X X X X X X X X
8	X X X X X X X X X X X X X X X X
10	X X X X X X X X X X X X X X X X
12	X X X X X X X X X X X X X X X X
14	X X X X X X X X X X X X X X X X
16	X X X X X X X X X X X X X X X X
18	X X X X X X X X X X X X X X X X
20	X X X X X X X X X X X X X X X X
22	X X X X X X X X X X X X X X X X
24	X X X X X X X X X X X X X X X X
26	X X X X X X X X X X X X X X X X
28	X X X X X X X X X X X X X X X X
30	X X X X X X X X X X X X X X X X
32	X X X X X X X X X X X X X X X X
34	X X X X X X X X X X X X X X X X
36	X X X X X X X X X X X X X X X X



HV Register

- Extruded aluminum construction
- Horizontal front bars
- Vertical second bars
- Two rows of individually adjustable face bars for horizontal and vertical deflection
- Pivoted bars for easy positive setting
- Bright White or Satin Anodized finish

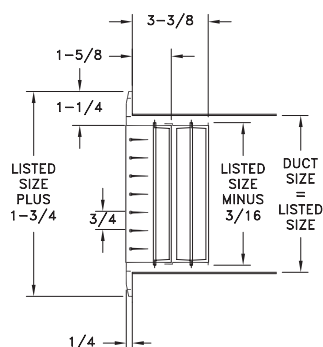
Note: Screw hole location details on page 120



HV Available Sizes (in.)	
HT	WIDTH
4	6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48
5	X X
6	X X
8	X X
10	X X
12	X X
14	X X
16	X X
18	X X
20	X X
22	X X
24	X X
26	X X
28	X X
30	X X
32	X X
34	X X
36	X X
38	X X
40	X X
42	X X
44	X X
46	X X
48	X X

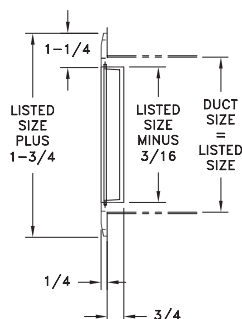


- Note: Screw hole location details on page 120**

[illegible]

- Extruded aluminum construction
- Vertical front bars
- Single row of individually adjustable face bars
- Pivoted bars for easy positive setting
- Bright White or Satin Anodized finish

Note: Screw hole location details on page 120

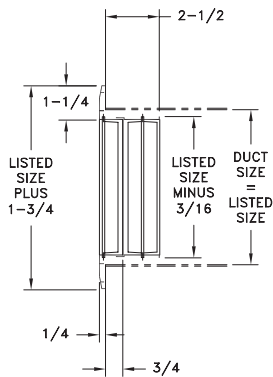
[illegible]



VD Register

- Extruded aluminum construction
- Vertical front bars
- Single row of individually adjustable face bars
- Pivoted bars for easy positive setting
- Opposed-blade damper
- Bright White or Satin Anodized finish

Note: Screw hole location details on page 120



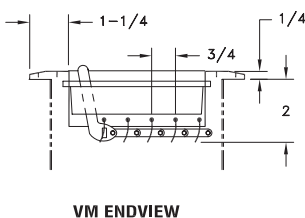
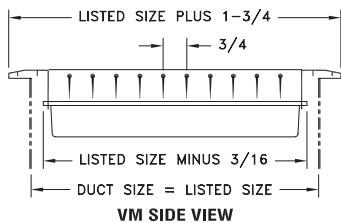
VD Available Sizes (in.)																									
HT	WIDTH																								
	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48			
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
14					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
16						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
18							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
20								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
22									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
24										X	X	X	X	X	X	X	X	X	X	X	X	X	X		
26											X	X	X	X	X	X	X	X	X	X	X	X	X		
28												X	X	X	X	X	X	X	X	X	X	X	X		
30													X	X	X	X	X	X	X	X	X	X	X		
32														X	X	X	X	X	X	X	X	X	X		
34															X	X	X	X	X	X	X	X	X		
36																X	X	X	X	X	X	X	X		
38																	X	X	X	X	X	X	X		
40																		X	X	X	X	X	X		
42																			X	X	X	X	X		
44																				X	X	X	X		
46																					X	X	X		
48																						X	X		



VM Register

- Extruded aluminum construction
- Vertical front bars
- Pivoted bars for easy positive setting
- Lever-operated, multi-shutter valve
- Single row of individually adjustable face bars
- Horizontal valve blades
- Bright White or Satin Anodized finish

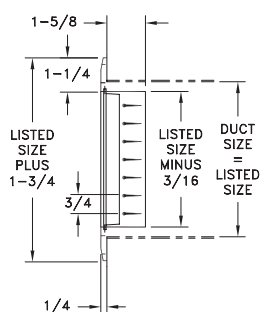
Note: Screw hole location details on page 120



		VM Available Sizes (in.)															
HT		WIDTH															
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X
14					X	X	X	X	X	X	X	X	X	X	X	X	X
16						X	X	X	X	X	X	X	X	X	X	X	X
18							X	X	X	X	X	X	X	X	X	X	X
20								X	X	X	X	X	X	X	X	X	X
22									X	X	X	X	X	X	X	X	X
24										X	X	X	X	X	X	X	X
26											X	X	X	X	X	X	X
28												X	X	X	X	X	X
30													X	X	X	X	X
32														X	X	X	X
34															X	X	X
36																X	X

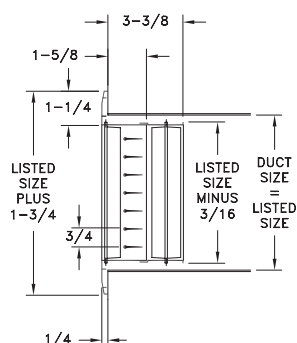


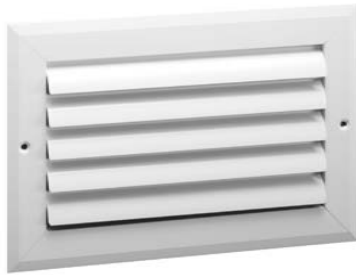
- Note: Screw hole location details on page 120**

[illegible]

- Extruded aluminum construction
- Vertical front bars
- Horizontal second bars
- Two rows of individually adjustable face bars for horizontal and vertical deflection
- Pivoted bars for easy positive setting
- Opposed-blade damper
- Bright White or Satin Anodized finish

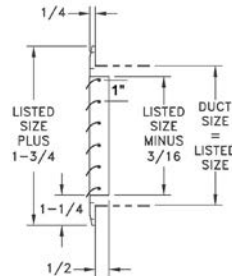
Note: Screw hole location details on page 120

[illegible]



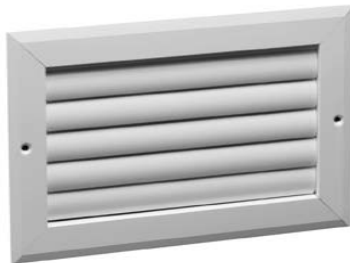
CH1 Grille

- Extruded aluminum construction
- One-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Bright White or Satin Anodized finish



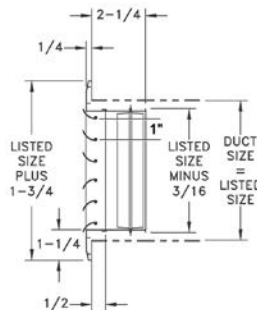
Note: Screw hole location details on page 120

		CH1 Available Sizes (in.)																
HT	WIDTH																	
	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36		
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X		
12				X	X	X	X	X	X	X	X	X	X	X	X	X		
14					X	X	X	X	X	X	X	X	X	X	X	X		
16						X	X	X	X	X	X	X	X	X	X	X		
18							X	X	X	X	X	X	X	X	X	X		
20								X	X	X	X	X	X	X	X	X		
22									X	X	X	X	X	X	X	X		
24										X	X	X	X	X	X	X		
26											X	X	X	X	X	X		
28												X	X	X	X	X		
30													X	X	X	X		
32														X	X	X		
34															X	X		
36																X		



CHD1 Register

- Extruded aluminum construction
- One-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Opposed-blade damper
- Bright White or Satin Anodized finish



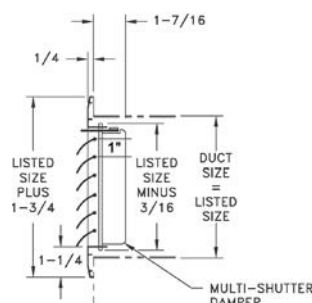
Note: Screw hole location details on page 120

		CHD1 Available Sizes (in.)																
HT		WIDTH																
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14					X	X	X	X	X	X	X	X	X	X	X	X	X	
16						X	X	X	X	X	X	X	X	X	X	X	X	
18							X	X	X	X	X	X	X	X	X	X	X	
20								X	X	X	X	X	X	X	X	X	X	
22									X	X	X	X	X	X	X	X	X	
24										X	X	X	X	X	X	X	X	
26											X	X	X	X	X	X	X	
28												X	X	X	X	X	X	
30													X	X	X	X	X	
32														X	X	X	X	
34															X	X	X	
36																X	X	



CHM1 Register

- Extruded aluminum construction
- One-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Multi-shutter valve
- Bright White or Satin Anodized finish



Note: Screw hole location details on page 120

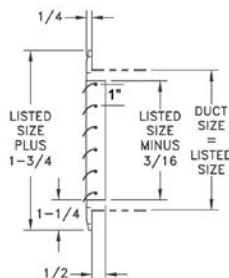
		CHM1 Available Sizes (in.)																
HT		WIDTH																
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14					X	X	X	X	X	X	X	X	X	X	X	X	X	
16						X	X	X	X	X	X	X	X	X	X	X	X	
18							X	X	X	X	X	X	X	X	X	X	X	
20								X	X	X	X	X	X	X	X	X	X	
22									X	X	X	X	X	X	X	X	X	
24										X	X	X	X	X	X	X	X	
26											X	X	X	X	X	X	X	
28												X	X	X	X	X	X	
30													X	X	X	X	X	
32														X	X	X	X	
34															X	X	X	
36																X	X	

Registers & Grilles - Aluminum



CH2 Grille

- Extruded aluminum construction
- Two-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Bright White or Satin Anodized finish



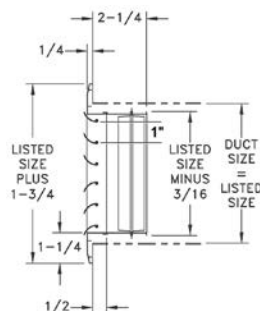
Note: Screw hole location details on page 120

		CH2 Available Sizes (in.)																		
HT		WIDTH																		
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14						X	X	X	X	X	X	X	X	X	X	X	X	X	X	
16							X	X	X	X	X	X	X	X	X	X	X	X	X	
18								X	X	X	X	X	X	X	X	X	X	X	X	
20									X	X	X	X	X	X	X	X	X	X	X	
22										X	X	X	X	X	X	X	X	X	X	
24											X	X	X	X	X	X	X	X	X	
26												X	X	X	X	X	X	X	X	
28													X	X	X	X	X	X	X	
30														X	X	X	X	X	X	
32															X	X	X	X	X	
34																X	X	X	X	
36																	X	X	X	



CHD2 Register

- Extruded aluminum construction
- Two-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Opposed-blade damper
- Bright White or Satin Anodized finish



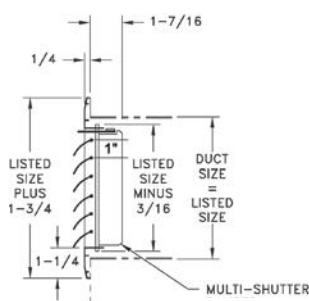
Note: Screw hole location details on page 120

		CHD2 Available Sizes (in.)																		
HT		WIDTH																		
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
16						X	X	X	X	X	X	X	X	X	X	X	X	X	X	
18							X	X	X	X	X	X	X	X	X	X	X	X	X	
20								X	X	X	X	X	X	X	X	X	X	X	X	
22									X	X	X	X	X	X	X	X	X	X	X	
24										X	X	X	X	X	X	X	X	X	X	
26											X	X	X	X	X	X	X	X	X	
28												X	X	X	X	X	X	X	X	
30													X	X	X	X	X	X	X	
32														X	X	X	X	X	X	
34															X	X	X	X	X	
36																X	X	X	X	



CHM2 Register

- Extruded aluminum construction
- Two-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Multi-shutter valve
- Bright White or Satin Anodized finish



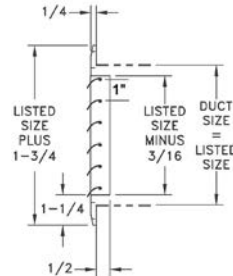
Note: Screw hole location details on page 120

		CHM2 Available Sizes (in.)																		
HT		WIDTH																		
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	
6		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14						X	X	X	X	X	X	X	X	X	X	X	X	X	X	
16							X	X	X	X	X	X	X	X	X	X	X	X	X	
18								X	X	X	X	X	X	X	X	X	X	X	X	
20									X	X	X	X	X	X	X	X	X	X	X	
22										X	X	X	X	X	X	X	X	X	X	
24											X	X	X	X	X	X	X	X	X	
26												X	X	X	X	X	X	X	X	
28													X	X	X	X	X	X	X	
30														X	X	X	X	X	X	
32															X	X	X	X	X	
34																X	X	X	X	
36																	X	X	X	



C3 Grille

- Extruded aluminum construction
- Three-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Bright White or Satin Anodized finish



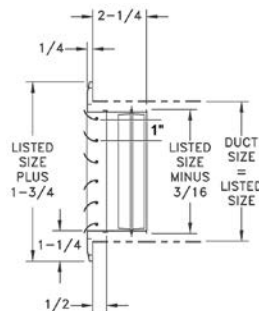
Note: Screw hole location details on page 120

		C3 Available Sizes (in.)																		
HT		WIDTH																		
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36			
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X			
14					X	X	X	X	X	X	X	X	X	X	X	X	X			
16						X	X	X	X	X	X	X	X	X	X	X	X			
18							X	X	X	X	X	X	X	X	X	X	X			
20								X	X	X	X	X	X	X	X	X	X			
22									X	X	X	X	X	X	X	X	X			
24										X	X	X	X	X	X	X	X			
26											X	X	X	X	X	X	X			
28												X	X	X	X	X	X			
30													X	X	X	X	X			
32														X	X	X	X			
34															X	X	X			
36																	X			



CD3 Register

- Extruded aluminum construction
- Three-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Opposed-blade damper
- Bright White or Satin Anodized finish



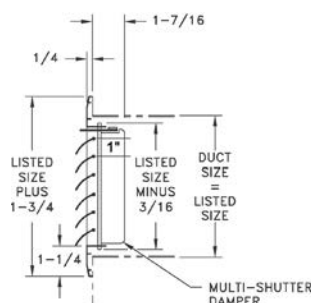
Note: Screw hole location details on page 120

		CD3 Available Sizes (in.)																
HT		WIDTH																
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14					X	X	X	X	X	X	X	X	X	X	X	X	X	
16						X	X	X	X	X	X	X	X	X	X	X	X	
18							X	X	X	X	X	X	X	X	X	X	X	
20								X	X	X	X	X	X	X	X	X	X	
22									X	X	X	X	X	X	X	X	X	
24										X	X	X	X	X	X	X	X	
26											X	X	X	X	X	X	X	
28												X	X	X	X	X	X	
30													X	X	X	X	X	
32														X	X	X	X	
34															X	X	X	
36																	X	



CM3 Register

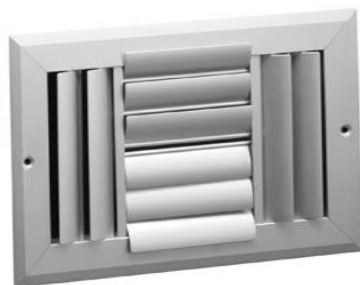
- Extruded aluminum construction
- Three-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Multi-shutter valve
- Bright White or Satin Anodized finish



Note: Screw hole location details on page 120

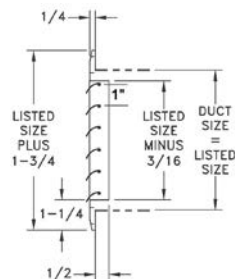
		CM3 Available Sizes (in.)																
HT		WIDTH																
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	
6		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12					X	X	X	X	X	X	X	X	X	X	X	X	X	
14						X	X	X	X	X	X	X	X	X	X	X	X	
16							X	X	X	X	X	X	X	X	X	X	X	
18								X	X	X	X	X	X	X	X	X	X	
20									X	X	X	X	X	X	X	X	X	
22										X	X	X	X	X	X	X	X	
24											X	X	X	X	X	X	X	
26												X	X	X	X	X	X	
28													X	X	X	X	X	
30														X	X	X	X	
32															X	X	X	
34																X	X	
36																	X	

Registers & Grilles - Aluminum



C4 Grille

- Extruded aluminum construction
- Four-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Bright White or Satin Anodized finish



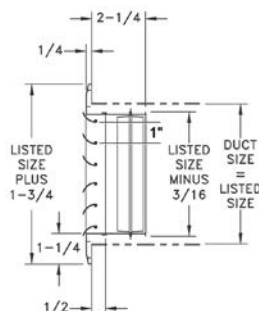
Note: Screw hole location details on page 120

		CH2 Available Sizes (in.)															
HT		WIDTH															
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X
14					X	X	X	X	X	X	X	X	X	X	X	X	X
16						X	X	X	X	X	X	X	X	X	X	X	X
18							X	X	X	X	X	X	X	X	X	X	X
20								X	X	X	X	X	X	X	X	X	X
22									X	X	X	X	X	X	X	X	X
24										X	X	X	X	X	X	X	X
26											X	X	X	X	X	X	X
28												X	X	X	X	X	X
30													X	X	X	X	X
32														X	X	X	X
34															X	X	X
36																X	X



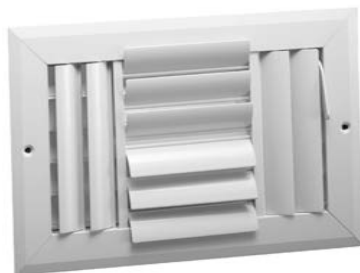
CD4 Register

- Extruded aluminum construction
- Four-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Opposed-blade damper
- Bright White or Satin Anodized finish



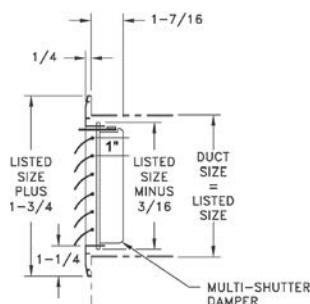
Note: Screw hole location details on page 120

		CHD2 Available Sizes (in.)															
HT		WIDTH															
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X
14					X	X	X	X	X	X	X	X	X	X	X	X	X
16						X	X	X	X	X	X	X	X	X	X	X	X
18							X	X	X	X	X	X	X	X	X	X	X
20								X	X	X	X	X	X	X	X	X	X
22									X	X	X	X	X	X	X	X	X
24										X	X	X	X	X	X	X	X
26											X	X	X	X	X	X	X
28												X	X	X	X	X	X
30													X	X	X	X	X
32														X	X	X	X
34															X	X	X
36																X	X



CM4 Register

- Extruded aluminum construction
- Four-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Multi-shutter valve
- Bright White or Satin Anodized finish



Note: Screw hole location details on page 120

		CHM2 Available Sizes (in.)															
HT		WIDTH															
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X
14					X	X	X	X	X	X	X	X	X	X	X	X	X
16						X	X	X	X	X	X	X	X	X	X	X	X
18							X	X	X	X	X	X	X	X	X	X	X
20								X	X	X	X	X	X	X	X	X	X
22									X	X	X	X	X	X	X	X	X
24										X	X	X	X	X	X	X	X
26											X	X	X	X	X	X	X
28												X	X	X	X	X	X
30													X	X	X	X	X
32														X	X	X	X
34															X	X	X
36																X	X

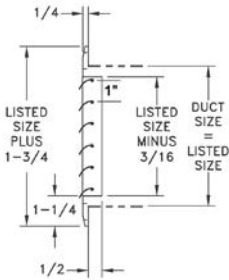


CH2CL Grille

- Extruded aluminum construction
- Two-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Bright White or Satin Anodized finish

		CH2CL Available Sizes (in.)																
HT		WIDTH																
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14					X	X	X	X	X	X	X	X	X	X	X	X	X	
16						X	X	X	X	X	X	X	X	X	X	X	X	
18							X	X	X	X	X	X	X	X	X	X	X	
20								X	X	X	X	X	X	X	X	X	X	
22									X	X	X	X	X	X	X	X	X	
24										X	X	X	X	X	X	X	X	
26											X	X	X	X	X	X	X	
28												X	X	X	X	X	X	
30													X	X	X	X	X	
32														X	X	X	X	
34															X	X	X	
36																X	X	

Note: Screw hole location details on page 120

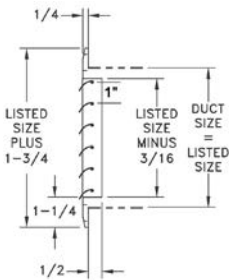


CH2CR Grille

- Extruded aluminum construction
- Two-way deflection
- Individually adjustable curved-face bars
- Pivoted bars for easy positive setting
- Bright White or Satin Anodized finish

		CH2CR Available Sizes (in.)																
HT		WIDTH																
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	
6		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12					X	X	X	X	X	X	X	X	X	X	X	X	X	
14						X	X	X	X	X	X	X	X	X	X	X	X	
16							X	X	X	X	X	X	X	X	X	X	X	
18								X	X	X	X	X	X	X	X	X	X	
20									X	X	X	X	X	X	X	X	X	
22										X	X	X	X	X	X	X	X	
24											X	X	X	X	X	X	X	
26												X	X	X	X	X	X	
28													X	X	X	X	X	
30														X	X	X	X	
32															X	X	X	
34																X	X	
36																	X	

Note: Screw hole location details on page 120



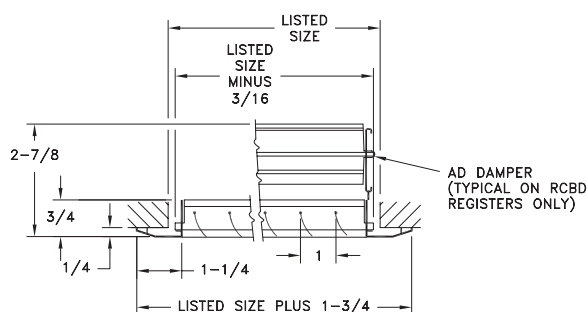
Registers & Grilles - Aluminum



Blades at 40° angle

RCB Grille RCBD Register

- Extruded aluminum construction
- Curved blades fixed on one-inch spacing
- Opposed-blade damper
- Bright White or Satin Anodized finish



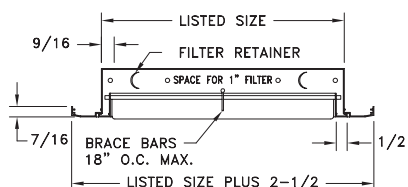
		RCB, RCBD Available Sizes (in.)																							
		WIDTH																							
HT		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48		
4		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
5		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
6		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
10				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
12					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
14						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
16							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
18								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
20									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
22										X	X	X	X	X	X	X	X	X	X	X	X	X	X		
24											X	X	X	X	X	X	X	X	X	X	X	X	X		
26												X	X	X	X	X	X	X	X	X	X	X	X		
28													X	X	X	X	X	X	X	X	X	X	X		
30														X	X	X	X	X	X	X	X	X	X		
32															X	X	X	X	X	X	X	X	X		
34																X	X	X	X	X	X	X	X		
36																	X	X	X	X	X	X	X		
38																		X	X	X	X	X	X		
40																			X	X	X	X	X		
42																				X	X	X	X		
44																					X	X	X		
46																						X	X		
48																							X		



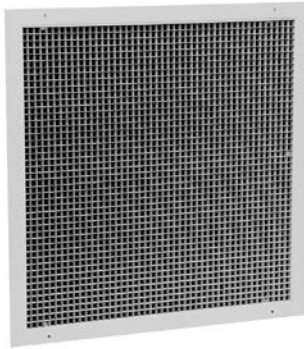
Blades at 40° angle

RCBF Filter Grille

- Extruded aluminum construction
- Horizontal curved blades
- Hinged on bottom edge, removable face
- Accommodates standard 1" thick disposable filter (not included)
- Filter grilles equipped with plastic slide latch
- Bright White or Satin Anodized finish

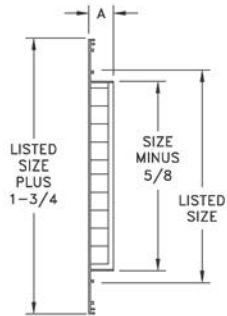


		RCBF Available Sizes (in.)																							
HT	WIDTH																								
	6	8	10	12	14	16	18	20	22	24	25	26	28	30	32	34	36	38	40	42	44	46	48		
6	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
8		X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
10			X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
12				X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
14					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
16						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
18							X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
20						X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
22								X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
24									X			X	X	X	X	X	X	X	X	X	X	X	X	X	
25								X			X														
26												X	X	X	X	X	X	X	X	X	X	X	X	X	
28													X	X	X	X	X	X	X	X	X	X	X	X	
30														X	X	X	X	X	X	X	X	X	X	X	
32															X	X	X	X	X	X	X	X	X	X	
34																X	X	X	X	X	X	X	X	X	
36																	X	X	X	X	X	X	X	X	
38																		X	X	X	X	X	X	X	
40																			X	X	X	X	X	X	
42																				X	X	X	X	X	
44																					X	X	X	X	
46																						X	X	X	
48																								X	



RE5 Grille

- All-aluminum construction
- Grid core $1/2" \times 1/2" \times 1/2"$
- Square core design with extruded aluminum frame
- Bright White or Mill finish

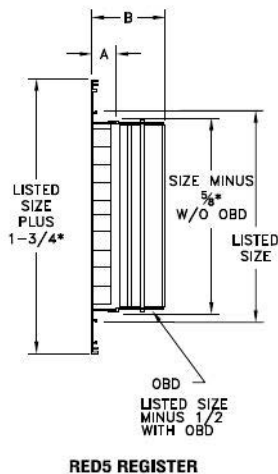
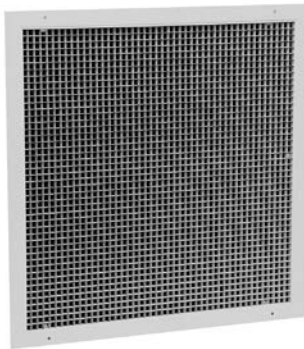


MODEL	GRID CORE DIMENSIONS	A
RE5	$1/2 \times 1/2 \times 1/2$	$1-1/16$
RE510	$1/2 \times 1/2 \times 1$	$1-9/16$
RE1	$1 \times 1 \times 1$	$1-9/16$

		RE5 Available Sizes (in.)																					
HT		WIDTH																					
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24										X	X	X	X	X	X	X	X	X	X	X	X	X	X
26											X	X	X	X	X	X	X	X	X	X	X	X	X
28												X	X	X	X	X	X	X	X	X	X	X	X
30													X	X	X	X	X	X	X	X	X	X	X
32														X	X	X	X	X	X	X	X	X	X
34															X	X	X	X	X	X	X	X	X
36																X	X	X	X	X	X	X	X
38																	X	X	X	X	X	X	X
40																		X	X	X	X	X	X
42																			X	X	X	X	X
44																				X	X	X	X
46																					X	X	X
48																						X	X

RED5 Register

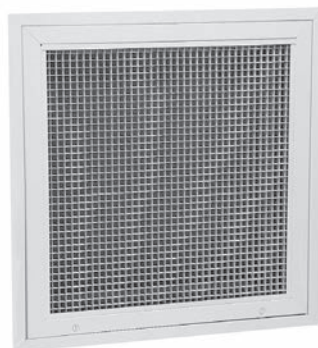
- Aluminum construction
- Opposed-blade, galvanized damper
- Square core design with extruded aluminum construction
- Bright White or Mill finish



MODEL	GRID CORE DIMENSIONS	A	B
RE5	$1/2 \times 1/2 \times 1/2$	$1-1/4$	$2-1/2$
RE510	$1/2 \times 1/2 \times 1$	$1-1/4$	$2-15/16$
RE1	$1 \times 1 \times 1$	$1-1/4$	$2-15/16$

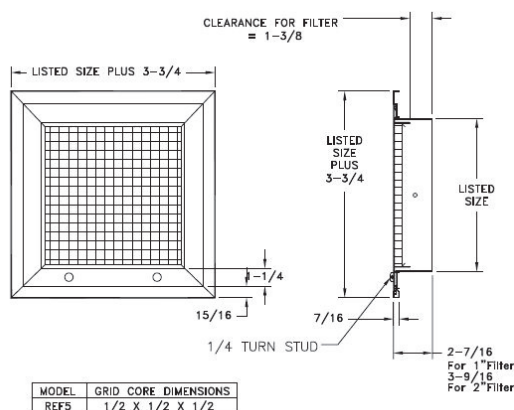
		RED5 Available Sizes (in.)																					
HT		WIDTH																					
		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26										X	X	X	X	X	X	X	X	X	X	X	X	X	X
28											X	X	X	X	X	X	X	X	X	X	X	X	X
30												X	X	X	X	X	X	X	X	X	X	X	X
32													X	X	X	X	X	X	X	X	X	X	X
34														X	X	X	X	X	X	X	X	X	X
36															X	X	X	X	X	X	X	X	X
38																X	X	X	X	X	X	X	X
40																	X	X	X	X	X	X	X
42																		X	X	X	X	X	X
44																			X	X	X	X	X
46																				X	X	X	X
48																					X	X	X

Registers & Grilles - Aluminum



REF5 Filter Grille, Grid Core

- All-aluminum construction
- 1/2" x 1/2" x 1/2" square core design
- Accommodates standard 1" thick disposable filter (not included)
- Filter grilles equipped with quarter turn fasteners
- Bright White or Mill finish
- Specify REF52 for 2" filter



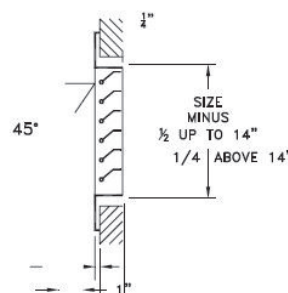
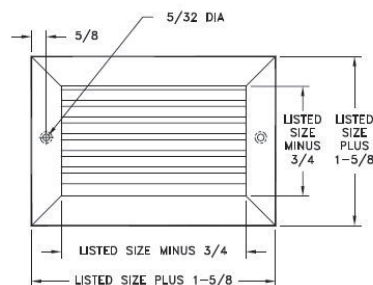
		REF5 Available Sizes (in.)																		
HT		WIDTH																		
		6	8	10	12	14	16	18	20	22	24	25	26	28	30	32	34	36		
4		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X		
5		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X		
6		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X		
8			X	X	X	X	X	X	X	X	X		X	X	X	X	X	X		
10				X	X	X	X	X	X	X	X		X	X	X	X	X	X		
12					X	X	X	X	X	X	X		X	X	X	X	X	X		
14						X	X	X	X	X	X		X	X	X	X	X	X		
16							X	X	X	X	X		X	X	X	X	X	X		
18								X	X	X	X		X	X	X	X	X	X		
20									X	X	X		X	X	X	X	X	X		
22										X	X		X	X	X	X	X	X		
24											X		X	X	X	X	X	X		
25									X			X								
26													X	X	X	X	X	X		
28														X	X	X	X	X		
30															X	X	X	X		
32																X	X	X		
34																	X	X		
36																		X		



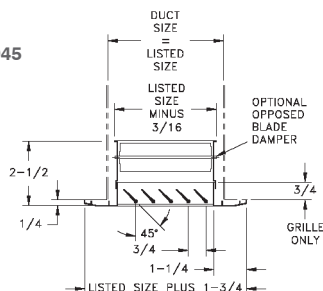
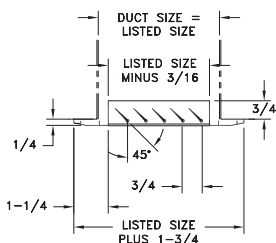
ER45 Return Air Grille

- Extruded aluminum construction
- Horizontal louvers fixed at 45 degree deflection
- Available in aluminum or white paint
- Minimum size - 4x4, Maximum size - 48x60
- One piece construction
- An economical choice for your light commercial needs

ER45 Available Sizes (in.)	
Min Size 4x4, Max Size 48x60	



- Extruded aluminum construction
- Horizontal bars at 45 degrees
- Face bars permanently fixed into heavy aluminum frames at a 45-degree angle
- Opposed-blade damper on RHD45
- Bright White or Satin Anodized finish



		RH45 Available Sizes (in.)																											
HT	WIDTH																												
	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22										X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24											X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26												X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28													X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30														X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
32															X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
34																X	X	X	X	X	X	X	X	X	X	X	X	X	X
36																	X	X	X	X	X	X	X	X	X	X	X	X	X
38																		X	X	X	X	X	X	X	X	X	X	X	X
40																			X	X	X	X	X	X	X	X	X	X	X
42																				X	X	X	X	X	X	X	X	X	X
44																					X	X	X	X	X	X	X	X	X
46																						X	X	X	X	X	X	X	X
48																							X	X	X	X	X	X	X



- Extruded aluminum construction
- Horizontal bars at 45 degrees
- Hinged on the bottom edge, face is removable
- Accommodates standard 1" thick disposable filter (not included)
- Filter grilles equipped with plastic slide latch
- Bright White or Satin Anodized finish
- RHF452 - Accepts 2" filter
- RHF454 - Accepts 4" filter

The technical drawings show the RH45 end and side views. The end view (top) shows a rectangular component with a 'LISTED SIZE' dimension. It features a 'FILTER RETAINER' with a 'SPACE FOR 1" FILTER' and 'DUCT MOUNTING HOLES (STANDARD)'. The component is supported by 'BRACE BARS 18" O.C. MAX.' with a height of 1/2. The side view (bottom) shows the component's profile with a 'LISTED SIZE' dimension. It includes a '2-1/16' height, a '7/16' offset, and a '3/4' width. The total width is 'LISTED SIZE PLUS 2-1/2'. The side view also shows a '1-1/4' height and a '1-5/8' offset, with a '1-1/32' dimension at the bottom right.

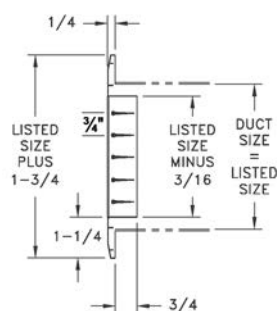
[illegible]

Registers & Grilles - Aluminum

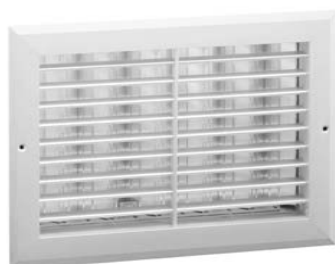


RH90 Grille

- Extruded aluminum construction
- Face bars permanently fixed into heavy aluminum frames at a 90-degree angle from face
- Bright White or Satin Anodized finish

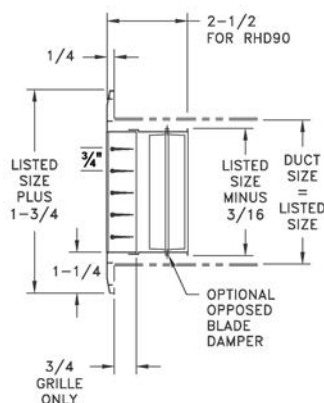


		RH90 Available Sizes (in.)																									
		WIDTH																									
HT		4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48			
4		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
5		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
6		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
10						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
12						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
14							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
16								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
18									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
20										X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
22											X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
24												X	X	X	X	X	X	X	X	X	X	X	X	X	X		
26													X	X	X	X	X	X	X	X	X	X	X	X	X		
28														X	X	X	X	X	X	X	X	X	X	X	X		
30															X	X	X	X	X	X	X	X	X	X	X		
32																X	X	X	X	X	X	X	X	X	X		
34																	X	X	X	X	X	X	X	X	X		
36																		X	X	X	X	X	X	X	X		
38																			X	X	X	X	X	X	X		
40																				X	X	X	X	X	X		
42																					X	X	X	X	X		
44																						X	X	X	X		
46																							X	X	X		
48																								X	X		



RHD90 Register

- Extruded aluminum construction
- Face bars permanently fixed into heavy aluminum frames at a 90-degree angle from face
- Opposed-blade damper
- Bright White or Satin Anodized finish



		RHD90 Available Sizes (in.)																						
		WIDTH																						
HT		6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	
4		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
5		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
6		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
16							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
18								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
20									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
22										X	X	X	X	X	X	X	X	X	X	X	X	X	X	
24											X	X	X	X	X	X	X	X	X	X	X	X	X	
26												X	X	X	X	X	X	X	X	X	X	X	X	
28													X	X	X	X	X	X	X	X	X	X	X	
30														X	X	X	X	X	X	X	X	X	X	
32															X	X	X	X	X	X	X	X	X	
34																X	X	X	X	X	X	X	X	
36																	X	X	X	X	X	X	X	
38																		X	X	X	X	X	X	
40																			X	X	X	X	X	
42																				X	X	X	X	
44																					X	X	X	
46																						X	X	
48																							X	



TG Transfer Grille

- Extruded aluminum construction
- Vision proof
- Inverted “Y” type grille bar for best vision proof quality and airflow
- Excellent for installation in doors or partitions
- Bright White or Satin Anodized finish

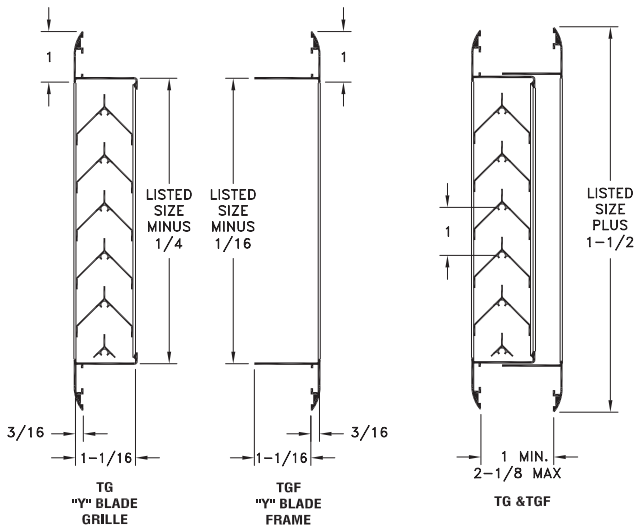


TGF Transfer Grille Frame

- Extruded aluminum construction

Note: When framing both sides of the door or partition opening, use the TGF frame with the TG Grille. Adjustable from 1” to 2 1/8” door thickness.

TG/TGF Transfer Grille with Transfer Grille Frame



TG/TGF Available Sizes (in.)																	
HT	WIDTH																
	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10			X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12				X	X	X	X	X	X	X	X	X	X	X	X	X	
14					X	X	X	X	X	X	X	X	X	X	X	X	
16						X	X	X	X	X	X	X	X	X	X	X	
18							X	X	X	X	X	X	X	X	X	X	
20								X	X	X	X	X	X	X	X	X	
22									X	X	X	X	X	X	X	X	
24										X	X	X	X	X	X	X	
26											X	X	X	X	X	X	
28												X	X	X	X	X	
30													X	X	X	X	
32														X	X	X	
34																X	
36																X	

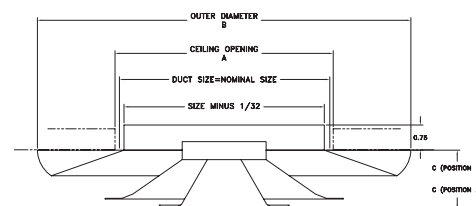
Ceiling Diffusers - Steel



20 Round Diffuser

- Steel construction
- For ceiling or exposed duct installation
- Five-step positioning of air pattern adjustment
- 360-degree pattern, horizontal to vertical pattern change
- Removable center core
- Diffuser outer shell fastens directly to duct; margins fit tight to ceiling for optimum ceiling appearance
- Optional #19 damper; duct-mount only
- Bright White finish

Listed Size	A	B	C Pos. 1	C Pos. 2
6	6-1/2	11-1/8	1-1/8	1-3/4
8	8-1/2	14-3/4	1-1/2	2-1/8
10	10-1/2	18-1/4	2-1/8	2-7/8
12	12-1/2	22	2-3/8	3-1/8
14	14-1/2	26	2-5/8	3-3/8
16	16-1/2	29	3-1/4	4
18	18-1/2	33-1/2	3-7/8	4-3/4

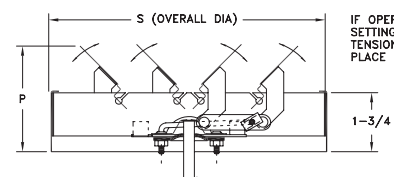


19 Damper

- Steel construction
- Opposed-blade damper
- Bright White finish
- Duct-mount only

19 Damper Listed Sizes (in.)								
Damper	6	8	10	12	14	15	16	18
S	5 ¹⁵ / ₁₆	7 ¹⁵ / ₁₆	9 ¹⁵ / ₁₆	11 ¹⁵ / ₁₆	13 ¹⁵ / ₁₆	14 ¹⁵ / ₁₆	15 ¹⁵ / ₁₆	17 ¹⁵ / ₁₆
P	3	3 ¹ / ₂	4 ⁹ / ₁₆	4 ⁹ / ₁₆	4 ⁹ / ₁₆	4 ⁹ / ₁₆	4 ⁹ / ₁₆	4 ⁹ / ₁₆

Note: 3/16" Hex Damper handle (by others) will lock into position if inserted too far into damper



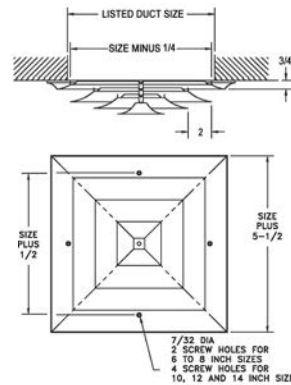
CROSS SECTION WITH VALVES PARTLY OPEN
SHOWING OPPOSED-BLADE OPERATION



24 Square Ceiling Diffuser

- All-steel construction
- Step-down face deflects air stream 360 degrees
- Bright White finish

Only available in sizes shown.



24 Ceiling Diffuser (in.)		
Size	Free Area Sq. Inches	No. of Cones
6	41	3
8	65	3
10	84	3
12	123	4
14	152	4
16	199	5
18	236	5
20	293	6
22	338	6
24	404	7



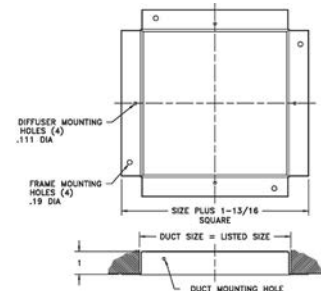
21 Installation Frame

- All-steel construction
- Golden Sand enamel finish
- Used but not furnished with #24 ceiling diffusers.

Not required when using 22 Butterfly Damper or 23 Opposed Blade Damper.

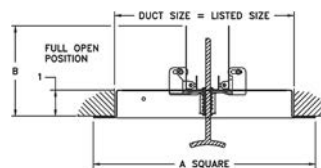
Cannot be used with SD or SDD.

21 Available Sizes (in.)	
6, 8, 10, 12, 14, 16, 18, 20, 22, 24	



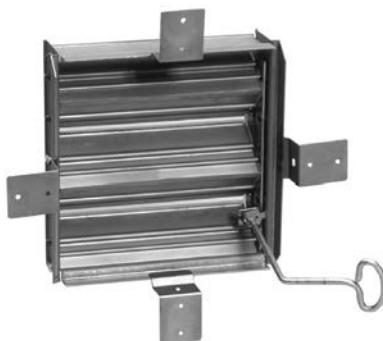
22 Butterfly Damper

- All-steel construction
- Used with #24 Ceiling Diffuser
- Knob control for quick adjustment (removable)
- Installation flange included
- Golden Sand enamel finish



22 Available Sizes (in.)		
Size	A	B
6	6 ³ / ₁₆	3 ¹¹ / ₁₆
8	8 ³ / ₁₆	4 ¹¹ / ₁₆
10	10 ³ / ₁₆	5 ¹¹ / ₁₆
12	12 ³ / ₁₆	6 ¹¹ / ₁₆
14	14 ³ / ₁₆	7 ¹¹ / ₁₆

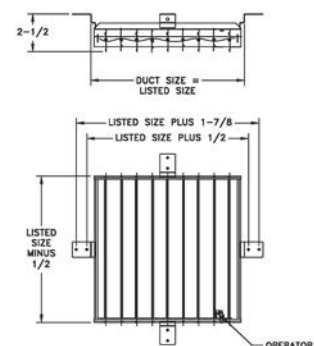
Only available in sizes shown.



23 Opposed-Blade Damper

- All-steel construction
- Used with #24 Ceiling Diffuser
- Controls air volume over entire diffuser
- Key operated
- Mill finish

23 Available Sizes (in.)	
6, 8, 10, 12, 14, 16, 18, 20, 22, 24	



Ceiling Diffusers - Steel

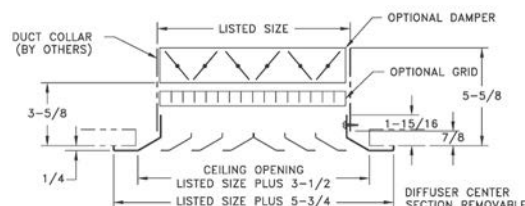


SRE Diffuser

- Steel construction
- Removable core
- Flat margin style
- Optional opposed blade damper available for field installation (see SR7 damper)
- Bright White enamel finish

SRE Available Sizes (in.)							
HT	WIDTH						
	6	9	12	15	18	21	24
6	X	X	X	X	X	X	X
9		X	X	X	X	X	X
12			X	X	X	X	X
15				X	X	X	X
18					X	X	X
21						X	X
24							X

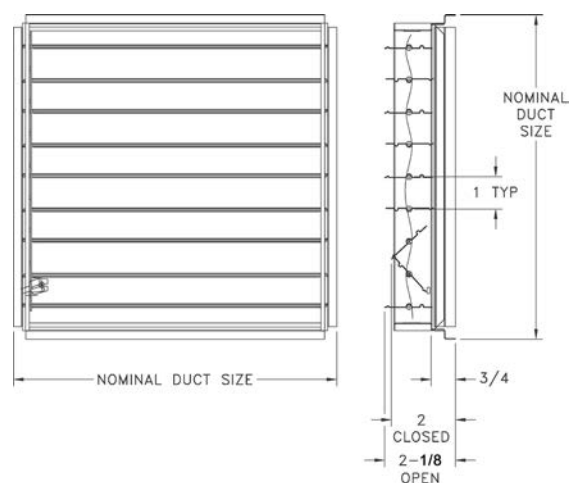
See page 34 for available air patterns.



SR7 Volume Damper

- Steel construction
- Used to control airflow at the diffuser
- Mill finish
- Field installed for use with SRE, SRS or SRT diffusers

SR7 Available Sizes (in.)							
HT	WIDTH						
	6	9	12	15	18	21	24
6	X	X	X	X	X	X	X
9		X	X	X	X	X	X
12			X	X	X	X	X
15				X	X	X	X
18					X	X	X
21						X	X
24							X



Ceiling Diffusers - Aluminum



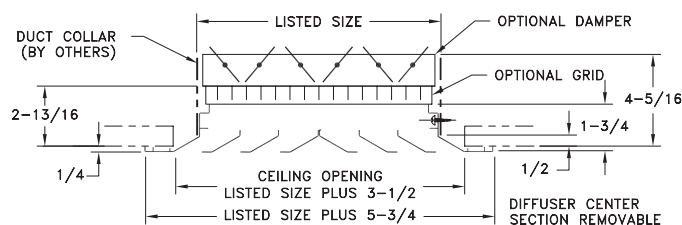
ARE Diffuser

- Extruded aluminum construction
- Removable core
- Flat margin style
- Optional factory-mounted aluminum opposed-blade damper available as AREDD
- Bright White or Satin Anodized finish

See page 34 for available air patterns.

ARE Available Sizes (in.)											
HT	WIDTH										
	6	9	12	15	18	21	24	27	30	33	36
6	X	X	X	X	X	X	X	X	X	X	X
9		X	X	X	X	X	X	X	X	X	X
12			X	X	X	X	X	X	X	X	X
15				X	X	X	X	X	X	X	X
18					X	X	X	X	X	X	X
21						X	X	X	X	X	X
24							X	X	X	X	X
27								X	X	X	X
30									X	X	X
33										X	X
36											X

Note: Number of cones varies by size of diffuser



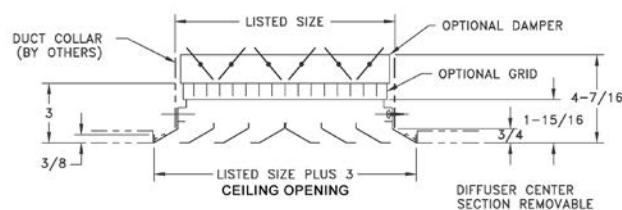
ARF Diffuser

- Extruded aluminum construction
- Removable core
- Flush margin style
- Optional factory-mounted, aluminum opposed-blade damper available as ARFDD
- Bright White or Satin Anodized finish

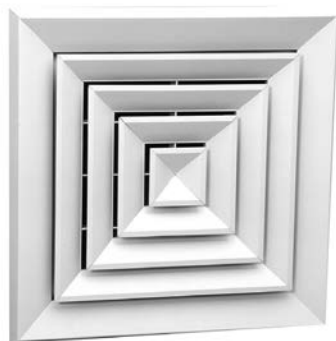
See page 34 for available air patterns.

ARF Available Sizes (in.)											
HT	WIDTH										
	6	9	12	15	18	21	24	27	30	33	36
6	X	X	X	X	X	X	X	X	X	X	X
9		X	X	X	X	X	X	X	X	X	X
12			X	X	X	X	X	X	X	X	X
15				X	X	X	X	X	X	X	X
18					X	X	X	X	X	X	X
21						X	X	X	X	X	X
24							X	X	X	X	X
27								X	X	X	X
30									X	X	X
33										X	X
36											X

Note: Number of cones varies by size of diffuser



Ceiling Diffusers - Aluminum



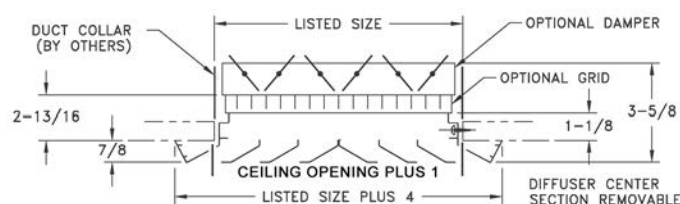
ARS Diffuser

- Extruded aluminum construction
- Removable core
- Beveled (step-down) margin style
- Optional factory-mounted, aluminum, opposed-blade damper available as ARSD
- Bright White or Satin Anodized finish

ARS Available Sizes (in.)		WIDTH										
HT		6	9	12	15	18	21	24	27	30	33	36
6	X	X	X	X	X	X	X	X	X	X	X	X
9		X	X	X	X	X	X	X	X	X	X	X
12			X	X	X	X	X	X	X	X	X	X
15				X	X	X	X	X	X	X	X	X
18					X	X	X	X	X	X	X	X
21						X	X	X	X	X	X	X
24							X	X	X	X	X	X
27								X	X	X	X	X
30									X	X	X	X
33										X	X	X
36											X	X

See page 34 for available air patterns.

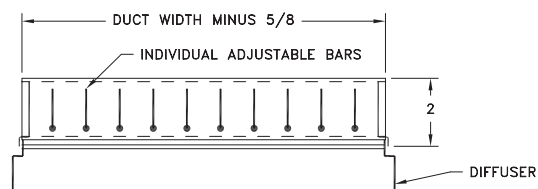
Note: Number of cones varies by size of diffuser



AR6 Control Grid

- Extruded aluminum construction
- Mounts on diffuser hanger bracket
- Provides uniform airflow in diffuser collar
- Mill finish

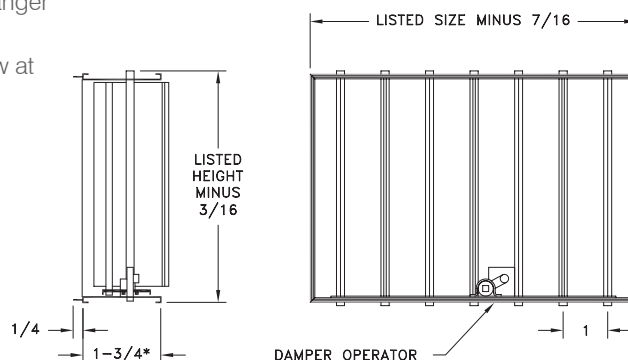
AR6 Available Sizes (in.)
Minimum: 6" x 6"
Maximum: 36" x 36" (in multiple sections)



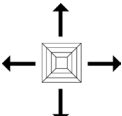
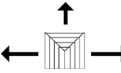
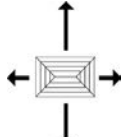
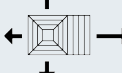
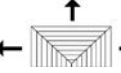
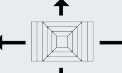
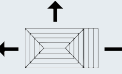
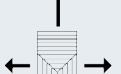
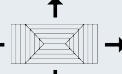
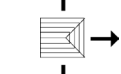
AR7 Damper

- Extruded aluminum construction
- Mounts on diffuser hanger bracket
- Used to control airflow at the diffuser
- Mill finish

AR7 Available Sizes (in.)
Minimum: 6" x 6"
Maximum: 36" x 36" (in multiple sections)



Neck View Type SR & AR Air Patterns

Style	Listed Sizes	Style	Listed Sizes	Style	Listed Sizes
 STYLE 4	6x6 24x24 9x9 27x27 12x12 30x30 15x15 33x33 18x18 36x36 21x21 24 x 24 Max. in Steel	 STYLE 3	6x6 24x24 9x9 27x27 12x12 30x30 15x15 33x33 18x18 36x36 21x21 24 x 24 Max. in Steel	 STYLE 2L	9x6 to 36x6 24x21 to 36x21 12x9 to 36x9 27x24 to 36x24 15x12 to 36x12 30x27 to 36x27 18x15 to 36x15 33x30 to 36x30 21x18 to 36x18 36x33 24 x 21 Max. in Steel
 STYLE 4	9x6 to 45x6 24x21 to 45x21 12x9 to 45x9 27x24 to 45x24 15x12 to 45x12 30x27 to 45x27 18x15 to 45x15 33x30 to 45x30 21x18 to 45x18 36x33 to 45x33 24 x 21 Max. in Steel	 STYLE 3S	9x6 24x21 to 36x21 12x9 27x24 to 42x24 15x9 30x27 to 42x27 15x12 to 21x12 33x30 to 42x30 18x15 to 27x15 36x33 21x18 to 33x18 24 x 21 Max. in Steel	 STYLE 2S	9x6 to 36x6 24x21 to 36x21 12x9 to 36x9 27x24 to 36x24 15x12 to 36x12 30x27 to 36x27 18x15 to 36x15 33x30 to 36x30 21x18 to 36x18 36x33 24 x 21 Max. in Steel
 STYLE 41	9x6 to 36x6 24x21 to 36x21 12x9 to 36x9 27x24 to 36x24 15x12 to 36x12 30x27 to 36x27 18x15 to 36x15 33x30 to 36x30 21x18 to 36x18 36x33	 STYLE 3S	12x6 18x9 24x12 30x15 36x18	 STYLE 2C	6x6 24x24 9x9 27x27 12x12 30x30 15x15 33x33 18x18 36x36 21x21
 STYLE 42	9x6 to 36x6 24x21 to 36x21 12x9 to 36x9 27x24 to 36x24 15x12 to 36x12 30x27 to 36x27 18x15 to 36x15 33x30 to 36x30 21x18 to 36x18 36x33	 STYLE 3S	15x6 to 36x6 21x9 to 36x9 27x12 to 36x12 33x15 36x15	 STYLE 2CR	9x6 to 36x6 24x21 to 36x21 12x9 to 36x9 27x24 to 36x24 15x12 to 36x12 30x27 to 36x27 18x15 to 36x15 33x30 to 36x30 21x18 to 36x18 36x33 24 x 21 Max. in Steel
 STYLE 41L	9x9 to 36x9 24x24 to 36x24 12x12 to 36x12 27x27 to 36x27 15x15 to 36x15 30x30 to 36x30 18x18 to 36x18 33x33 to 36x33 21x21 to 36x21 36x36	 STYLE 31S	6x6 to 9x6 24x24 to 36x24 9x9 to 15x9 27x27 to 36x27 12x12 to 21x12 30x30 to 36x30 15x15 to 27x15 33x33 to 36x33 18x18 to 33x18 36x36 21x21 to 36x21	 STYLE 2CL	9x6 to 36x6 24x21 to 36x21 12x9 to 36x9 27x24 to 36x24 15x12 to 36x12 30x27 to 36x27 18x15 to 36x15 33x30 to 36x30 21x18 to 36x18 36x33 24 x 21 Max. in Steel
 STYLE 41S	12x6 to 36x6 27x21 to 36x21 15x9 to 36x9 30x24 to 36x24 18x12 to 36x12 33x27 to 36x27 21x15 to 36x15 36x30 24x18 to 36x18	 STYLE 31L	9x6 to 36x6 24x21 to 36x21 12x9 to 36x9 27x24 to 36x24 15x12 to 36x12 30x27 to 36x27 18x15 to 36x15 33x30 to 36x30 21x18 to 36x18 36x33	 STYLE 1	6x6 27x27 9x9 30x30 12x12 33x33 15x15 36x36 18x18 39x39 21x21 42x42 24x24 24 x 24 Max. in Steel
 STYLE 42S	12x6 to 36x6 27x21 to 36x21 15x9 to 36x9 30x24 to 36x24 18x12 to 36x12 33x27 to 36x27 21x15 to 36x15 36x30 24x18 to 36x18	 STYLE 3L	9x6 to 36x6 24x21 to 36x21 12x9 to 36x9 27x24 to 36x24 15x12 to 36x12 30x27 to 36x27 18x15 to 36x15 33x30 to 36x30 21x18 to 36x18 36x33 24 x 21 Max. in Steel	 STYLE 1L	9x6 to 36x6 24x21 to 36x21 12x9 to 36x9 27x24 to 36x24 15x12 to 36x12 30x27 to 36x27 18x15 to 36x15 33x30 to 36x30 21x18 to 36x18 36x33 24 x 21 Max. in Steel
		 STYLE 2	6x6 24x24 9x9 27x27 12x12 30x30 15x15 33x33 18x18 36x36 21x21 24 x 24 Max. in Steel	 STYLE 1S	9x6 to 36x6 24x21 to 36x21 12x9 to 36x9 27x24 to 36x24 15x12 to 36x12 30x27 to 36x27 18x15 to 36x15 33x30 to 36x30 21x18 to 36x18 36x33 24 x 21 Max. in Steel

 Aluminum Only

SR Sizes:
6x6 to 24x24 in 3" Increments (see page 30)

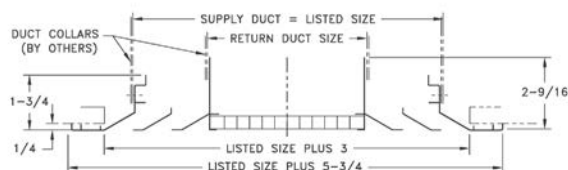
AR Sizes:
6x6 to 36x36 in 3" Increments (see page 32)

Ceiling Diffusers - Aluminum

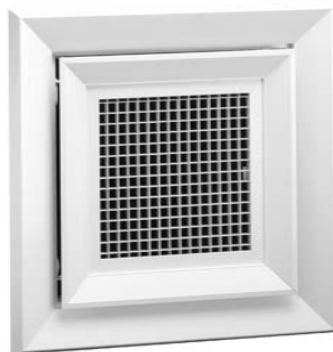


ASRE Diffuser

- Extruded aluminum construction
- Flat margins overlap opening
- For use with roof-mounted installations
- Removable core
- Return damper available - AR7
- Supply damper available - AS7
- Bright White or Satin Anodized finish

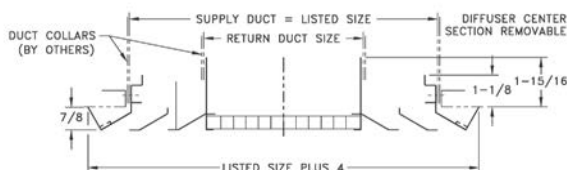


ASRE Available Sizes (in.)			
Supply Size	Return Neck	Supply Size	Return Neck
9 x 9	6 x 6	27 x 18	21 x 12
12 x 12	9 x 9	27 x 15	21 x 9
12 x 9	9 x 6	27 x 12	21 x 6
15 x 15	9 x 9	30 x 30	21 x 21
15 x 12	12 x 9	30 x 27	21 x 18
15 x 9	12 x 6	30 x 24	21 x 15
15 x 6	12 x 3	30 x 21	21 x 12
18 x 18	12 x 12	30 x 18	24 x 12
18 x 15	12 x 9	30 x 15	24 x 9
18 x 12	12 x 6	33 x 33	21 x 21
18 x 9	15 x 6	33 x 30	24 x 21
21 x 21	15 x 15	33 x 27	24 x 18
21 x 18	15 x 12	33 x 24	24 x 15
21 x 15	15 x 9	33 x 21	24 x 12
21 x 12	15 x 6	33 x 18	27 x 12
21 x 9	18 x 6	33 x 15	27 x 9
24 x 24	18 x 18	36 x 36	24 x 24
24 x 21	18 x 15	36 x 33	27 x 24
24 x 18	18 x 12	36 x 30	27 x 21
24 x 15	18 x 9	36 x 27	27 x 18
24 x 12	18 x 6	36 x 24	27 x 15
24 x 9	21 x 6	36 x 21	27 x 12
27 x 27	18 x 18	36 x 18	30 x 12
27 x 24	18 x 15	42 x 18	27 x 12
27 x 21	21 x 15		



ASRS Diffuser

- Extruded aluminum construction
- Step-down (beveled) margins overlap opening and lowers the diffuser from the ceiling
- For use with roof-mounted installations
- Removable core
- Bright White or Satin Anodized finish
- Return damper available - AR7
- Supply damper available - AS7



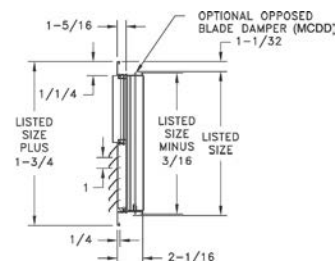
ASRS Available Sizes (in.)			
Supply Size	Return Neck	Supply Size	Return Neck
9 x 9	6 x 6	27 x 18	21 x 12
12 x 12	9 x 9	27 x 15	21 x 9
12 x 9	9 x 6	27 x 12	21 x 6
15 x 15	9 x 9	30 x 30	21 x 21
15 x 12	12 x 9	30 x 27	21 x 18
15 x 9	12 x 6	30 x 24	21 x 15
15 x 6	12 x 3	30 x 21	21 x 12
18 x 18	12 x 12	30 x 18	24 x 12
18 x 15	12 x 9	30 x 15	24 x 9
18 x 12	12 x 6	33 x 33	21 x 21
18 x 9	15 x 6	33 x 30	24 x 21
21 x 21	15 x 15	33 x 27	24 x 18
21 x 18	15 x 12	33 x 24	24 x 15
21 x 15	15 x 9	33 x 21	24 x 12
21 x 12	15 x 6	33 x 18	27 x 12
21 x 9	18 x 6	33 x 15	27 x 9
24 x 24	18 x 18	36 x 36	24 x 24
24 x 21	18 x 15	36 x 33	27 x 24
24 x 18	18 x 12	36 x 30	27 x 21
24 x 15	18 x 9	36 x 27	27 x 18
24 x 12	18 x 6	36 x 24	27 x 15
24 x 9	21 x 6	36 x 21	27 x 12
27 x 27	18 x 18	36 x 18	30 x 12
27 x 24	18 x 15	42 x 18	27 x 12
27 x 21	21 x 15		



MCD Adjustable Modular Diffuser

- Extruded aluminum construction
- Four modular cores provide variable pattern adjustments of four-way, three-way, two-way, or one-way horizontal air patterns
- Flat margin
- Fixed fins
- Bright White finish

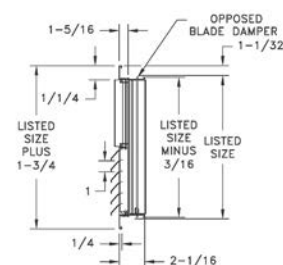
MCD Available Sizes (in.)
6" x 6", 8" x 8", 10" x 10", 12" x 12", 14" x 14", 16" x 16", 18" x 18", 20" x 20", 22" x 22"



MCDD Adjustable Modular Diffuser

- Extruded aluminum construction
- Opposed-blade damper
- Four modular cores provide variable pattern adjustments of four-way, three-way, two-way, or one-way horizontal air patterns
- Removable modules provide easy access to damper
- Flat margin
- Fixed fins
- Bright White finish

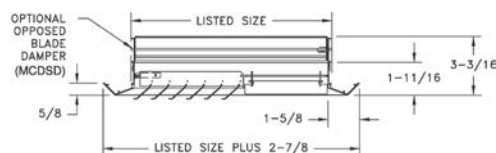
MCDD Available Sizes (in.)
6" x 6", 8" x 8", 10" x 10", 12" x 12", 14" x 14", 16" x 16", 18" x 18", 20" x 20", 22" x 22"



MCDS Adjustable Modular Diffuser

- Extruded aluminum construction
- Step-down (beveled) margin
- Four modular cores provide variable pattern adjustments of four-way, three-way, two-way, or one-way horizontal air patterns
- Fixed fins
- Bright White finish

MCDS Available Sizes (in.)
6" x 6", 8" x 8", 10" x 10", 12" x 12", 14" x 14", 16" x 16", 18" x 18", 20" x 20", 22" x 22"



For T-Bar application, see page 71

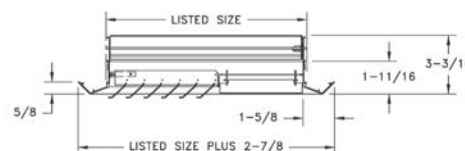
Ceiling Diffusers - Aluminum



MCDSD Adjustable Modular Diffuser

- Extruded aluminum construction
- Opposed-blade damper
- Step-down (beveled) margin
- Four modular cores provide variable pattern adjustments of four-way, three-way, two-way, or one-way horizontal air patterns
- Removable modules provide easy access to damper
- Fixed fins
- Bright White finish

MCDSD Available Sizes (in.)	
6" x 6", 8" x 8", 10" x 10", 12" x 12", 14" x 14",	
16" x 16", 18" x 18", 20" x 20", 22" x 22"	



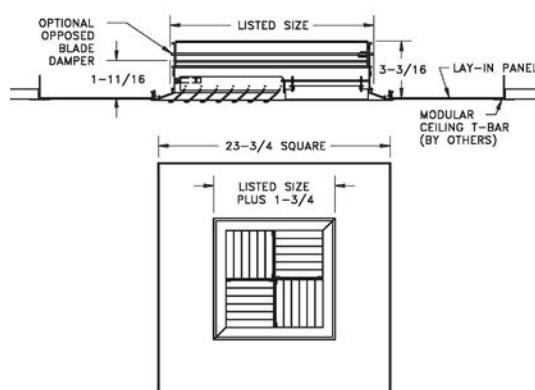
For T-Bar application, see page 71.



Modular T-Bar Panel

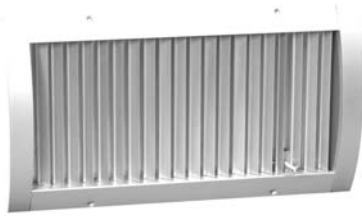
- Steel construction (aluminum optional)
- Adapts MCD and MCDD for T-Bar installation
- Bright White finish

Modular T-Bar Panel Available Sizes	
Opening 6" - 20"	
Overall 23-3/4" x 23-3/4"	



Note: Aluminum panel for factory-mounted, step-down margin. Available as Models MCDST and MCSDST.

Spiral Diffusers

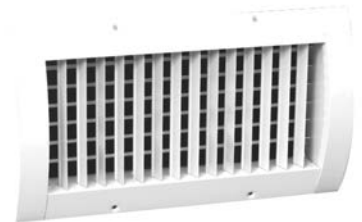
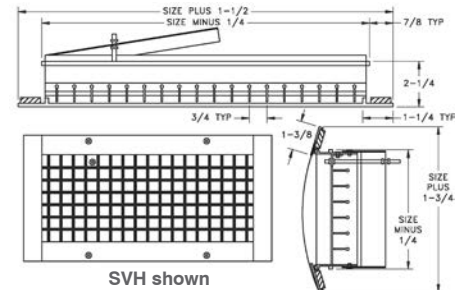


(Shown with scoop)
Size restrictions apply.
See price list for sizes and ordering information.

Model SV Single-Deflection Diffuser

- Extruded aluminum construction
- Single row of individually adjustable vertical blades for horizontal air-deflection control
- Available as diffuser only or diffuser with air scoop (SV3)
- Optional face adjustable scoop to direct airflow
- Counter-sunk screw holes
- Available sizes: 10x3 to 36x12 for 6" to 50" ducts
- Bright White and Satin Anodized finishes

SV Available Sizes (in.)
10" x 3" to 36" x 12"

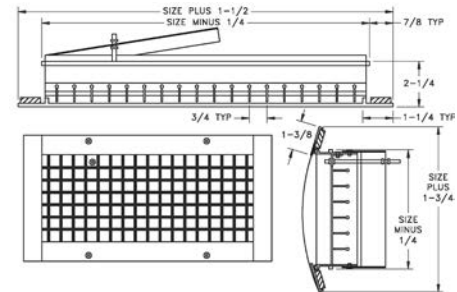


Size restrictions apply.
See price list for sizes and ordering information.

Model SVH Double-Deflection Diffuser

- Extruded aluminum construction
- Two rows of individually adjustable blades for horizontal and vertical deflection control
- Optional face adjustable scoop to direct airflow
- Counter-sunk screw holes
- Available sizes: 10x3 to 36x12 for 6" to 50" ducts
- Bright White and Satin Anodized finishes

SVH Available Sizes (in.)
10" x 3" to 36" x 12"

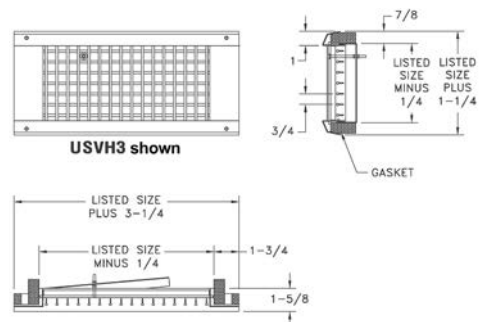


Size restrictions apply.
See price list for sizes and ordering information.

Model USV Single-Deflection Universal Diffuser

- Extruded aluminum construction
- Single row of individually adjustable vertical blades for horizontal air deflection control
- Optional face adjustable scoop to direct airflow
- Counter-sunk screw holes
- Available sizes: 10x3 to 36x12
- Fits duct sizes 6" on up, based on diffuser height
- Bright White and Satin Anodized finishes

USV Available Sizes (in.)
10" x 3" to 36" x 12"



Spiral Diffusers

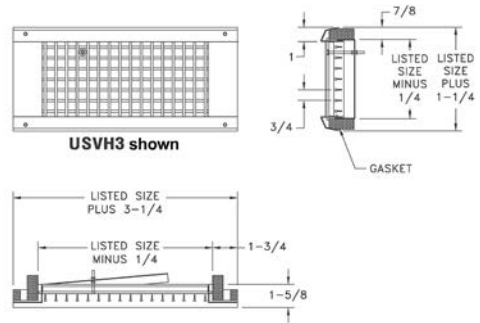


Size restrictions apply.
See price list for sizes and ordering information.

Model USVH Double Deflection Universal Diffuser

- Extruded aluminum construction
- Two rows of individually adjustable blades for horizontal and vertical deflection control
- Optional face adjustable scoop to direct airflow
- Counter-sunk screw holes
- Available sizes: 10x3 to 36x12
- Fits duct sizes 6" on up, based on diffuser height
- Bright White and Satin Anodized finishes

USVH Available Sizes (in.)
10" x 3" to 36" x 12"

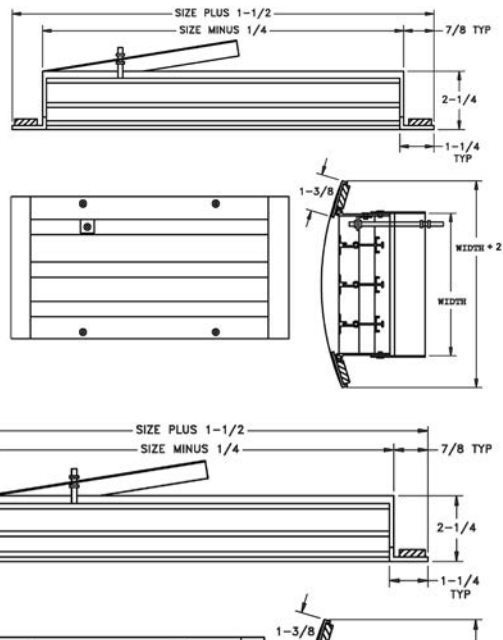


Size restrictions apply.
See price list for sizes and ordering information.

Model SS Slot Face Diffuser

- Extruded aluminum construction
- Slot sizes available: 1/2", 3/4", 1"
- Optional face adjustable scoop to direct airflow. Scoop not available for 1/2" or 3/4" one slot
- Counter-sunk screw holes
- Available in one to four slots wide up to 48" length for 6" to 50" ducts
- Bright White and Satin Anodized finishes

SS Available Sizes (in.)
One to four slots wide up to 48" long



For Models SV and SVH
Minimum Duct Diameter per listed size
Width

Height	Width								
	10	12	14	16	18	20	24	30	36
3	5	5	5	5	5	5	5	5	5
4	6	6	6	6	6	6	6	6	6
6	8	8	8	8	8	8	8	8	8
8	10	10	10	10	10	10	10	10	10
10		12	12	12	12	12	12	12	12
12			14	14	14	14	14	14	14

Maximum duct diameter for all sizes is 36".

For Models USV and USVH
Minimum Duct Diameter
Width

Height	Width								
	10	12	14	16	18	20	24	30	36
3	6	6	6	6	6	6	6	6	6
4	10	10	10	10	10	10	10	10	10
6	12	12	12	12	12	12	12	12	12
8	20	20	20	20	20	20	20	20	20
10			24	24	24	24	24	24	24
12					30	30	30	30	30

Linear and Slot Diffusers



Minimum width 1-1/2"

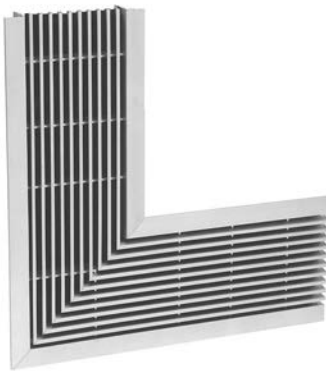
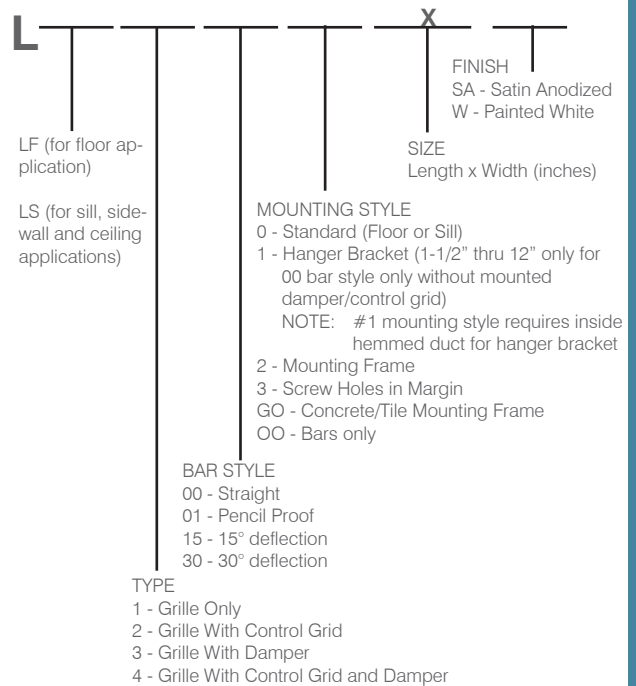
Note: Floor application must be ordered as "LF." Eight-inch maximum width for constant traffic; 12" maximum width for occasional traffic; maximum length 72".

See following page for dimensional data.

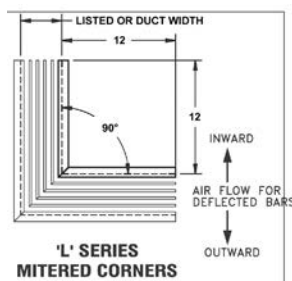
LS/LF Series Diffuser

- Extruded aluminum construction
- Ceiling, sidewall, sill or floor applications
- Available in 0, 15, or 30 degrees and pencil proof bar deflections
- Four mounting styles—standard, hanger bracket, mounting frame and screw holes in margin
- Maximum one-piece length 72", width 24" (1/2" width increments)
- Lengths over 72" made in multiple units with keyway splices to form even continuous lengths
- Bright White or Satin Anodized finish

HOW TO ORDER



Mitered Corner Sections furnished as shown. Blank off baffles available upon request.

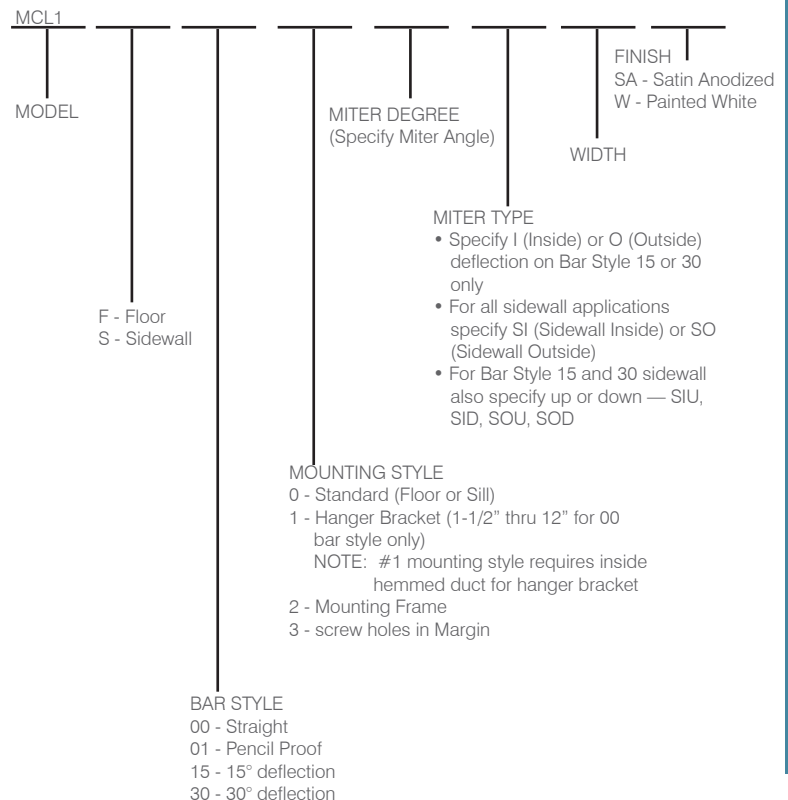


See page 47 for distribution plenums.

L Series Mitered Corners

Mitered corner sections furnished as shown.

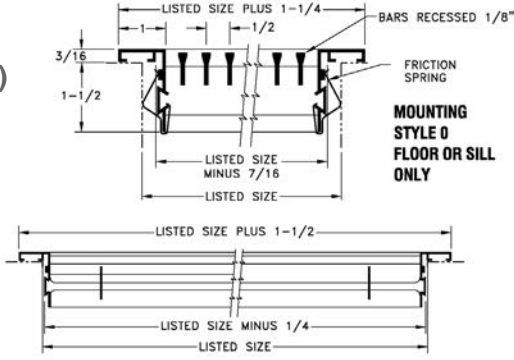
HOW TO ORDER



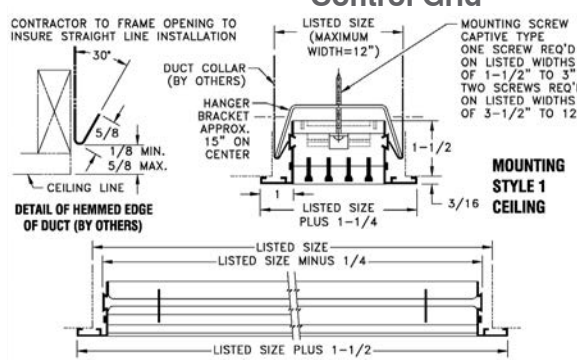
Linear and Slot Diffusers

L Series - Dimensional Data

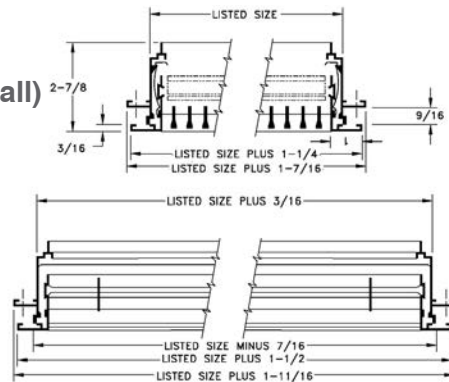
Mounting Style 0 (Floor/Sill) LF



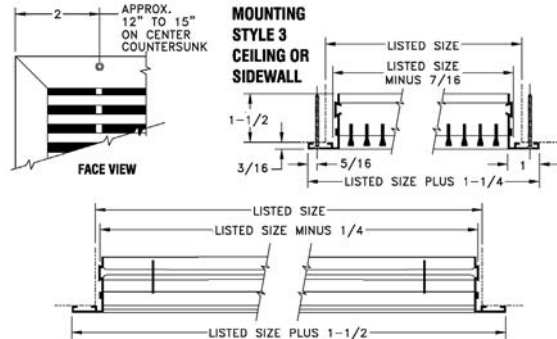
Mounting Style 1 (Ceiling) LS



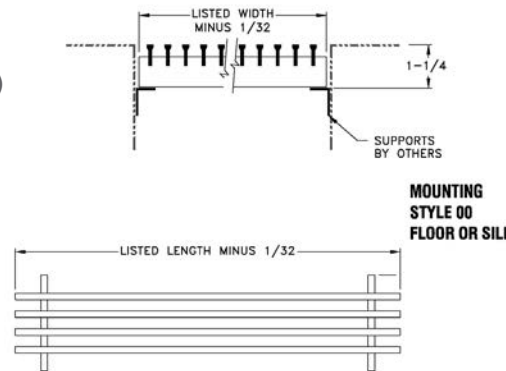
Mounting Style 2 (Ceiling/Sidewall) LS



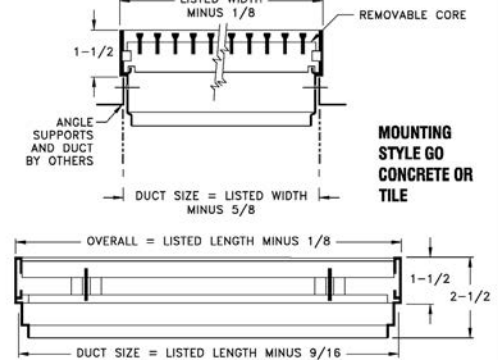
Mounting Style 3 (Ceiling/Sidewall) LS

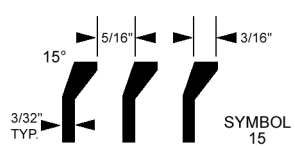
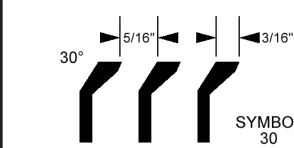
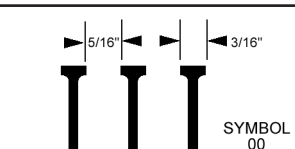
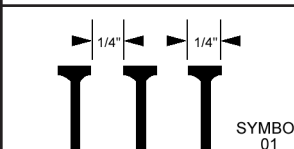


Mounting Style 00 (Bars Only)



Mounting Style GO (Concrete/Tile) LF



BAR STYLES			
 15° 5/16" 3/16" 3/32" TYP. SYMBOL 15		 30° 5/16" 3/16" SYMBOL 30	
 5/16" 3/16" SYMBOL 00		 1/4" 1/4" SYMBOL 01	

Bars on 1/2" Centers

Note: Quantity of bars = 2 x listed width minus 2.
Example: 4" listed width = 4" x 2 = 8 minus 2 = 6 bars.

L Series Single-Leaf Damper Option

- Aluminum construction
- Leaf type for sizes 1 1/2" to 3"



Note: Order with desired diffuser for attachment at factory.

Cannot be used with hanger brackets.

L Series G Grid Option

- Aluminum construction
- Individual adjustable blades
- Cannot be used with hanger brackets



Note: G Grid blades are assembled parallel to short dimension. Order with desired diffuser for factory fitting.

L Series D Damper Option

- Extruded aluminum construction
- Controls the air volume from full flow to shut-off
- Fits widths of 3 1/2" and wider

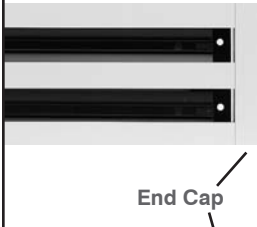
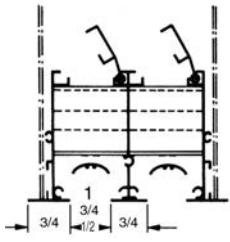
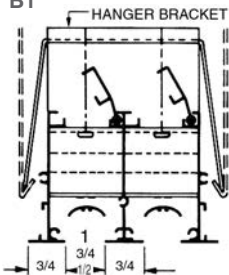
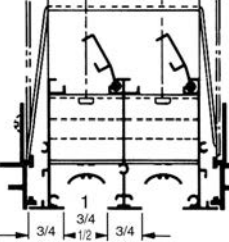
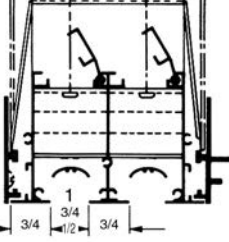
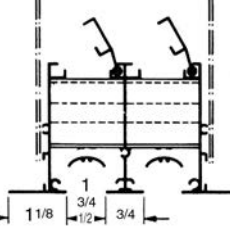
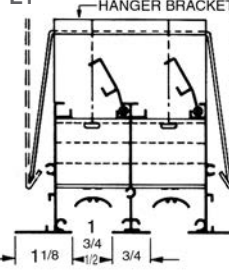
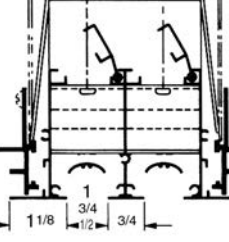
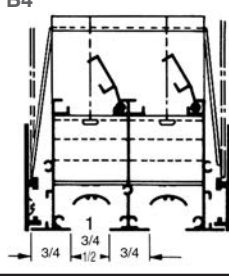
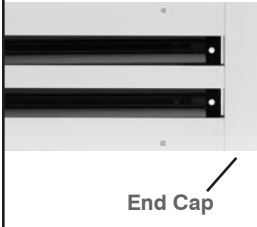
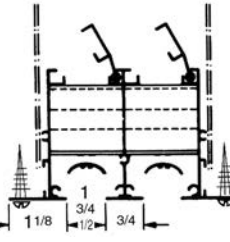
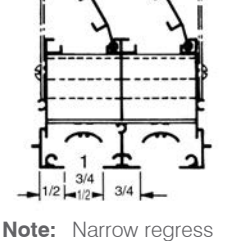


Note: Order with desired diffuser for attachment at factory.

Must be ordered separately and duct-mounted if mounting style #1 is used.

D Available Sizes (in.)
3 1/2" and wider

S Series Slot Diffusers

MARGIN STYLE	SLOT	DIFFUSER ONLY Mounting Style 0	with Hanger Bracket Mounting Style 1	with No. 2 Standard Mounting Plaster Frame	with No. 3 Wall-Mounting Plaster Frame
	1" 3/4" 1/2"				
	1" 3/4" 1/2"				
	1" 3/4" 1/2"		HOW TO ORDER S Number of slots 01 to 10 STYLE 1 - Diffuser Only 2 - Diffuser w/Pattern Controller 3 - Diffuser w/Damper 4 - Diffuser w/Pattern Controller and Damper FINISH (SA, W) LENGTH (in.) END CAPS E1 - One End E2 - Both Ends 00 - None MOUNTING STYLE 0 - None (Diffuser only) 1 - Hanger Bracket* 2 - Standard Mounting Frame 3 - Wall Mounting Frame 4 - Wall-to-Wall Mounting Frame MARGIN (see pages 45-46) B E F L TYPE 50 - 1/2" Slot 75 - 3/4" Slot 10 - 1" Slot		
	1" 3/4" 1/2"				

Note: Narrow regress T-Bar ceiling only.

- Extruded aluminum construction
- Three slot sizes: 1/2" slot, 3/4" slot, 1" slot
- One to ten slots wide for air volume of 10-350 cfm per foot
- Adjustable pattern controller
- Four margin styles
- Maximum one-piece length 72", lengths over 72" made in multiple units with keyway splices for even continuous lengths. Any fractional inch increment of length.
- Available as diffuser only, diffuser with damper or pattern controller, and diffuser with damper and pattern controller. See style details on page 41.

See page 47 for distribution plenums.

Note: The width dimension is determined by the slot width and the number of slots.

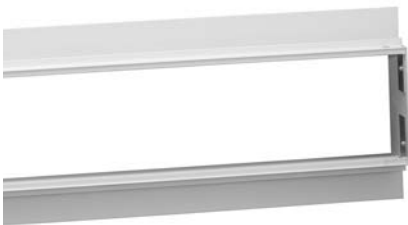
* When using the larger bracket for sheetrock, the E margin is recommended.



Damper

Single-leaf dampers are furnished in each slot opening throughout the entire diffuser length when specified. Dampers are fastened to the margin and are spring-loaded to hold their setting at all duct pressures. Multiple dampers are furnished for grille lengths over 24 inches.

Dampers are part of the S Series and are not specified separately.



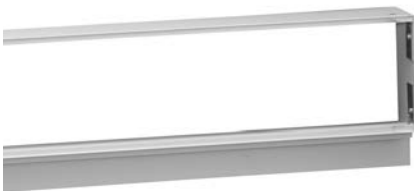
Frames

Plaster frames are available to provide a positive-dimensioned ceiling or wall opening for the diffuser or grille.

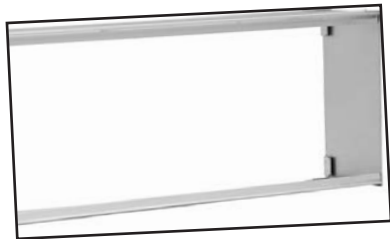
Frames for S Series diffusers are furnished with formed bridge spacers to maintain a uniform, rigid opening during installation. The duct collar is fastened to the frame.

See specific S Series for frame dimensions and installation details.

No. 2



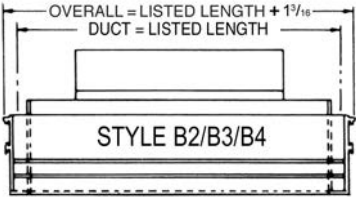
No. 3



No. 4

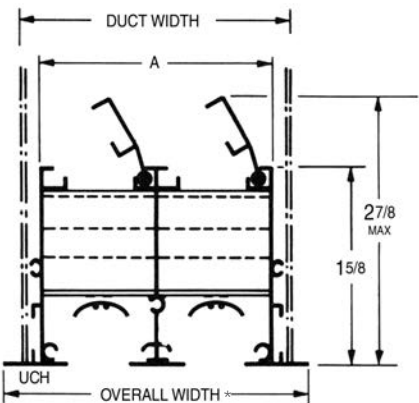
STYLE DETAILS			
1		2	
DIFFUSER ONLY		DIFFUSER AND PATTERN CONTROLLER	
3		4	
DIFFUSER AND DAMPER		DIFFUSER, DAMPER AND PATTERN CONTROLLER	

Linear and Slot Diffusers



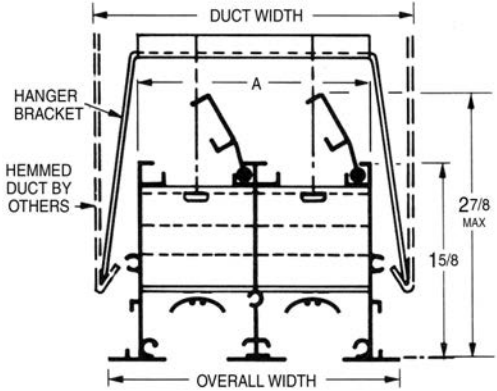
STYLE B0 Also for T-Bar applications

Order 22³/₄" or
46³/₄" lengths
with End Caps.



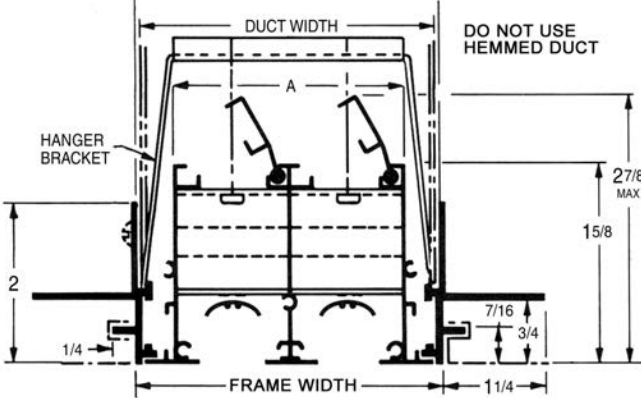
*Overall width is only 5/16" greater than the duct width.

STYLE B1

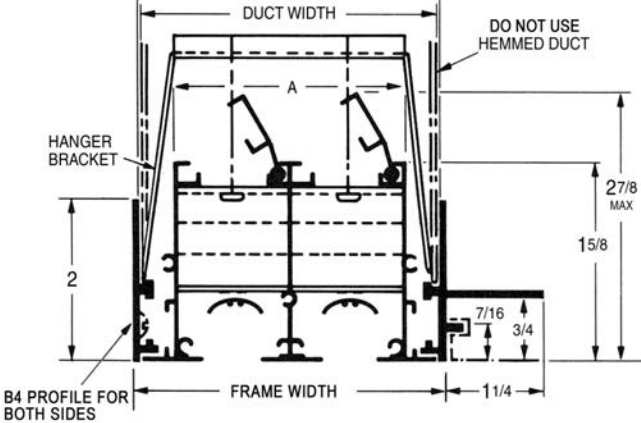


Duct
width
equals
overall
width.

STYLE B2



STYLE B3/B4



Style B0

Dimension	Type	Number of Slots										Duct Width	Overall Width
		1	2	3	4	5	6	7	8	9	10		
A	50	1 ¹ / ₄	2 ¹ / ₂	3 ³ / ₄	5	6 ¹ / ₄	7 ¹ / ₂	8 ³ / ₄	10	11 ¹ / ₄	12 ¹ / ₂	A + ⁷ / ₁₆	A + ³ / ₄
	75	1 ¹ / ₂	3	4 ¹ / ₂	6	7 ¹ / ₂	9	10 ¹ / ₂	12	13 ¹ / ₂	15	A + ⁷ / ₁₆	A + ³ / ₄
	10	1 ³ / ₄	3 ¹ / ₂	5 ¹ / ₄	7	8 ³ / ₄	10 ¹ / ₂	12 ¹ / ₄	14	15 ³ / ₄	17 ¹ / ₂	A + ⁷ / ₁₆	A + ³ / ₄

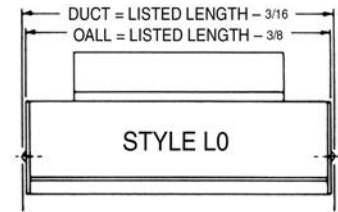
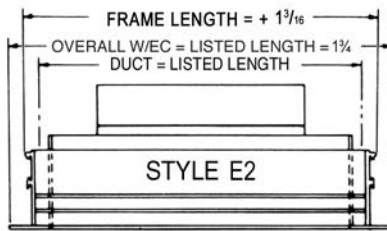
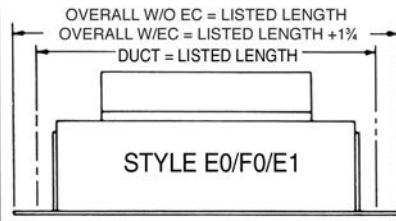
Style B1

Dimension	Type	Number of Slots										Duct Width	Overall Width
		1	2	3	4	5	6	7	8	9	10		
A	50	1 ¹ / ₄	2 ¹ / ₂	3 ³ / ₄	5	6 ¹ / ₄	7 ¹ / ₂	8 ³ / ₄	10	11 ¹ / ₄	12 ¹ / ₂	A + ³ / ₄	A + ³ / ₄
	75	1 ¹ / ₂	3	4 ¹ / ₂	6	7 ¹ / ₂	9	10 ¹ / ₂	12	13 ¹ / ₂	15	A + ³ / ₄	A + ³ / ₄
	10	1 ³ / ₄	3 ¹ / ₂	5 ¹ / ₄	7	8 ³ / ₄	10 ¹ / ₂	12 ¹ / ₄	14	15 ³ / ₄	17 ¹ / ₂	A + ³ / ₄	A + ³ / ₄

Style B2/B3/B4

Dimension	Type	Number of Slots										Duct Width	Frame Width
		1	2	3	4	5	6	7	8	9	10		
A	50	1 ¹ / ₄	2 ¹ / ₂	3 ³ / ₄	5	6 ¹ / ₄	7 ¹ / ₂	8 ³ / ₄	10	11 ¹ / ₄	12 ¹ / ₂	A + ¹³ / ₁₆	A + ¹⁵ / ₁₆
	75	1 ¹ / ₂	3	4 ¹ / ₂	6	7 ¹ / ₂	9	10 ¹ / ₂	12	13 ¹ / ₂	15	A + ¹³ / ₁₆	A + ¹⁵ / ₁₆
	10	1 ³ / ₄	3 ¹ / ₂	5 ¹ / ₄	7	8 ³ / ₄	10 ¹ / ₂	12 ¹ / ₄	14	15 ³ / ₄	17 ¹ / ₂	A + ¹³ / ₁₆	A + ¹⁵ / ₁₆

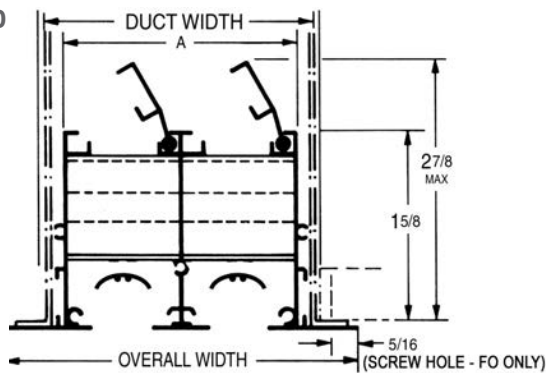
Linear and Slot Diffusers



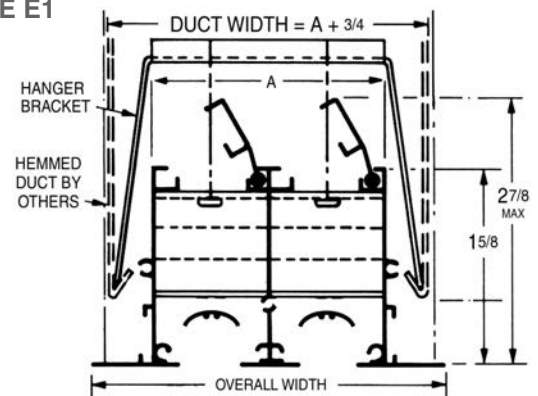
STYLE E0/F0

Also for
T-Bar
applications

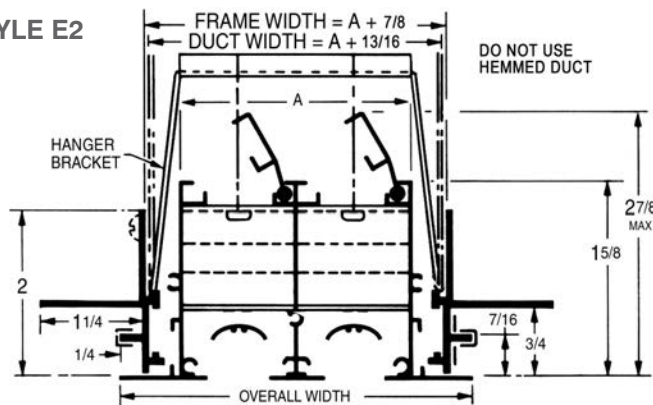
For E0, order 22"
and 46" lengths
with End Caps.



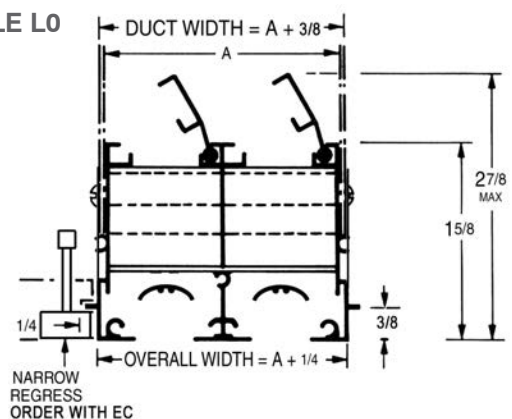
STYLE E1



STYLE E2



STYLE L0



Style E1

Dimension	Type	Number of Slots										Overall Width
		1	2	3	4	5	6	7	8	9	10	
A	50	1 1/4	2 1/2	3 3/4	5	6 1/4	7 1/2	8 3/4	10	11 1/4	12 1/2	A + 1 1/2
	75	1 1/2	3	4 1/2	6	7 1/2	9	10 1/2	12	13 1/2	15	A + 1 1/2
	10	1 3/4	3 1/2	5 1/4	7	8 3/4	10 1/2	12 1/4	14	15 3/4	17 1/2	A + 1 1/2

Style E2

Dimension	Type	Number of Slots										Overall Width
		1	2	3	4	5	6	7	8	9	10	
A	50	1 1/4	2 1/2	3 3/4	5	6 1/4	7 1/2	8 3/4	10	11 1/4	12 1/2	A + 1 1/2
	75	1 1/2	3	4 1/2	6	7 1/2	9	10 1/2	12	13 1/2	15	A + 1 1/2
	10	1 3/4	3 1/2	5 1/4	7	8 3/4	10 1/2	12 1/4	14	15 3/4	17 1/2	A + 1 1/2

Style E0/F0

Dimension	Type	Number of Slots										Duct Width	Overall Width
		1	2	3	4	5	6	7	8	9	10		
A	50	1 1/4	2 1/2	3 3/4	5	6 1/4	7 1/2	8 3/4	10	11 1/4	12 1/2	A + 7/16	A + 1 1/2
	75	1 1/2	3	4 1/2	6	7 1/2	9	10 1/2	12	13 1/2	15	A + 7/16	A + 1 1/2
	10	1 3/4	3 1/2	5 1/4	7	8 3/4	10 1/2	12 1/4	14	15 3/4	17 1/2	A + 7/16	A + 1 1/2

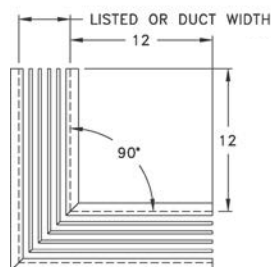
Style L0

Dimension	Type	Number of Slots									
		1	2	3	4	5	6	7	8	9	10
A	50	1 1/4	2 1/2	3 3/4	5	6 1/4	7 1/2	8 3/4	10	11 1/4	12 1/2
	75	1 1/2	3	4 1/2	6	7 1/2	9	10 1/2	12	13 1/2	15
	10	1 3/4	3 1/2	5 1/4	7	8 3/4	10 1/2	12 1/4	14	15 3/4	17 1/2

Linear and Slot Diffusers



**S SERIES
MITERED CORNERS**



S Series Mitered Corners

90-degree mitered corners are available as factory-fabricated section. Precise factory cutting and assembly reduces field fabrication time and assures proper fit. Corner sections are furnished and blanked off. Corner sections butt to adjacent straight sections, which are spliced together with aligning keys.

Mitered corners are furnished in style #4 (with pattern controller and damper). When viewed from the room side, the mitered corner section appears identical to the butting straight sections.

Plaster frame mitered corners can be specified with the outlet mitered corner.

Mitered Corner Sections Order as:

S _____ **MC** 90

NO. OF SLOTS
01 - 10

TYPE
50 - 1/2" Slot
75 - 3/4" Slot
10 - 1" Slot

FINISH
SA - Satin Anodized
W - Painted White

MITER TYPE
C - Ceiling
SI - Sidewall Inside
SO - Sidewall Outside

MOUNTING STYLE
0 - None (Diffuser only)
1 - Hanger Bracket
2 - Standard Mounting Frame
3 - Wall Mounting Frame
4 - Wall-to-Wall Mounting Frame

MARGIN (see page 43)

Note: Margins ordered without mounting frame may require hanger brackets and inside hemmed duct for installation.

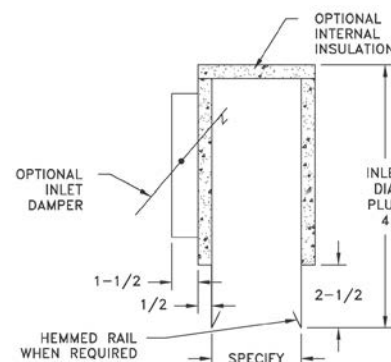


DP Distribution Plenum

- Galvannealed steel construction
- For L and S Series Linears and Slots
- Available in insulated or noninsulated designs

DP Available Sizes

12", 24", 36", 48", 60", 72" lengths



DP

I - Internally insulated
N - Noninsulated

Number of slots for slot diffuser. Listed width in inches for linear bar grilles

S - Slots for slot diffusers
W - Listed width for linear bar grilles

Inlet size 5" to 12"

N - No Inlet
O - Oval Inlet
R - Round Inlet

D - Inlet Damper
N - No Damper

H - Hemmed rail for concealed mfg. hanger brackets - Do not use with mounting frames
S - Straight sides - Use with all mounting frames

Nominal Length - 12" to 72"

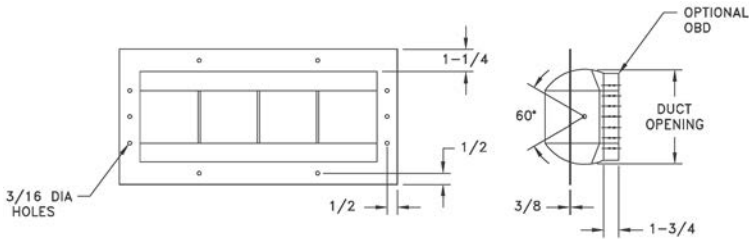


DL Drum Louver

- All-aluminum construction
- Horizontal and vertical air stream control
- Galvanized, opposed-blade damper (optional)
- Adjustable drum and vane design
- White or Mill finish

Drum Louver Available Sizes	
6" x 12", 6" x 18", 6" x 24", 6" x 30", 6" x 48", 6" x 60"	
10" x 20", 10" x 25", 10" x 30", 10" x 35", 10" x 40", 10" x 50"	
12" x 30", 12" x 40", 12" x 50", 12" x 70"	
15" x 30", 15" x 50", 15" x 60", 15" x 70"	

Order H x W



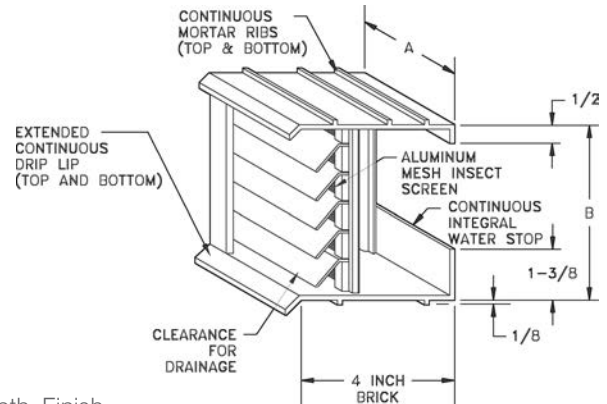
Duct Opening Sizing		
Listed Height Size	Duct Opening Height	Duct Opening Width
6	Listed Size Plus 5/8	Listed Size Plus 1 1/8
10	Listed Size Plus 3/8	Listed Size Plus 1 1/8
12	Listed Size Plus 3/8	Listed Size Plus 1 1/8
15	Listed Size Plus 3/8	Listed Size Plus 1 1/8

Other sizes not available.



BV Brick/Block Vent

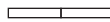
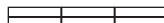
- Extruded aluminum construction
- Standard masonry size
- Maximum water protection
- 6063-T5 extruded aluminum alloy
- 18 x 16 mesh aluminum insect screen standard
- 4" standard depth
- Satin Anodized finish



Note: To order specify Model, Depth, Finish

Example: BV168 4 SA

DIMENSIONS/FREE AREA

	BV Model	Masonry Opening Size	A Width Inches	B Height Inches	Free Area Sq. Ft.
STANDARD BRICK	802	ONE BRICK 	8	2 1/2	.01
	805	TWO BRICK 	8	4 3/4	.06
	162	TWO BRICK 	16 3/8	2 1/2	.02
	808	THREE BRICK 	8	7 1/2	.13
	242	THREE BRICK 	24 3/4	2 1/2	.04
	165	FOUR BRICK 	16 3/8	4 3/4	.14
	168	SIX BRICK 	16 3/8	7 1/2	.30
	245	SIX BRICK 	24 3/4	4 3/4	.23
	248	NINE BRICK 	24 3/4	7 1/2	.50
JUMBO BRICK	122	ONE JUMBO 	11 5/8	2 1/2	.02
	125	TWO JUMBO 	11 5/8	4 3/4	.10
	128	THREE JUMBO 	11 5/8	7 1/2	.21
MODULAR BLOCK	158	STANDARD BLOCK 	15 1/2	7 1/2	.30
	318	TWO STANDARD BLOCK 	31 3/8	7 1/2	.66
	168	JUMBO BLOCK 	16 3/8	7 1/2	.30

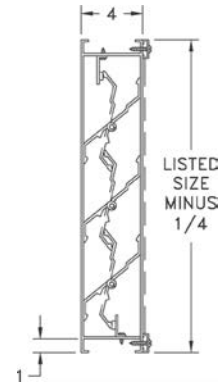
Notes:

1. Brick/Block vent depths are identical with or without the optional opposed-blade damper.
2. Contact factory regarding applications requiring custom size widths and/or heights.
3. Masonry opening sizes listed are representative of the blocks or bricks shown. Field dimensions must be verified to guarantee fit.



4ABC Adjustable Louver

- Extruded aluminum construction
- Adjustable baffle blades on 4" centers
- 4" louver depth
- Channel frame
- Max. one-piece size 60" W x 72" H
- Mill finish standard
- Lever activated, manually
- Blades open to 45°; closes fully



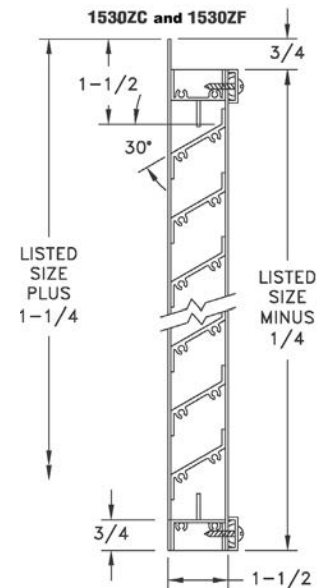
1530ZC Shown

1530ZC Stationary Louver

- Extruded aluminum construction
- Fixed Z blade louver
- Blades at 30-degree angle
- 1 1/2" louver depth
- Channel frame
- Available with bird screen or insect screen
- Mill finish standard

1530ZF Stationary Louver

- Extruded aluminum construction
- Fixed Z blade louver
- Blades at 30-degree angle
- 1 1/2" louver depth
- Flange frame
- Available with bird screen or insect screen
- Mill finish standard



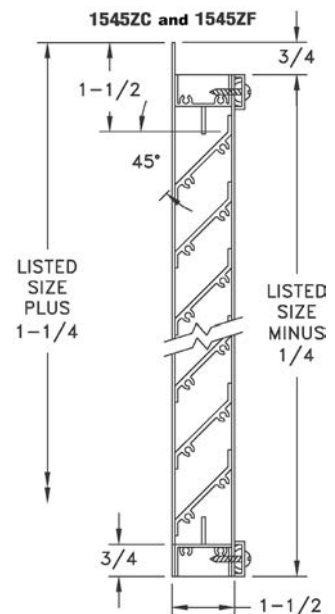
1545ZF Shown

1545ZC Stationary Louver

- Extruded aluminum construction
- Fixed Z blade louver
- Blades at 45-degree angle
- 1 1/2" louver depth
- Channel frame
- Available with bird screen or insect screen
- Mill finish standard

1545ZF Stationary Louver

- Extruded aluminum construction
- Fixed Z blade louver
- Blades at 45-degree angle
- 1 1/2" louver depth
- Flange frame
- Available with bird screen or insect screen
- Mill finish standard



Louvers



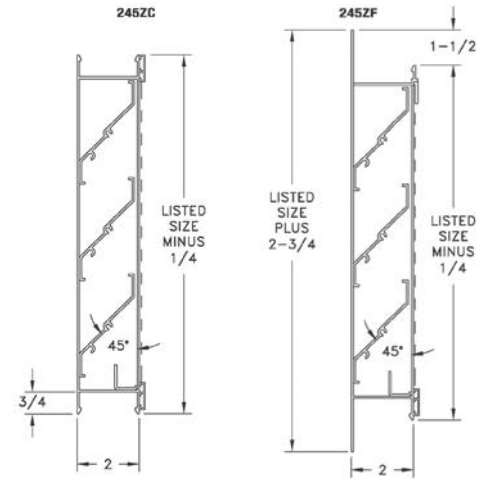
245ZF Shown

245ZC Stationary Louver

- Extruded aluminum construction
- Fixed-blade louver
- Blades at 45-degree angle
- 2" louver depth
- Channel frame
- Available with bird screen or insect screen
- Mill finish standard

245ZF Stationary Louver

- Extruded aluminum construction
- Fixed-blade louver
- Blades at 45-degree angle
- 2" louver depth
- Flange frame
- Available with bird screen or insect screen
- Mill finish standard



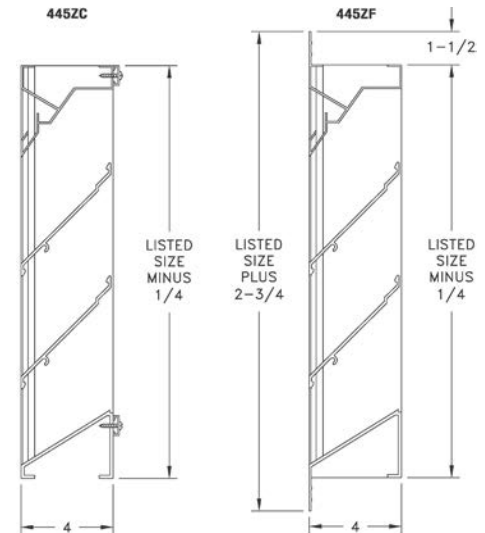
445ZF Shown

445ZC Stationary Louver

- Extruded aluminum construction
- Fixed-blade louver
- Blades at 45-degree angle
- 4" louver depth
- Channel frame
- Available with bird screen or insect screen
- Mill finish standard

445ZF Stationary Louver

- Extruded aluminum construction
- Fixed-blade louver
- Blades at 45-degree angle
- 4" louver depth
- Flange frame
- Available with bird screen or insect screen
- Mill finish standard



645ZC Shown

645ZC Fixed Louver

- Extruded aluminum construction
- Fixed-blade louver
- Blades at 45-degree angle
- 6" louver depth
- Channel frame
- Available with bird screen or insect screen
- Mill finish standard

645ZF Fixed Louver

- Extruded aluminum construction
- Fixed-blade louver
- Blades at 45-degree angle
- 6" louver depth
- Flange frame
- Available with bird screen or insect screen
- Mill finish standard

T-Bar Construction Features



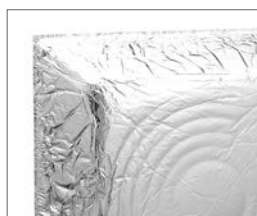
Our popular supply and return products for T-Bar ceilings are an innovative response to the challenge of creating a better indoor environment. T-Bar products combine clean appearance with installation ease, and include critical design details to ensure consistent performance. Glass fiber insulation minimizes condensation, and the aluminum foil vapor barrier protects the insulation from moisture, if condensation occurs.

Patented adjustable deflectors permit a variety of directional patterns and minimizes static pressure loss.

A unique modular collar system provides a standard collar and damper unit, which can be shared between a number of different T-Bar products. In addition, Hart & Cooley offers specialty T-Bar products to meet specific design demands. Surfaire® diffusers feature deflector apertures that enhance mixing of conditioned air.

T-Bar products are offered in lanced, perforated, louvered and fixed-bar face styles, with steel or molded fiberglass backs. They include a choice of easy mounting systems and adjustable damper designs.

T-Bar Return-Air Filter Grilles



See page 54 for fiberglass specifications.

659T

Steel

Lanced Filter Grille

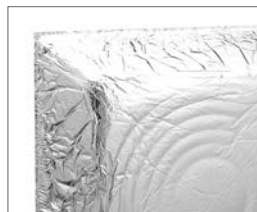
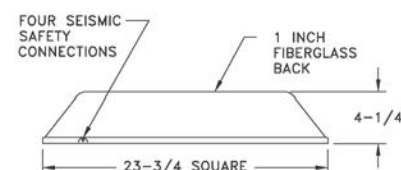
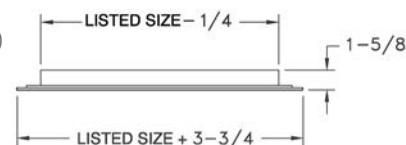
- Steel construction
- Lanced-face design with $\frac{1}{3}$ " blade spacing
- Flush, removable face with concealed latches and hinges can be installed in any direction
- Uses standard 1" disposable filters (not furnished)
- Bright White finish

659TI With Insulated Back

Includes these features

- Molded fiberglass back R4.2, R6 (see information on page 54)
- Accepts 6" to 14" unique tab collar (6400 series) or 6" to 16" unique snap-in collar (5400 and 5400PP series); also accepts standard spin-in collar
- Frame includes four seismic safety connections

659T / 659TI Available Sizes	
20" x 20" with extended frame (overall $23\frac{3}{4}$ " x $23\frac{3}{4}$ ")	for 24" x 24" openings
44" x 20" with extended frame (overall $47\frac{3}{4}$ " x $23\frac{3}{4}$ ")	for 48"x24" opening (659T only)



673T

Steel

Filter Grille

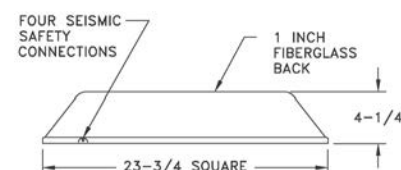
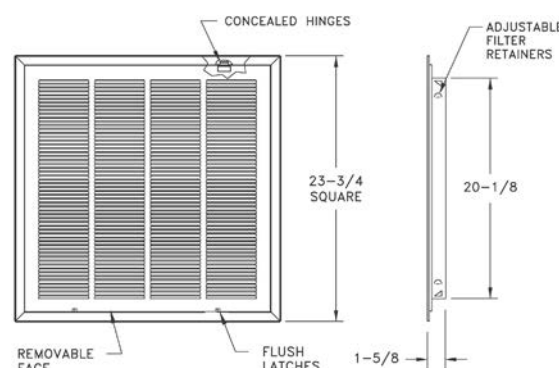
- Steel construction
- Lanced-face design with $\frac{1}{2}$ " blade spacing
- Flush, removable face with concealed latches and hinges can be installed in any direction
- Uses standard 1" disposable filters (not furnished)
- Bright White finish

673TI With Insulated Back

Includes these features

- Molded fiberglass back R4.2, R6 (see information on page 54)
- Accepts 6" to 14" unique tab collar (6400 series) or 6" to 16" unique snap-in collar (5400 and 5400PP series); also accepts standard spin-in collar
- Frame includes four seismic safety connections

673T/673TI Available Size	
20" x 20", overall $23\frac{3}{4}$ " x $23\frac{3}{4}$ "	



T-Bar Return-Air Filter Grilles



673TPI R6

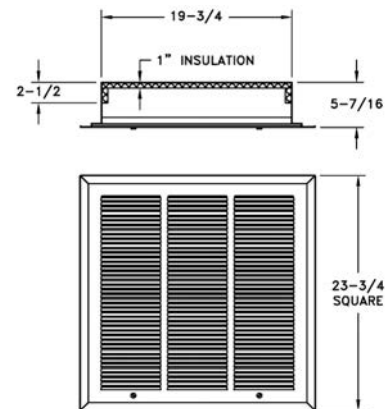
Steel

Filter Grille

- Steel construction
- Lanced-face design with 1/2" blade spacing
- Flush, face with screwdriver latches and piano hinges can be installed in any direction
- Plenum box with R6 insulated ductboard
- Uses standard 1" disposable filters (not furnished)
- Bright White finish

673TPI R6 Available Size

20" x 20", overall 23³/₄" x 23³/₄"



Molded Fiberglass Back

R4.2, R6 & R8

- These fiberglass backs are sold separately for field installation. (Glue or double sided tape recommended)
- Available in 4.2, 6.0 and 8.0 "R" values
- Recommended for T-bar diffusers without steel back panel
- Accepts 6"-14" tab collars (6400 series) or 6"-18" snap in collar (5400 & 5400PP Series)
- Accepts standard spin-in collar

- Bonded foil vapor barrier minimizes condensation
- Fiberglass back meets or exceeds the following tests and ratings:
Meets 25/50 tested in accordance with A.S.T.M. E84 (UL723)
UL181 Erosion and Impact Test, and will not support microbial growth

Note: Attachment of molded fiberglass back and 5400 collar requires 5400PP (push pins).



96AFBT

Steel

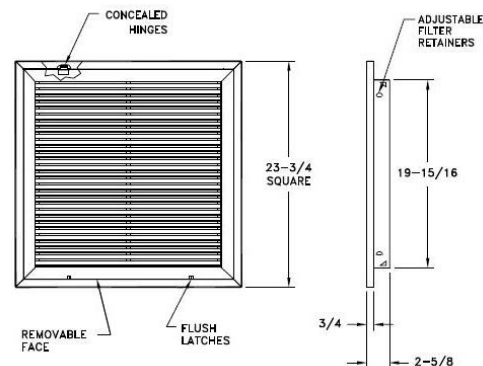
Fixed-Bar Filter Grille

- All-steel construction
- Bar-style face design
- Flush, removable face with concealed latches and hinges, can be installed in any direction
- Uses standard 1" disposable filters (not furnished)
- Bright White finish
- Specify 96AFBT2 for 2" filters

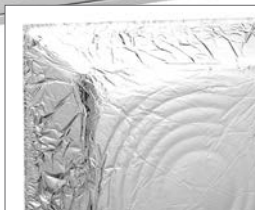
96AFBT Available Sizes

20" x 20", overall 23³/₄" x 23³/₄"

44" x 20", overall 47³/₄" x 23³/₄"



T-Bar Return-Air Filter Grilles



See page 54 for fiberglass specifications.

96AFBTI

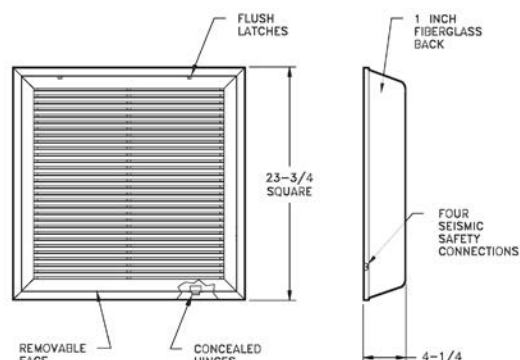
Steel

Fixed-Bar Filter Grille with Fiberglass Back

- Steel construction
- Bar-style face design
- Flush, removable face with concealed latches and hinges, can be installed in any direction
- R4.2 molded fiberglass back
- Accepts 6" to 14" unique tab collar (6400 series) or 6" to 16" unique snap-in collar (5400 and 5400PP series); also accepts standard spin-in collar
- Frame includes four seismic safety connections
- Uses standard 1" disposable filters (not furnished)
- Bright White finish

96AFBTI Available Size

20" x 20", overall 23³/₄" x 23³/₄"



RHF45T

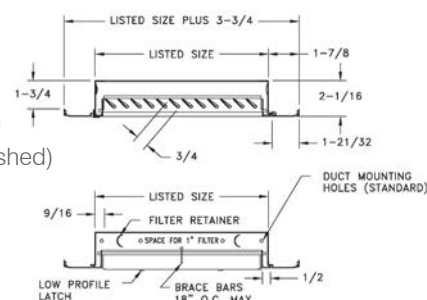
Aluminum

Bar-Style Filter Grille

- Extruded aluminum construction
- Bar-style face
- Hinged to filter frame, removable face
- Mounts flush with T-Bar ceilings
- Filter grilles equipped with plastic slide latch
- Uses standard 1" disposable filter (not furnished)
- Bright White or Satin Anodized finish
- Specify RHF45T2 for 2" filters

RHF45T Available Sizes

20" x 20" with extended frame (overall 23³/₄" x 23³/₄") for 24" x 24" openings
44" x 20" with extended frame (overall 47³/₄" x 23³/₄") for 48" x 24" openings



RCBFT

Aluminum

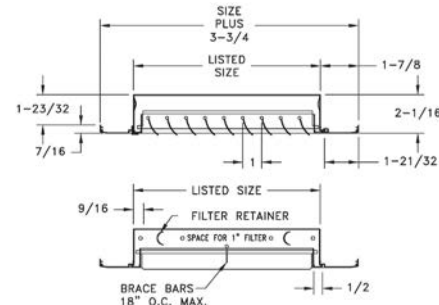
Curved-Blade Filter Grille

- Extruded aluminum construction
- Curved-blade style face
- Hinged to filter frame
- Mount flush with T-Bar ceilings
- Filter grilles equipped with plastic slide latch
- Uses standard 1" disposable filter (not furnished)
- Bright White or Satin Anodized finish

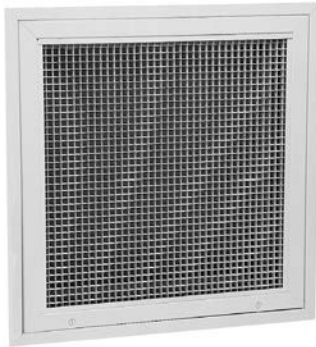
RCBFT Available Sizes

20" x 20" with extended frame (overall 23³/₄" x 23³/₄") for 24" x 24" openings
44" x 20" with extended frame (overall 47³/₄" x 23³/₄") for 48" x 24" openings

Engineering Data not available



T-Bar Return-Air Filter Grilles



REF5T/REF5TI

Aluminum Egg Crate Filter Grille

- Aluminum and steel construction
- Egg crate style face
- Non-removable face, hinged to filter frame
- Mount flush with T-Bar ceilings
- REF5T with thumb screw fasteners, REF5TI with cam lock
- Uses standard 1" disposable filter (not furnished)
- Bright White or Mill Aluminum finish
- Specify REF5T2 for 2" filters

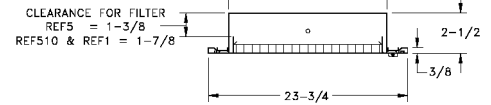
REF5T/
REF5TI

REF5T
only

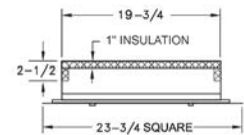
Available Sizes

20" x 20" with extended frame (overall 23 ³ / ₄ " x 23 ³ / ₄ ") for 24" x 24" openings
44" x 20" with extended frame (overall 47 ³ / ₄ " x 23 ³ / ₄ ") for 48" x 24" openings

REF5T



REF5TI R4.2 R6.0

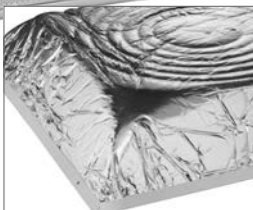
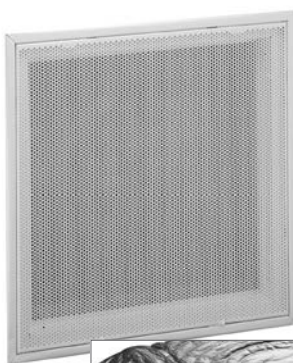
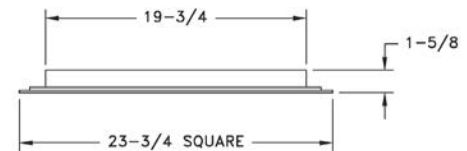


PFT Steel Perforated Filter Grille

- Steel construction
- Perforated face design
- Flush, removable face with concealed latches and hinges, can be installed in any direction
- Uses standard 1" disposable filter (not furnished)
- Bright White finish

PFT Available Size

20" x 20", overall 23³/₄" x 23³/₄"

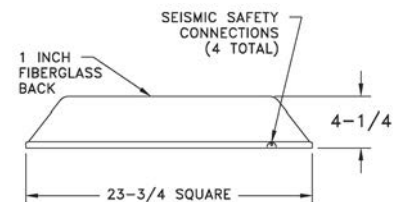


PFTI Steel Perforated Filter Grille with Insulated Back

- Steel construction
- Perforated face design
- Flush, removable face with concealed latches and hinges, can be installed in any direction
- Molded fiberglass back, available in R4.2 or R6.0
- Accepts 6" to 14" unique tab collar (6400 series) or 6" to 16" unique snap-in collar (5400 and 5400PP series); also accepts standard spin-in collar
- Frame includes four seismic safety connections
- Uses standard 1" disposable filters (not furnished)
- Bright White finish

PFTI Available Size

20" x 20", overall 23³/₄" x 23³/₄"



See page 54 for fiberglass specifications.

T-Bar Return-Air Grilles

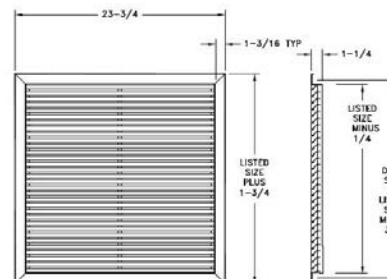


94AT Steel Bar-Style Return Grille

- Steel construction
- Mount flush with T-Bar ceilings
- Bright White finish

94AT Available Sizes

22" x 22" (overall 23 ³ / ₄ " x 23 ³ / ₄ ") for 24" x24" openings
46" x 22" (overall 47 ³ / ₄ " x 23 ³ / ₄ ") for 48" x 24" openings

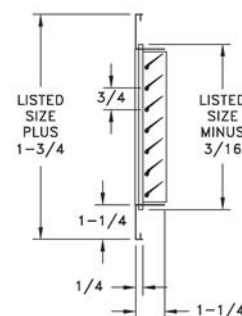


RH45T Aluminum Bar-Style Return Grille

- Extruded aluminum construction
- Horizontal bars at 45 degree
- Mount flush with T-Bar ceilings
- Bright White or Satin Anodized finish

RH45T Available Sizes

22" x 22" (overall 23 ³ / ₄ " x 23 ³ / ₄ ") for 24" x24" openings
46" x 22" (overall 47 ³ / ₄ " x 23 ³ / ₄ ") for 48" x 24" openings



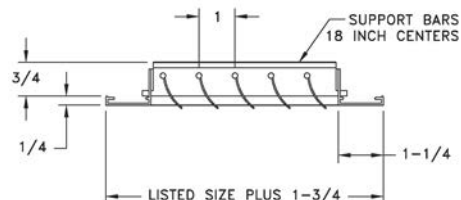
RCBT Aluminum Curved-Blade Return Grille

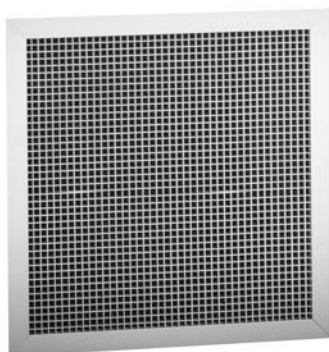
- Extruded aluminum construction
- Horizontal curved blades
- Mount flush with T-Bar ceilings
- Bright White or Satin Anodized finish

RCBT Available Sizes

22" x 22" (overall 23 ³ / ₄ " x 23 ³ / ₄ ") for 24" x24" openings
46" x 22" (overall 47 ³ / ₄ " x 23 ³ / ₄ ") for 48" x 24" openings

Engineering Data not available



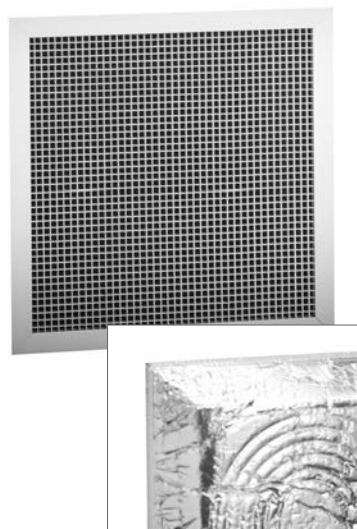
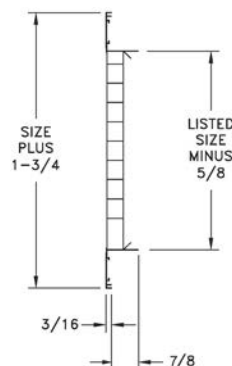


RE5T Aluminum Egg Crate Return Grille

- All aluminum construction
- Egg crate style face
- Mount flush with T-Bar ceilings
- Bright White or Mill Aluminum finish

RE5T Available Sizes

22" x 22" (overall 23 ³ / ₄ " x 23 ³ / ₄ ") for 24" x 24" openings
22" x 46" (overall 47 ³ / ₄ " x 23 ³ / ₄ ") for 48" x 24" openings

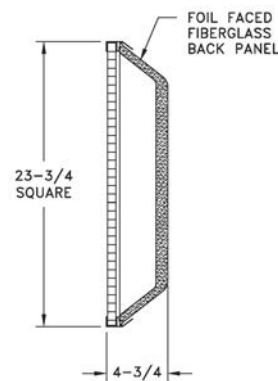


RE5TI Aluminum Egg Crate Return Grille with Insu- lated Back

- All aluminum construction
- Egg crate style face
- R4.2 molded fiberglass back
- Accepts 6" to 14" unique tab collar (6400 series) or 6" to 16" unique snap-in collar (5400 and 5400PP series); also accepts standard spin-in collar
- Bright White finish
- No steel, great for MRI rooms

RE5TI Available Size

grid core face 1/2" x 1/2" x 1/2"



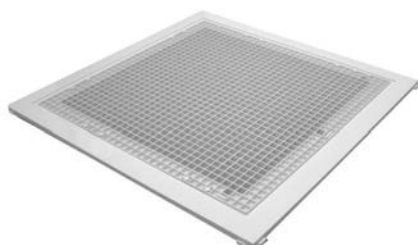
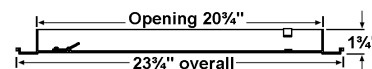
See page 54 for fiberglass specifications.

Rezzin Plastic T-Bar Egg- Crate Filter Grille

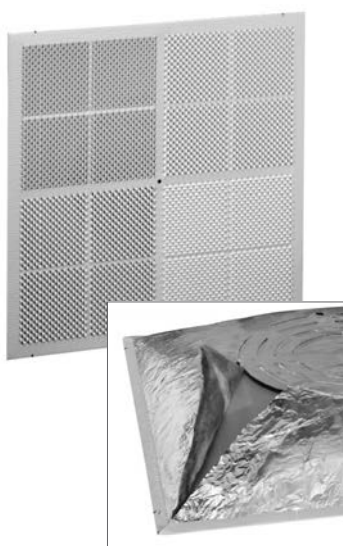
- Egg crate style face, 1/2" x 1/2" x 1/2" grid pattern
- Face is hinged to filter frame
- Mounts flush with T-bar ceilings
- Uses Rezzin back panel or standard fiberglass back
- Uses standard 1" disposable filters
- Bright white finish
- Contains metal screws

Available Size

20" x 20", overall 23³/₄" x 23³/₄"



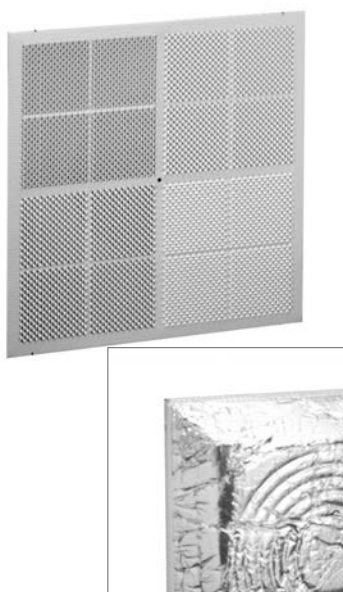
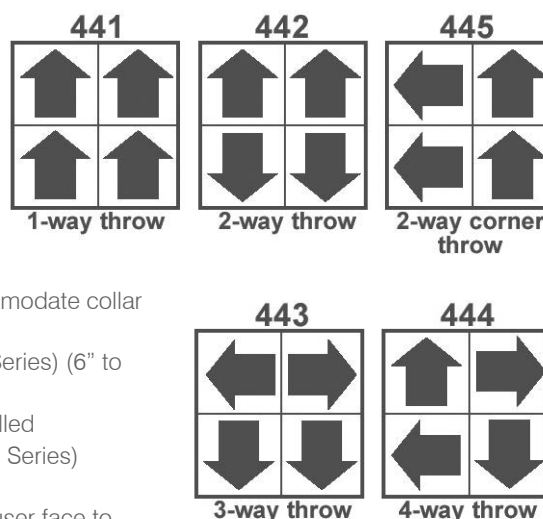
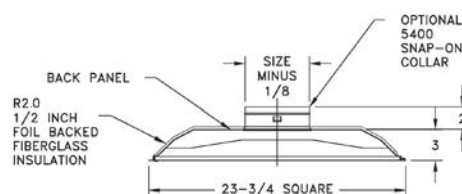
T-Bar Surfaire/Renovator Diffusers



444 SurfAire® Aluminum Face Renovator Series Diffuser

- Aluminum face
- Unique deflector apertures
- Air distributed in thin layers along ceiling surface allowing optimum mixing of conditioned air
- Formed galvanized steel back panel
- Frame includes four seismic safety connections
- Back plate covered with glass fiber insulation to reduce condensation
- Aluminum foil vapor barrier protects insulation from harmful effects of condensation
- Insulation prescored to accommodate collar size desired
- Accepts snap-in collar (5400 Series) (6" to 12")
- 444 - 14" collar is factory-installed
- Utilizes butterfly damper (3800 Series) inserted in collar
- Damper adjusted through diffuser face to allow proper air balancing
- Bright White finish

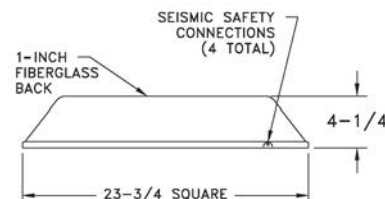
444 Available Size
overall size 23 ³ / ₄ " x 23 ³ / ₄ "



REN4 Aluminum Face Renovator Series Diffuser with Insulated Back

- Aluminum face
- Unique deflector apertures
- Molded fiberglass back panel, available in R4.2 or R6
- Accepts 6" to 14" unique tab collar (6400 series) or 6" to 16" unique snap-in collar (5400 and 5400PP series); also accepts standard spin-in collar
- Frame includes four seismic safety connections
- Bright White finish

REN4 Available Size
20" x 20", overall 23 ³ / ₄ " x 23 ³ / ₄ "



See page 54 for fiberglass specifications.

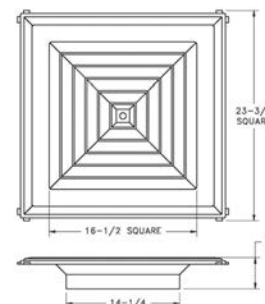
T-Bar Rezzin Diffusers



4-Way Rezzin T-Bar Diffuser

- Engineered polymer construction
- Four-way deflection
- Available with Rezzin square-to-round, ordered separately
- Bright White finish
- Contains metal screws

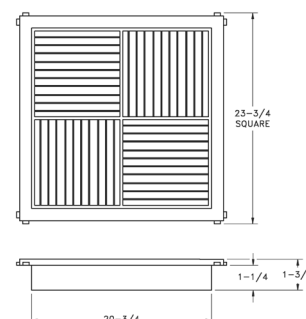
4-Way Diffuser Available Size (in.)
24 x 24



Rezzin T-Bar Modular Core Diffuser

- Engineered polymer construction
- Modular cores provide one, two, three, or four-way horizontal air patterns
- Removable modules provide easy access to accessories
- Available with Rezzin back panel, ordered separately
- Bright White finish

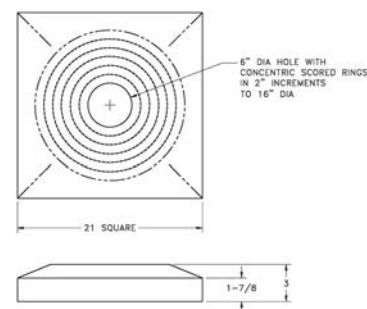
Modular Core Available Size (in.)
24 x 24



Rezzin Back Panel

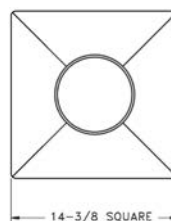
- Engineered polymer construction
- Use 6400 Series Tab Collar
- Bright White finish
- Use with Rezzin Modular Core and Rezzin Egg Crate diffuser

Back Panel Available Size (in.)
24 x 24

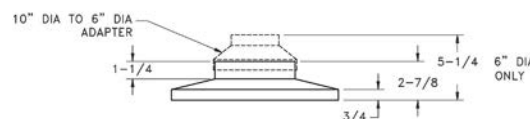


Rezzin Square-to-Round Transition

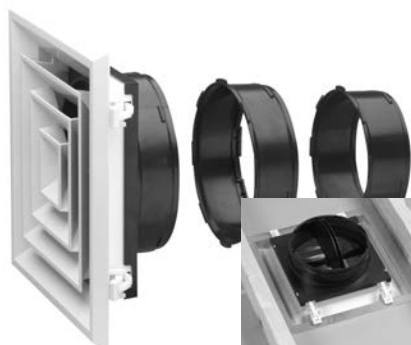
- Engineered polymer construction
- Allows flex duct installation for 4-Way Rezzin Diffuser
- Black finish
- Contains metal screws/clips
- Can use RD damper



Sq to Rd Available Sizes (in.)	
Square Size	Round Neck
14 x 14	6
14 x 14	8
14 x 14	10
14 x 14	12
14 x 14	14



T-Bar Rezzin Diffusers

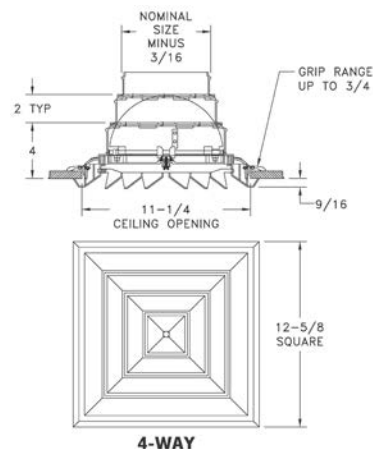


T-Bar Backer Plate or Rafter Rough-In Plate Available

Rezzin Square Ceiling Diffuser

- Engineered polymer construction
- 12"x12" face
- 6", 7" and 8" collars included
- Ratcheting cam lock—install without screws
- Removable core and integral damper
- Available in 4-way, 3-way and 2-way corner
- Bright White finish
- Contains metal parts

Square Available Size (in.)
12 x 12



3-Way



4-Way



2-Way Corner

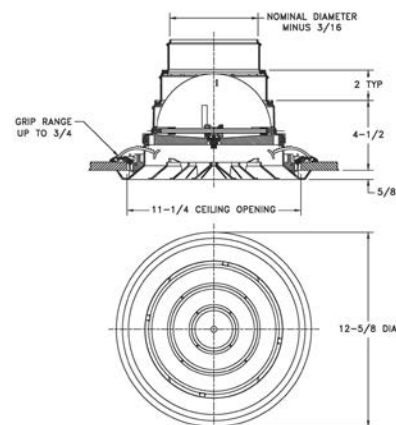


T-Bar Backer Plate or Rafter Rough-In Plate Available

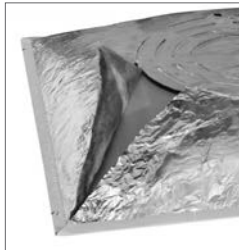
Rezzin Plastic Round Ceiling Diffuser

- Engineered polymer construction
- 12" round face
- 6", 7" and 8" collars included
- Ratcheting cam lock—install without screws
- Removable core and integral damper
- Bright White finish
- Contains metal parts

Round Available Size (in.)
12"



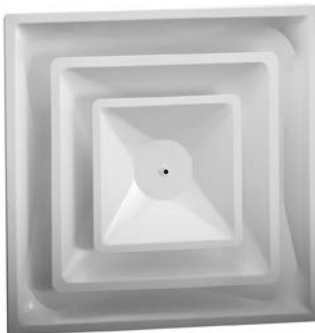
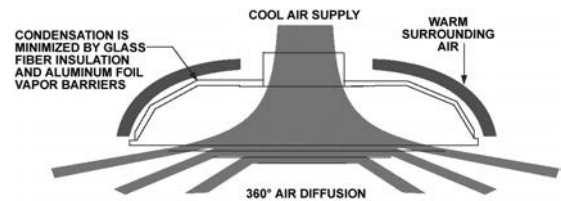
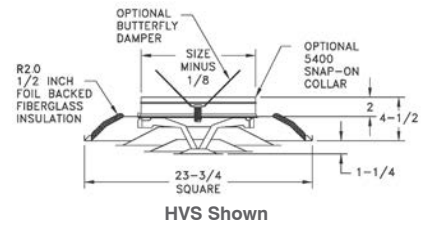
T-Bar Fixed-Pattern Diffusers



HVS/HVS R6 Steel High-Volume Supply

- Steel construction
- Provides high air volume delivery
- 360-degree air diffusion
- Formed back panel
- Fixed core
- Fiberglass insulation blanket with foil vapor barrier to minimize condensation on HVS
- Insulation prescored to accommodate collar size desired
- R6 molded fiberglass back on HVS R6; use 5400 with 5400PP
- Accepts unique 2" high snap-in collar (5400 series) (6" to 12")
- Utilizes butterfly damper (3800 Series) inserted in collar
- Bright White finish
- HVS14-14" collar factory-installed

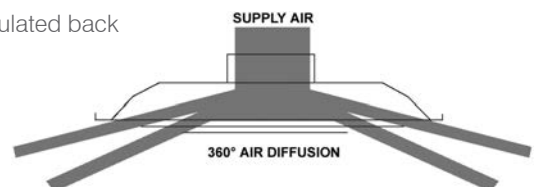
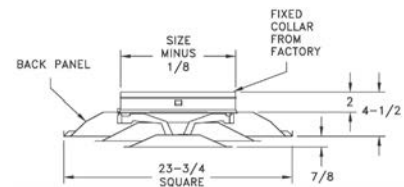
HVS Available Size
Overall Size 23 ³ / ₄ " x 23 ³ / ₄ "



FPD/FPD R6 AFPD/AFP R6 Steel/Aluminum Fixed-Pattern Diffuser

- Steel construction - FPD
- Aluminum construction - AFPD
- Provides high air volume delivery
- 360-degree air diffusion
- Two-cone fixed core
- Fixed collar 6" to 14"
- Unique 2" high collar permits easy flex connections
- Utilizes butterfly damper (3800 Series) inserted in collar; order separately
- Damper adjustable through face
- Formed back panel
- Bright White finish
- FPD R6/AFP R6 features insulated back

FPD T-Bar Available Size
Overall Size 23 ³ / ₄ " x 23 ³ / ₄ "



T-Bar Fixed-Pattern Diffusers

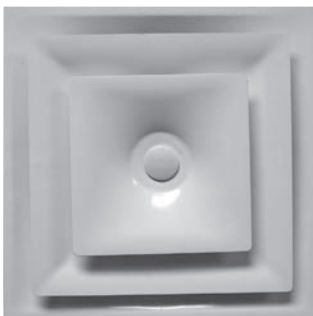
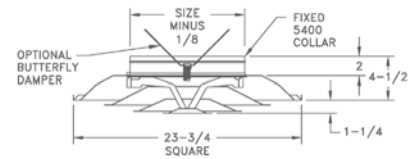
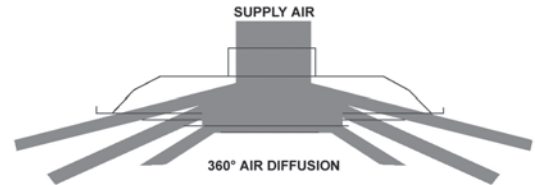


FPD3/FPD3 R6 Steel Fixed-Pattern Diffuser

- Steel construction
- Provides high air volume delivery
- 360-degree air diffusion
- Three cone fixed core
- Fixed collar 6" to 14"
- Unique 2" high collar permits easy flex connections
- Utilizes butterfly damper (3800 Series) inserted in collar—order separately
- Damper adjustable thru face
- Formed steel back panel
- Bright White finish
- FPD3 R6 features insulated back

FPD3 T-Bar Available Size

Overall Size 23³/₄" x 23³/₄"

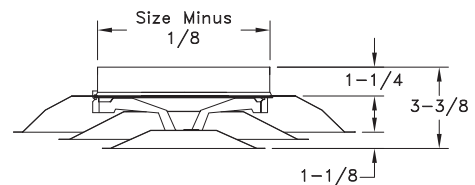


FPD12 Steel Fixed Pattern Diffuser

- Steel construction
- 360-degree air diffusion
- Two-cone fixed core
- Fixed collar
- Removable plug for damper
- Used with SMF (page 74) for surface-mount applications
- Bright White finish
- Accepts Model RD Radial Damper

FPD12 Available Size

Overall Size 11-3/4" x 11-3/4"



T-Bar Fixed-Pattern Diffusers



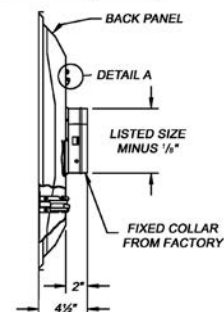
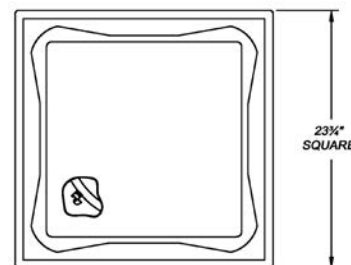
DPD/DPD R6

Steel

T-Bar Plate Diffuser

- Aesthetically appealing, single-face plate design
- 360° air diffusion pattern
- Detachable face plate
- 2" fixed collar
- Optional R6 insulated back (DPD R6)
- White finish

DPD/DPD R6 Available Sizes					
6"	8"	10"	12"	14"	



Removing Face Plate

1. Remove black push pins from hook.
2. Push the face plate towards the back panel. This will disengage the hooks from the backside panel slots (*Detail A*).
3. Rotate the face plate counterclockwise, and pull plate away from back panel and hooks through the slots.

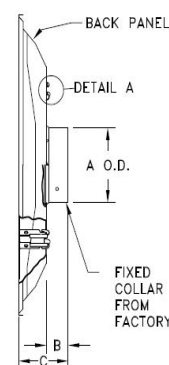
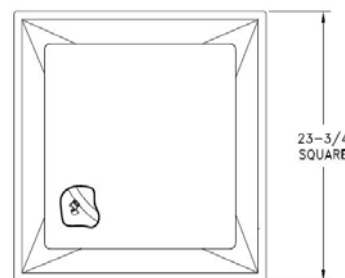


ADPD

Aluminum

T-Bar Plate Diffuser

- Aesthetically appealing, single-face plate design
- 360° air diffusion pattern
- Detachable face plate
- 2" fixed collar
- Constructed of 100% aluminum allowing for MRI applications
- Can be used with SMF 24 x 24 W surface mount frames for drywall applications
- White finish



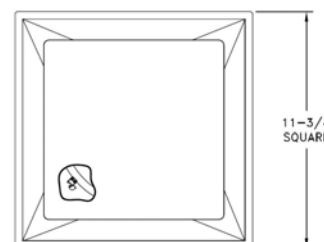
Tbar grid	round duct size	B	C
12 x 12	6, 7	1-1/8"	2-1/4"
	8	1-1/4"	2-3/8"
24 x 24	6,8	1-1/4"	3-3/4"
	10,12,14	1-3/8"	3-7/8"

DPD12

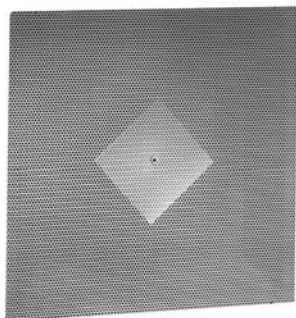
Steel

T-Bar Plate Diffuser

- Aesthetically appealing, single-face plate design
- 360° air diffusion pattern
- Detachable face plate
- Constructed of heavy gauge steel for 1' x 1' Tbar grids
- Can be used with SMF 12 x 12 W surface mount frames for drywall applications
- White finish



T-Bar Fixed-Pattern Perforated Supply Diffusers



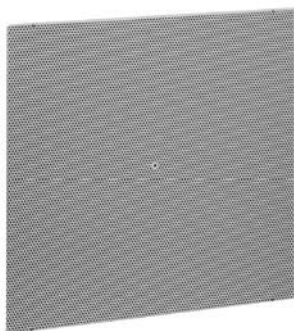
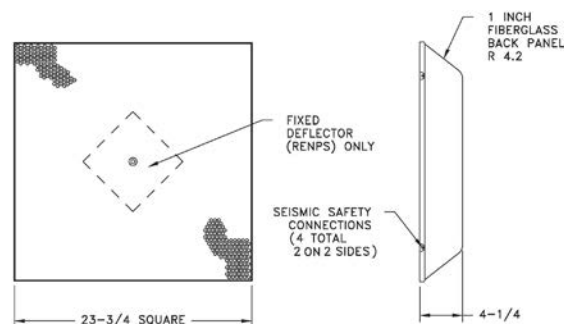
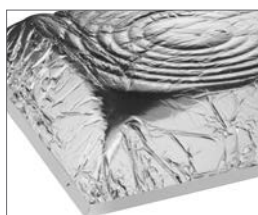
RENPS/ARENPS RENPS R6 Steel/Aluminum

Perforated Supply Diffuser with Insulated Back

- Perforated steel face with deflector
- Molded fiberglass back panel, available in R4.2 or R6
- Accepts 6" to 14" unique tab collar (6400 series) or 6" to 16" unique snap-in collar (5400 and 5400PP series); also accepts standard spin-in collar
- ARENPS constructed with aluminum face
- Bright White finish

RENPS Available Size
Overall 23 ³ / ₄ " x 23 ³ / ₄ "

See page 54
for fiberglass
specifica-
tions.

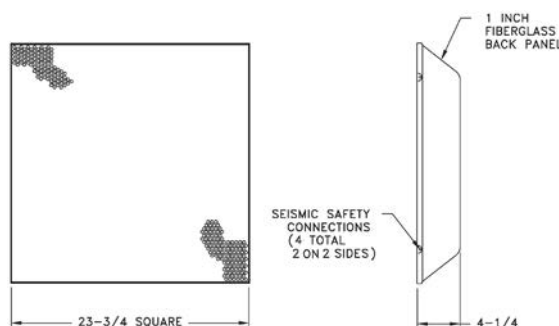
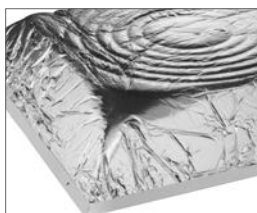


RENP Steel Perforated Return with Insulated Back

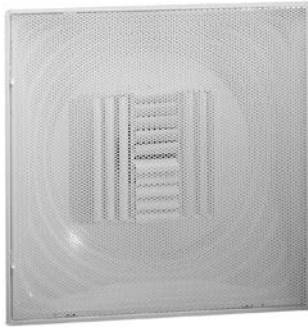
- Perforated steel face
- R4.2 molded fiberglass back panel
- Accepts 6" to 14" unique tab collar (6400 series) or 6"-16" unique snap-in collar (5400 and 5400PP series); also accepts standard spin-in collar
- Bright White finish

RENP Available Size
Overall 23 ³ / ₄ " x 23 ³ / ₄ "

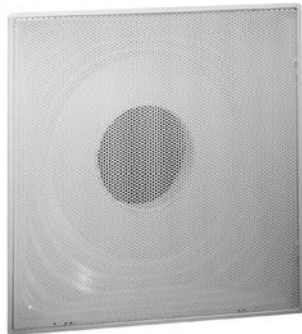
See page 54
for fiberglass
specifica-
tions.



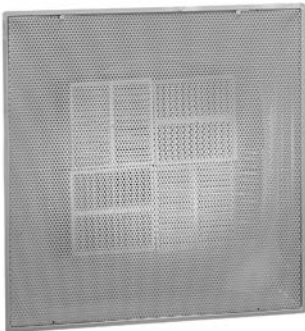
T-Bar Perforated Supply/Return



**CBPS Curved-Blade
Perforated Supply**



**CBPR Curved-Blade
Perforated Return**



CBPS/CBPR

Steel

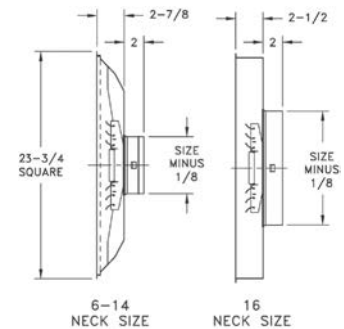
Curved-Blade

Perforated Supply/Return

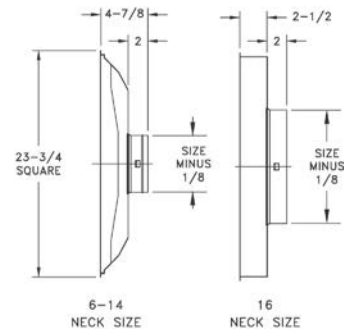
- Steel construction
- Removable, hinged face allows for easy access to air pattern control core
- Individually adjustable pattern deflectors factory-set at 4-way deflection; can be field-adjusted for 1, 2, 3-way air patterns
- Available in 6", 8", 10", 12", 14" and 16" diameter necks
- Unique 2" high collar permits easy flex connections
- Accepts 3800 Series butterfly damper (order separately)
- For 16", use T19
- Bright White finish

CBPS/CBPR Available Size

Overall Size 23³/₄" x 23³/₄"



CBPS



CBPR

SBP

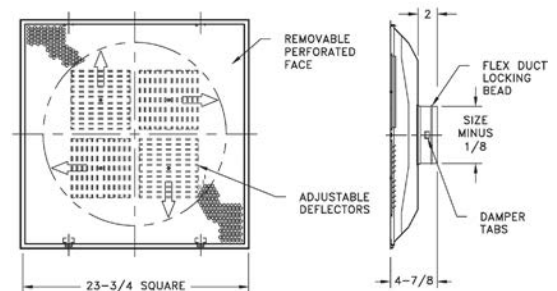
Steel

Shallow Back Perforated Supply

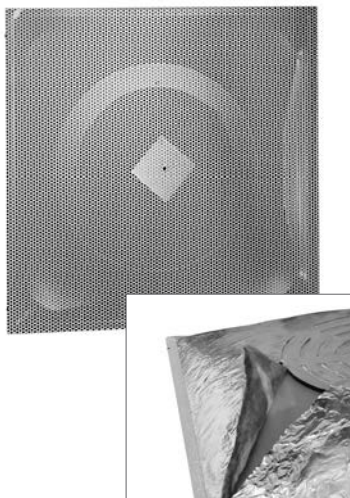
- Steel construction
- Available in 6" to 14" collar sizes
- Face-mounted, adjustable deflectors
- Removable perforated face
- Hinged/latched face for easy access to deflector and damper
- Bright White finish

SBP Available Size

Overall Size 23³/₄" x 23³/₄"



T-Bar Perforated Supply/Return



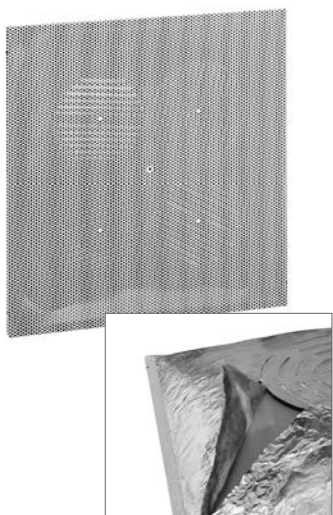
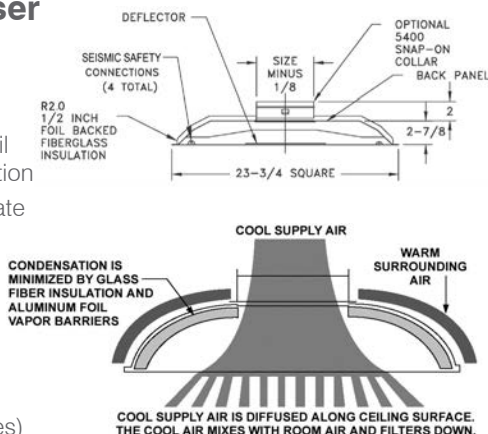
PDS

Steel

Perforated Supply Diffuser (with fixed deflector)

- Perforated steel face
- Formed steel, black back panel
- Fiberglass insulation blanket with foil vapor barrier to minimize condensation
- Insulation prescored to accommodate collar size desired
- Accepts unique snap-in collar (5400 Series) 6" to 12" – order separately
- Available in 14" fixed collar (PDS14)
- Utilizes butterfly damper (3800 Series) inserted in collar
- Damper adjusted through diffuser face to allow proper air balancing
- Bright White finish

PDS Available Size
Overall Size 23 ³ / ₄ " x 23 ³ / ₄ "



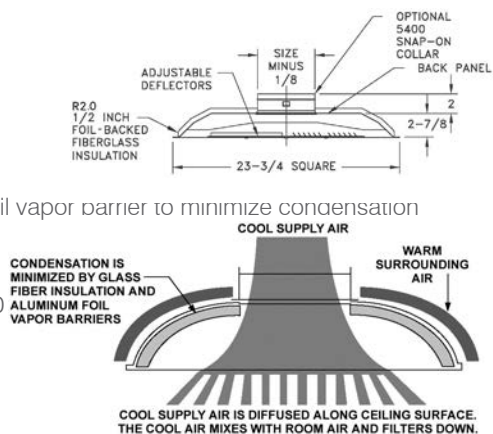
PDSD

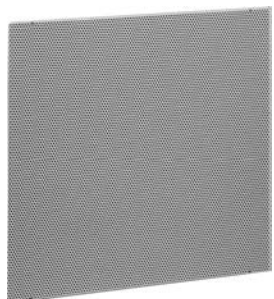
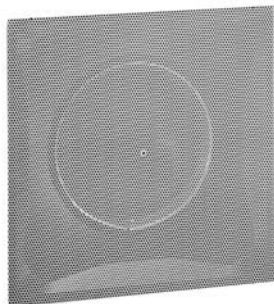
Steel

Perforated Diffuser Supply (with adjustable deflector)

- Perforated steel face
- Face adjustable deflectors
- Formed steel, black back panel
- Fiberglass insulation blanket with foil vapor barrier to minimize condensation
- Insulation prescored to accommodate collar size desired
- Accepts unique snap-in collar (5400 Series) 6" to 12" – order separately
- Available in 14" fixed collar (PDSD14)
- Utilizes butterfly damper (3800 Series) inserted in collar
- Damper adjusted through diffuser face to allow proper air balancing
- Bright White finish

PDSD Available Size
Overall Size 23 ³ / ₄ " x 23 ³ / ₄ "



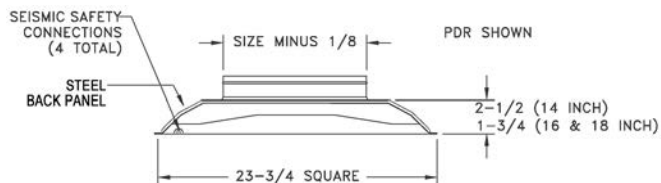


PDR

Steel

Perforated Return Grille

- 51% net free area
- Available with 14", 16", or 18" fixed collars
- Formed steel, black back panel
- White finish



PDR Available Size
Overall Size 23 ³ / ₄ " x 23 ³ / ₄ "

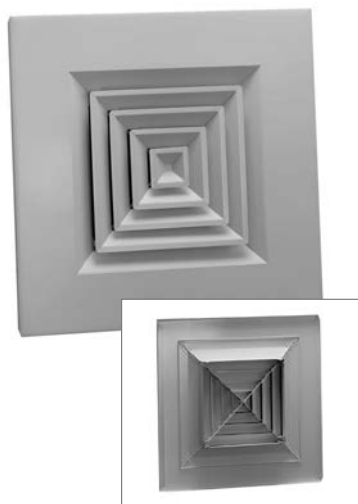
PD

Steel

Perforated Return Face Only—No Back

- Face only return for plenum ceilings
- Available in 24" x 12", 24" x 24" and 48" x 24" sizes
- White finish

T-Bar Directional/Modular Diffuser



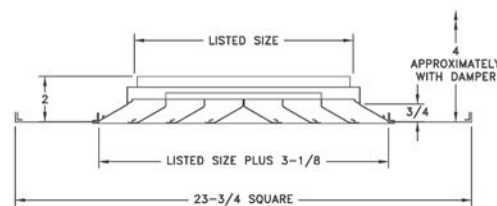
ART Aluminum Square and Rectangular T-Bar Diffusers

- Aluminum construction
- Available in one, two, three and four-way deflections
- Removable core
- Bright White or Satin Anodized finish

ART Available Sizes

6" x 6", 9" x 9", 12" x 12", 15" x 15", 21" x 21"

Note: For 18" x 18" neck, order ARE 18" x 18".

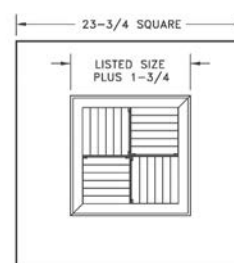
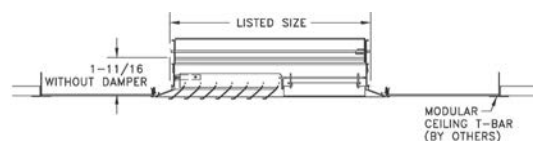


MCDST Aluminum Modular Core Diffuser

- Extruded aluminum diffuser in aluminum panel
- Modular cores provide one, two, three, and four-way air patterns
- Removable modules provide easy access to duct-mounted damper
- Available in 6" to 20"
- Available as MCDSTSR w/ square-to-round transition attached
- Bright White finish

MCDST/MCDSTSR Available Sizes

6" x 6", 8" x 8", 10" x 10", 12" x 12", 14" x 14",
16" x 16", 18" x 18", 20" x 20"



MCDSTSR



MCDSDT



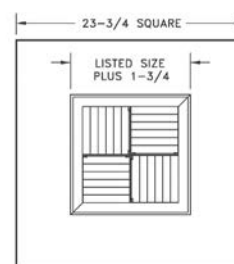
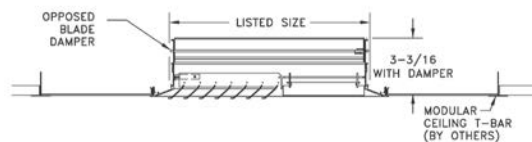
MCDSDTSR

MCDSDT Aluminum Modular Core Diffuser with Damper

- Extruded aluminum diffuser in aluminum panel
- Modular cores provide one two, three, and four-way air patterns
- Removable modules provide easy access to damper
- Aluminum opposed-blade damper
- Available in 6" to 20"
- Available as MCDSDTSR with square-to-round transition attached
- Bright White finish

MCDSDT/MCDSDTSR Available Sizes

6" x 6", 8" x 8", 10" x 10", 12" x 12", 14" x 14",
16" x 16", 18" x 18", 20" x 20"



T-Bar Directional/Modular Diffuser



A504MS/A504OB
Four-way deflection



A501MS/A501OB
One-way deflection



A503MS/A503OB
Three-way deflection



A502MS/A502OB
Two-way deflection



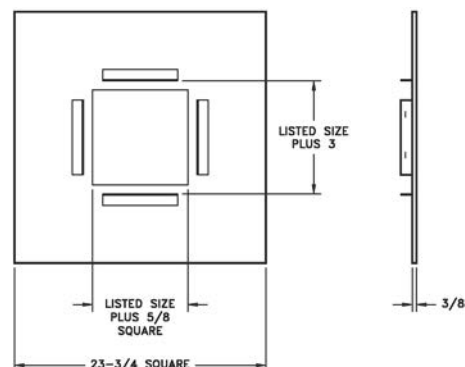
A505MS/A505OB
Two-way corner deflection

A500P Steel T-Bar Panel for A500 Series Diffusers

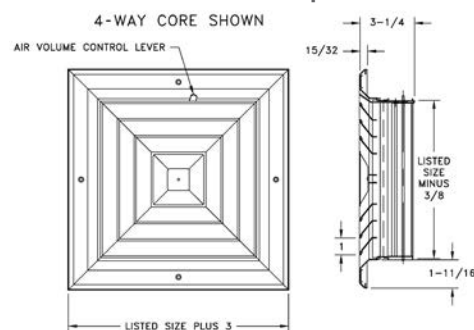
- Adapts A500 diffuser to T-Bar installation
- Diffuser snaps in behind panel for clean appearance
- Steel panel
- Diffuser must be ordered separately
- Bright White finish
- Diffuser sizes 6"x6" to 14"x14"

A500P T-Bar Panel Available Size

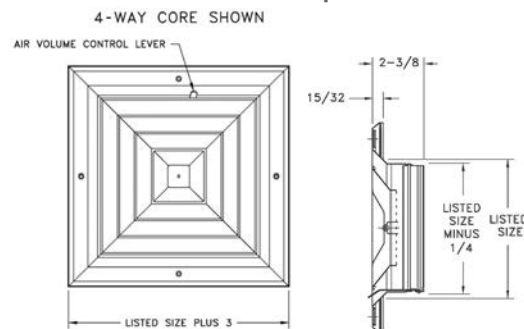
Opening 6" to 14"
Overall 23³/₄" x 23³/₄"



OB Damper



MS Damper

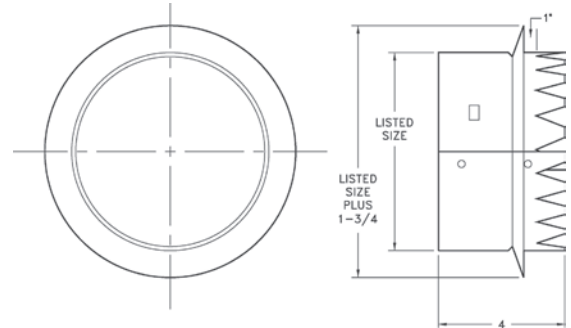




6400 Tab Collar

- Galvanized steel construction
- For use with fiberglass-backed ceiling diffusers
- Tabbed for easy installation
- Accepts 3800 Series damper

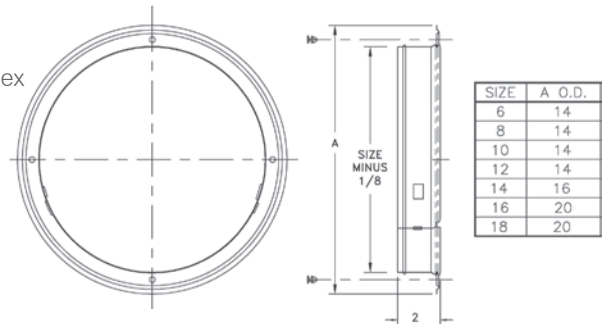
6400 Series Available Sizes					
6"	8"	10"	12"	14"	



5400 Series Collar Ring*

- Unique snap-in design for easy installation
- 2" high collar permits easy flex connections
- Bead on collar improves the strength and provides retention for flexible duct connections

5400 Series Available Sizes										
6"	7"	8"	9"	10"	12"	14"*	16"	18"		



*14" collar is mounted to diffuser at factory for steel back panels only.

Note: Uses 5400PP (black push pins) with insulated back panels (non-steel).



5400PP Push Pins

- Attaches 5400 collar to molded fiberglass back for the following products:

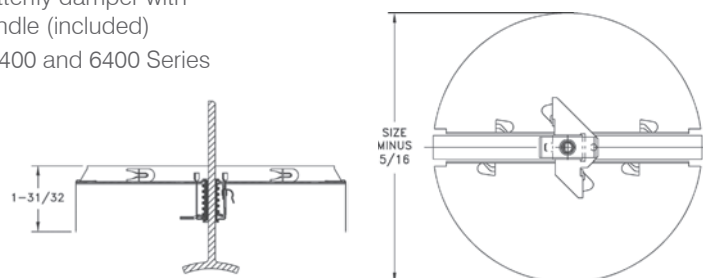
659TI 1 1/4" long
PFTI 1 1/4" diameter head
REN
RENPS/RENPS R6
RE5TI
96AFBTI
REN4
HVS R6
SRET/SRET R6



3800 Series Damper

- Adjustable butterfly damper with removable handle (included)
- For use with 5400 and 6400 Series collars
- Golden Sand finish

3800 Series Available Sizes						
6"	7"	8"	9"	10"	12"	14"



T-Bar Accessories

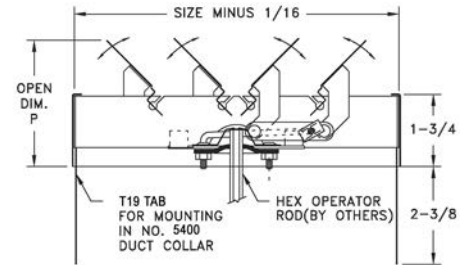


T19 Series Damper

- Multi-blade damper
- Tabs for easy installation
- For use with 5400 Series collar
- Bright White finish

Note: $\frac{3}{16}$ hex operator by others

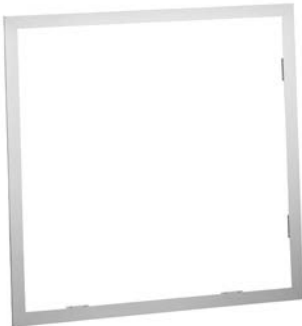
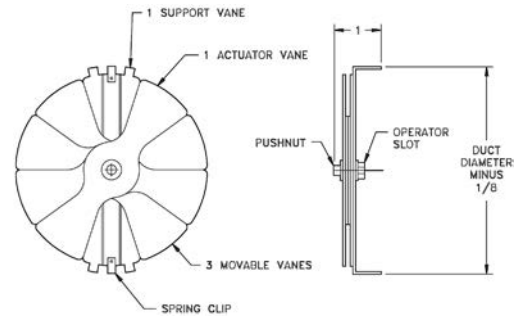
19 Series Available Sizes					
6"	8"	10"	12"	14"	16"



RD Radial Damper

- Galvanized steel construction
- Face-adjustable
- For use with round neck diffusers
- Mill finish

RD Available Sizes				
6"	8"	10"	12"	14"



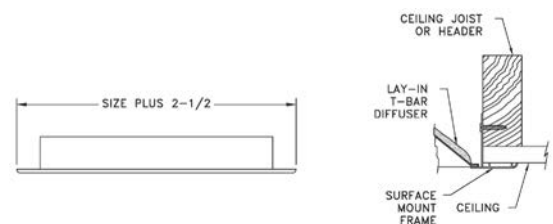
SMF

Aluminum

Surface Mount Frame

- Aluminum construction
- Permits installation of standard T-Bar diffusers in a plaster ceiling
- Accepts standard T-Bar diffusers
- Bright White finish

SMF Available Sizes	
12" x 12", 24" x 12", 24" x 24", 24" x 48"	



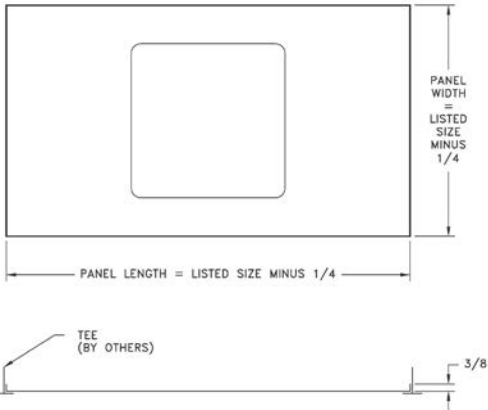


P Filler Panel

- Steel or aluminum construction
- Available in 9 sizes from 12" x 12" to 36" x 36" in 12" increments
- Bright White finish

Diffusers are factory-installed (must order with diffuser).

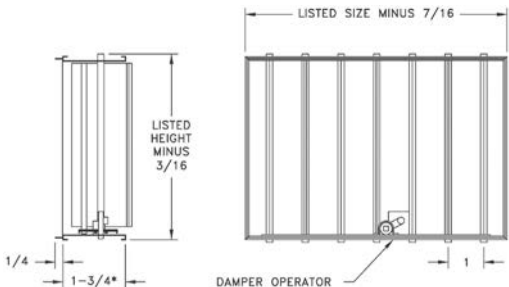
P Filler Panel Available Sizes
12" x 12", 24" x 12", 36" x 12", 48" x 12", 24" x 24", 36" x 24", 48" x 24", 36" x 36"



AD
Aluminum
Opposed-Blade Damper

- Extruded aluminum construction
- Opposed-blade damper
- Controls the air volume from full flow to shut-off

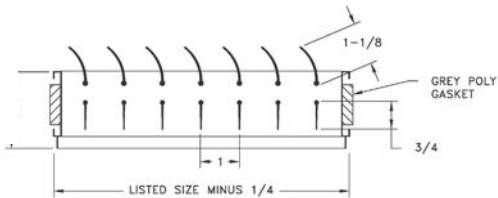
AD Available Sizes
Minimum: 6" x 4", 1 3/4" x 4"
Maximum: 24" x 24" One-Piece



DT Air Diverter

- Extruded aluminum construction
- Two sets of individually adjustable blades
- Equalizes flow and controls volume at collar take-offs to registers and grilles
- Equipped with gasket around outside of frame for positioning firmly in duct
- Mill finish

DT Available Sizes
Minimum: 6" x 4"
Maximum: 48" x 48"



Miscellaneous

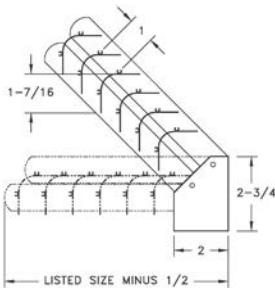


FT Flexiturn

- Extruded aluminum construction
- Designed to pick up air from the main trunk at branch take-offs and divert it toward the grille
- Mounts easily with sheet metal screws
- Gang-operated blades move from 45 degrees open to fully closed
- Positive setting
- Mill finish

FT Flexiturn Available Sizes

Minimum: 8" x 4"
Maximum: 36" x 18"

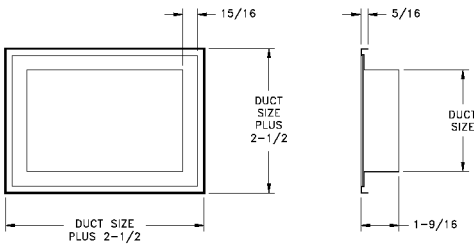


APF Aluminum Plaster Frame

- Aluminum construction
- Provides attractive appearance for registers and grilles around plaster
- Bright White finish

APF Available Sizes

Minimum: 6" x 4"
Maximum: 48" x 48"



Using the Engineering Data

For most of the models & sizes we've done the calculations for you.
CFM = volume of air flow in cubic feet per minute

421

Face Velocity		300	400	500	600	700	800
Pressure Loss		.006	.010	.016	.022	.031	.040
4x10	CFM	50	70	85	100	120	135
Ak	Spread	4.5	5.0	6.5	7.5	9.0	10.0
.170	Throw	4.0	6.0	8.0	10.0	11.0	12.5

Terminal velocity of 50 fpm

821-defl A

Face Velocity		400	500	600	700	800
Pressure Loss		.010	.016	.022	.031	.040
24 x 8	CFM	420	525	625	730	835
Ak	Throw	17.0	21.0	25.0	29.0	33.0
1.045						

Terminal velocity is 75 fpm

Face Velocity = speed of air at the face of diffuser in feet per minute (FPM)

Ak = net area in square feet. This is the lab measured area across the face when air is mechanically forced through the opening.

Free Area (if given) = daylight area (in²) of blade openings. Free area is typically only required on natural / gravity movement of air, non-mechanically forced, as in free area needed for combustion air requirements on heating equipment. Use the Ak value (*144 to get to in²) if the free area has not been calculated, but is needed for a given size/model grille requiring free area for combustion.

Equation of Airflow: CFM = Ak (ft²) x Face Velocity (fpm)
Example from 421 table above: 100 = .17 x 600 _ numbers are often rounded

Sizing a Supply

Determine the amount of CFM (air volume) needed for each supply outlet. This should be done by room heating and cooling load requirements from various design manuals (ACCA Man J, ASHRAE Fundamentals Hndbk) and then followed by the duct design and layout.

Face Velocity - H&C recommends sizing a supply outlet in the range of 500 to 800 fpm face velocity (700 being a common target). The upper end of this range will create better mixing of room air and longer throws, which is what the typical forced air system is intended to do. However, the Pressure resistance and Noise must be taken into consideration depending upon the application. In some instances, greater face velocity is allowed because the pressure and noise can be accommodated.

consider the associated pressure loss that deals with each relative model. An increase in face velocity creates more pressure resistance against the blower's delivery of air volume. The velocity ranges given previously will, in most cases, have minor effect on the blower's overall performance given the entire duct system losses that it will encounter.

Noise – an increase in face velocity will create more noise. The tables below show NC design guidelines and also face velocity ranges if NC values have not been tabulated.

Application	Recommended Face Velocities
Broadcasting Studios	<500 FPM
Residences	500 to 750 FPM
Apartments	500 to 750 FPM
Churches	500 to 750 FPM
Hotel Guestrooms	500 to 750 FPM
Legitimate Theaters	500 to 1000 FPM
Private Offices, acoustically treated	500 to 1000 FPM
Private Offices, not treated	1000 to 1250 FPM
Motion Picture Theaters	1000 to 1250 FPM
General Offices	1250 to 1500 FPM
Stores, upper floors	1500 FPM
Stores, main floors	1500 FPM
Industrial Buildings	1500 to 2000 FPM

	Communication Environment	Typical Occupancy
< NC 25	Extremely quiet environment; suppressed speech is quite audible; suitable for acute pickup of all sounds.	Broadcasting studios, concert halls, music rooms.
NC 30	Very quiet office; suitable for large conferences; telephone use satisfactory.	Residences, theaters, libraries, executive offices, directors rooms.
NC 35	Quiet office; satisfactory for conference at a 15-foot table; normal voice 10 to 30 feet; telephone use satisfactory.	Private offices, schools, hotel guestrooms, courtrooms, churches, hospital rooms.
NC 40	Satisfactory for conferences at a 6-to 8-foot table; normal voice 6 to 12 feet; telephone use satisfactory.	General office, labs, dining rooms.
NC 45	Satisfactory for conferences at a 4- to 5-foot table; normal voice 3 to 6 feet; raised voice 6 to 12 feet; telephone use occasionally difficult.	Retail stores, cafeterias, lobby areas, large drafting and engineering offices, reception areas.
> NC 50	Unsatisfactory for conference of more than two or three persons; normal voice 1 to 2 feet; raised voice 3 to 6 feet; telephone use slightly difficult.	Computer rooms, stenographic pools, print machine rooms, process areas.

Sizing a Return

Air volume going back to the air handler (fan) must equal what is supplied from the air handler. Therefore the total CFM capacity of the return grilles must equal or exceed the total CFM capacity of all the supply diffusers.

Keeping face velocity low

- Returns should be at 400-600 fpm maximum
- Filter Returns should be at 450 fpm maximum
- *ACCA recommends 300 max for filter grilles and 500 max for non-filter grilles.
- The rule of thumb is 2 cfm per square inch of filter size. See table below.
- Low velocity reduces noise, especially on stamped face grilles (672/673); fixed-bar grilles can handle more velocity without noise (94A/96AFB/RH45/RHF45/RCB).
- A single point return cannot be oversized like a supply. The system will not be affected adversely, only improved. *This does not apply to multiple return locations where balancing is more critical to pull in relevant amounts from each room.
- Static pressure is also reduced. Pressure works against & reduces blower delivery volume (cfm)
- Noise is not expected from a return.

Location

Filter Size	Area (in ²)	Ton (cfm)	Filter Size	Area (in ²)	Ton (cfm)
12 12	144	n/a	20 20	400	2 (800)
12 20	240	1 (400)	20 25	500	2.5 (1000)
12 24	288	1.5 (600)	20 30	600	3 (1200)
12 30	360	1.5 (600)	20 36	720	3 (1200)
14 14	196	1 (400)	24 24	576	3 (1200)
14 20	280	1.5 (600)	24 30	720	3 (1200)
14 24	336	1.5 (600)	24 36	864	4 (1600)
14 30	420	2 (800)	25 25	625	3 (1200)
16 20	320	1.5 (600)	30 30	900	4 (1600)
16 24	384	2 (800)	30 36	1080	5 (2000)

- Returns should be put in stagnant air locations that need to be reconditioned.
 - High for cooling mode (hot air rises)
 - Low for heating mode (cold air falls)
 - Both modes, choose a primary season
- Returns should not be near a supply register's throw range. If at all possible place the return at an opposite corner of the room.

Room Air Movement

- Returns do NOT have much effect on a room's air movement, regardless of face velocity. They only grab air about a duct diameter away from the face. Most of the room air movement is done by the supplies.

Unlisted Sizes—Engineering Data

When a size is not listed there are a couple ways to do an engineered estimate. Airflow principles permit you to utilize existing sizes to determine sizes not shown.

Method 1: Use nearest nominal size table entry. If a 14x14 is not given, but a 20x10 is, since these two sizes have an approximate equal core area (196 and 200) the table entry for a 20x10 can be used to approximate what the 14x14 grille would perform to.

Method 2: A more exact method would be to do interpolation process between two listed sizes. If 14x14 is not given, but 18x10 and 20x10 are, then this equation will get more exact 14x14 data. $Y = Y1$

+ $\{[(X - X1) * (Y2 - Y1)] / (X2 - X1)\}$ where:

Y = unknown CFM or throw that is being computed for 14x14

Y1 = CFM or throw of listed 18x10 (for ex 600 cfm)

Y2 = CFM or throw of listed 20x10 (for ex 640 cfm)

X = 196 in² (nominal area of 14x14)

X1 = 180 in² (nominal area of 18x10)

X2 = 200 in² (nominal area of 20x10)

Using equation above computes $Y = 600 + \{[(196 - 180) * (640 - 600)] / (200 - 180)\} =$

$600 + \{[16 * 40] / 20\} = 600 + 32 = 632$ cfm for Y

Method 3: Sizes beyond the table (smaller or larger) can have their CFM or Throw determined by using listed sizes by the following:

CFM for larger sizes:

If **24** looking for 24x6 or 24x12 cfm that is not listed, using the listed 12x6 cfm and doubling it or quadrupling it will give the answer for the 24x6 and 24x12, respectively.

12 x 6	12 x 6
12 x 6	12 x 6

CFM for smaller sizes:

If looking for a 6x6 cfm that is not listed, using the listed 12x6 cfm and halving it will give the answer for a 6x6.

Throw:

Double the size and CFM, multiply the throw by 1.5

Quadruple the size and CFM, multiply the throw by 2

Half the size and CFM, multiply the throw by .67

One quarter the size and CFM, multiply the throw by .5

*Pressure loss, face velocity and noise criteria will all remain the same relative to the listed size used to determine the larger or smaller sizes not shown.

94A Series Return Air Grilles & Registers (Page 9-10)
96AFB Steel Fixed-Bar Filter Grille (Page 10)

Face Velocity		300	400	500	600	700	800	900	1000
6 x 6	CFM	45	60	75	90	105	120	135	150
Ak .150	Ps	.010	.019	.029	.046	.060	.075	.100	.130
8 x 8	CFM	84	112	140	169	197	225	253	281
Ak .280	Ps	.010	.019	.029	.046	.060	.075	.100	.130
10 x 10	CFM	135	180	225	270	315	360	405	450
Ak .450	Ps	.011	.019	.030	.042	.057	.072	.094	.119
12 x 6	CFM	96	127	159	191	223	255	287	318
Ak .320	Ps	.011	.019	.029	.045	.059	.074	.099	.128
14 x 6	CFM	112	150	187	225	262	300	337	375
Ak .370	Ps	.011	.019	.029	.044	.058	.074	.097	.124
14 x 8	CFM	152	203	254	304	355	406	456	507
Ak .510	Ps	.011	.019	.030	.041	.056	.072	.093	.116
12 x 12	CFM	198	264	330	395	461	527	593	659
Ak .660	Ps	.011	.019	.030	.039	.054	.070	.089	.109
24 x 8	CFM	267	355	444	533	622	711	800	888
Ak .890	Ps	.011	.020	.031	.040	.055	.074	.091	.111
18 x 12	CFM	301	401	502	602	703	803	903	1004
Ak 1.000	Ps	.011	.020	.031	.041	.056	.076	.092	.112
30 x 8	CFM	336	448	560	672	784	895	1007	1119
Ak 1.120	Ps	.011	.020	.031	.041	.056	.078	.093	.114
24 x 12	CFM	406	541	676	811	946	1082	1217	1352
Ak 1.350	Ps	.011	.020	.031	.043	.058	.081	.095	.116
18 x 18	CFM	458	611	764	917	1069	1222	1375	1528
Ak 1.530	Ps	.011	.020	.032	.043	.058	.083	.096	.117
30 x 12	CFM	511	682	852	1023	1193	1364	1534	1704
Ak 1.700	Ps	.011	.020	.032	.044	.059	.084	.097	.118
20 x 20	CFM	571	761	951	1141	1331	1522	1712	1902
Ak 1.900	Ps	.011	.020	.032	.044	.059	.086	.098	.119
36 x 12	CFM	618	824	1030	1236	1442	1649	1855	2061
Ak 2.060	Ps	.011	.020	.032	.045	.060	.087	.099	.120
24 x 20	CFM	690	920	1150	1380	1610	1840	2070	2300
Ak 2.300	Ps	.011	.020	.032	.045	.060	.089	.100	.120
30 x 18	CFM	781	1041	1301	1561	1822	2082	2342	2602
Ak 2.600	Ps	.011	.020	.032	.045	.060	.090	.100	.121
24 x 24	CFM	835	1114	1392	1671	1949	2228	2506	2785
Ak 2.780	Ps	.011	.020	.031	.046	.060	.090	.100	.121
36 x 18	CFM	946	1261	1576	1892	2207	2522	2838	3153
Ak 3.150	Ps	.011	.019	.031	.045	.059	.090	.099	.120
30 x 24	CFM	1057	1410	1762	2115	2467	2820	3172	3525
Ak 3.520	Ps	.011	.019	.030	.045	.058	.089	.098	.119
36 x 24	CFM	1284	1712	2140	2568	2996	3424	3852	4280
Ak 4.280	Ps	.011	.018	.028	.043	.055	.085	.092	.114
30 x 30	CFM	1341	1789	2236	2683	3130	3577	4024	4471
Ak 4.470	Ps	.011	.017	.028	.042	.054	.083	.091	.112
36 x 30	CFM	1633	2177	2721	3265	3810	4354	4898	5442
Ak 5.440	Ps	.010	.015	.024	.037	.047	.070	.079	.100
48 x 24	CFM	1751	2335	2919	3503	4086	4670	5254	5838
Ak 5.840	Ps	.009	.014	.022	.035	.043	.064	.073	.095
36 x 36	CFM	1992	2656	3320	3984	4648	5312	5976	6640
Ak 6.640	Ps	.008	.012	.017	.029	.034	.048	.059	.081
48 x 36	CFM	2742	3656	4570	5484	6398	7312	8226	9140
Ak 9.140	Ps	.008	.012	.017	.029	.034	.048	.059	.081
48 x 48	CFM	3808	5077	6346	7615	8884	10154	11423	12692
Ak 12.700	Ps	.008	.012	.017	.029	.034	.048	.059	.081
For sizes not listed and sizing tips see page(s) 78									

PFG Perforated Face Grille (Page 11)
Return Air Grille Balancing Data
To Determine CFM:

1. Use an ALNOR Velometer with No. 2220 or 2220A Tip or a 4" rotating vane anemometer. If a 4" rotating vane anemometer is used, place dial face against perforated plate, and sample in a random manner for at least 1 minute.
2. Select proper Ak from Table by unit size and instrument used for measuring velocity.
3. Determine CFM by the following equation: $CFM = Ak \times \text{Average Velocity}$.

Sample Problem

Determine Return Airflow Rate (CFM) through a 10 x 10, using an ALNOR Velometer with Tip No. 2220 or 2220A.

Solution

1. Assume the average of 6 velocity readings taken with an ALNOR Velometer is 2000 FPM.
2. From Table, the Area Factor for a 10 x 10 using an ALNOR Velometer is $Ak = .39 \text{ sq. ft.}$
3. $CFM = Ak \times \text{Average Velocity} = .39 \text{ sq. ft.} \times 2000 \text{ FPM} = 780 \text{ CFM}$

Neck Velocity			200	300	400	500	600	650	700	750	800	900
S.P. Drop w/OBD			.012	.027	.049	.078	.110	.130	.150	.170	.190	.240
Size	Ak ALNOR	Ak 4" ROT. Vane	Air Capacities - CFM									
10 x 10	.39	.55	140	210	285	350	415	450	485	520	555	625
12 x 12	.46	.79	200	300	400	500	600	650	700	750	800	900
14 x 14	.62	1.07	270	410	545	680	815	885	955	1020	1090	1225
10 x 22	.71	1.21	305	460	610	765	915	995	1070	1150	1220	1375
16 x 16	.82	1.40	355	530	710	890	1065	1155	1245	1335	1425	1600
18 x 18	1.05	1.77	450	675	900	1125	1350	1460	1575	1690	1800	2030
20 x 20	1.28	2.25	555	835	1110	1390	1665	1805	1945	2080	2220	2500
22 x 22	1.55	2.70	670	1010	1345	1680	2020	2180	2350	2520	2690	3020

Recommended Noise Criteria and Face Velocity Ranges are on page 75

Engineering Data

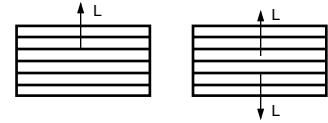
C Series Curved-Blade Diffusers
Selection Procedure

1. Determine the diffuser air pattern best suited to the duct layout and room area to be served.

2. Select the air pattern type and CFM per outlet. The tables give the recommended limits of air volume per outlet for various ceiling heights. Choose the correct table for the style diffuser selected. Outlets are assumed to be mounted flush on the ceiling and no obstruction to the air stream.

3. Turn to the proper SIZE SELECTION TABLE for the air pattern desired.

4. Determine the appropriate size based on the CFM, Throw, Pressure Loss, and Face Velocity requirements.

C Series Curved-Blade Diffusers (Page 17-21)
One-Way, Two-Way


Face Velocity		400	500	600	700	800	900	1000	1100	1200
Pressure Loss		.010	.016	.022	.031	.040	.050	.062	.075	.090
6 x 6	CFM	35	45	55	65	70	80	90	100	110
Ak .090	Throw 1/2	3.5/2.5	5.0/3.5	6.0/4.0	7.0/5.0	7.5/5.5	8.5/6.0	9.5/7.0	11.0/7.5	11.5/8.5
8 x 6	CFM	40	50	60	70	80	90	100	110	120
Ak .100	Throw 1/2	3.5/2.5	4.5/3.0	5.5/4.0	6.5/4.5	7.0/5.0	8.0/6.0	9.0/6.5	10.0/7.0	11.0/7.5
10 x 6	CFM	60	75	90	105	120	135	150	165	180
Ak .150	Throw 1/2	5.0/3.5	6.0/4.5	7.0/5.0	8.5/6.0	9.5/7.0	11.0/7.5	12.0/8.5	13.0/9.5	14.0/10.0
8 x 8	CFM	65	80	95	110	130	145	160	175	190
Ak .160	Throw 1/2	5.0/3.5	6.0/4.5	7.5/5.0	8.5/6.0	10.0/7.0	11.0/8.0	12.0/9.0	14.0/9.5	15.0/10.0
12 x 6	CFM	70	90	110	125	145	160	180	200	215
Ak .180	Throw 1/2	5.0/3.5	6.5/4.5	8.0/5.5	9.0/6.5	11.0/7.5	12.0/8.5	13.0/9.5	15.0/10.0	16.0/11.0
14 x 6	CFM	85	105	125	145	170	190	210	230	250
Ak .210	Throw 1/2	5.5/4.0	7.0/5.0	8.5/6.0	10.0/7.0	11.0/8.0	13.0/9.0	14.0/10.0	16.0/11.0	17.0/12.0
10 x 10	CFM	95	120	145	170	190	215	240	265	290
Ak .240	Throw 1/2	6.0/4.0	7.5/5.0	9.0/6.5	10.0/7.5	12.0/8.0	13.0/9.5	15.0/10.0	16.0/11.0	18.0/13.0
12 x 10	CFM	115	145	175	205	230	260	290	320	350
Ak .290	Throw 1/2	6.5/4.5	8.0/5.5	9.5/7.0	11.0/8.0	13.0/9.0	14.0/10.0	16.0/11.0	18.0/13.0	19.0/14.0
16 x 8	CFM	125	155	185	215	250	280	310	340	370
Ak .310	Throw 1/2	6.5/5.0	8.5/6.0	10.0/7.0	12.0/8.0	13.0/9.5	15.0/11.0	17.0/12.0	18.0/13.0	20.0/14.0
12 x 12	CFM	140	175	210	245	280	315	350	385	420
Ak .350	Throw 1/2	7.0/5.0	9.0/6.0	11.0/7.5	12.0/8.5	14.0/10.0	16.0/11.0	18.0/12.0	19.0/14.0	21.0/15.0
16 x 12	CFM	185	230	275	320	370	415	460	505	550
Ak .460	Throw 1/2	8.0/5.5	10.0/7.5	12.0/9.0	14.0/10.0	16.0/11.0	18.0/13.0	20.0/14.0	22.0/16.0	24.0/17.0
14 x 14	CFM	190	240	290	335	385	430	480	530	575
Ak .480	Throw 1/2	8.0/5.5	10.0/7.5	12.0/9.0	14.0/10.0	17.0/12.0	18.0/13.0	21.0/15.0	23.0/16.0	25.0/17.0
16 x 16	CFM	250	315	380	440	505	565	630	695	755
Ak .630	Throw 1/2	9.5/6.5	12.0/8.5	14.0/10.0	16.0/12.0	19.0/13.0	21.0/15.0	23.0/17.0	26.0/18.0	28.0/20.0
20 x 14	CFM	270	340	410	475	545	610	680	750	815
Ak .680	Throw 1/2	9.5/7.0	12.0/8.5	15.0/10.0	17.0/12.0	19.0/14.0	22.0/15.0	24.0/17.0	27.0/19.0	29.0/21.0
24 x 12	CFM	280	350	420	490	560	630	700	770	840
Ak .700	Throw 1/2	10.0/7.0	12.0/8.5	15.0/10.0	17.0/12.0	20.0/14.0	22.0/16.0	25.0/17.0	27.0/19.0	30.0/21.0
30 x 10	CFM	290	365	440	510	585	655	730	805	875
Ak .730	Throw 1/2	10.0/7.0	13.0/9.0	15.0/11.0	18.0/12.0	20.0/14.0	23.0/16.0	25.0/18.0	28.0/20.0	30.0/21.0
36 x 10	CFM	350	440	530	615	705	790	880	970	1055
Ak .880	Throw 1/2	11.0/8.0	14.0/10.0	17.0/12.0	19.0/14.0	22.0/16.0	25.0/18.0	28.0/20.0	31.0/22.0	33.0/24.0
36 x 12	CFM	420	525	630	735	840	945	1050	1155	1260
Ak 1.050	Throw 1/2	12.0/8.5	15.0/11.0	18.0/13.0	21.0/15.0	24.0/17.0	27.0/19.0	30.0/21.0	33.0/23.0	36.0/25.0
30 x 16	CFM	460	575	690	805	920	1035	1150	1265	1380
Ak 1.150	Throw 1/2	12.0/9.0	16.0/11.0	19.0/13.0	22.0/15.0	25.0/18.0	28.0/20.0	31.0/22.0	34.0/24.0	37.0/26.0
36 x 16	CFM	560	700	840	980	1120	1260	1400	1540	1680
Ak 1.400	Throw 1/2	14.0/9.5	17.0/12.0	21.0/15.0	24.0/17.0	27.0/19.0	31.0/22.0	34.0/24.0	38.0/27.0	41.0/29.0

For sizes not listed and sizing tips see page(s) 78

Terminal Velocity of 75 FPM

Curved-Blade – C Series

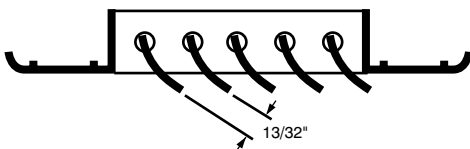
Ceiling Height In Feet	Maximum Cooling Temperature Differential (°F)	Maximum CFM per outlet			
		1 way	2 way	3 way	4 way
7	15°	75	150	225	300
8	18°	100	200	300	400
9	20°	200	400	600	800
10	22°	300	600	900	1200
11	25°	400	800	1200	1600
12	25°	500	1000	1500	2000
14	25°	700	1400	2100	2800
16	25°	900	1800	2700	3600

*NC 30	NC 35	**NC 40

* less than or equal to

** greater than or equal to

The Face Bars on the Curved-Blade Diffuser should be pre-set to the dimension shown below.



TG, TGF Transfer Grilles (Page 27)

Face Velocity*		500	600	700	800	900	1000	1200	1400	1600	1800	2000	2200	2400	2600
10X6	CFM	145	174	203	232	261	290	348	406	464	522	580	638	696	754
Ak 0.29	Ps	0.2	0.3	0.4	0.5	0.7	0.8	1.1	1.3	1.6	1.8	2.1	2.3	2.6	2.9
8X8	CFM	150	180	210	240	270	300	360	420	480	540	600	660	720	780
Ak 0.3	Ps	0.1	0.3	0.4	0.5	0.6	0.8	1	1.3	1.5	1.7	2	2.2	2.5	2.7
12X6	CFM	170	204	238	272	306	340	408	476	544	612	680	748	816	884
Ak 0.34	Ps	0	0.1	0.2	0.3	0.4	0.6	0.8	1	1.2	1.4	1.6	1.9	2.1	2.3
14X6	CFM	200	240	280	320	360	400	480	560	640	720	800	880	960	1040
Ak 0.4	Ps	0	0.1	0.2	0.3	0.4	0.5	0.7	0.8	1	1.2	1.4	1.6	1.8	1.9
14X8	CFM	265	318	371	424	477	530	636	742	848	954	1060	1166	1272	1378
Ak 0.53	Ps	-0.1	0	0.1	0.2	0.2	0.3	0.5	0.6	0.8	1	1.1	1.3	1.5	1.6
20X6	CFM	285	342	399	456	513	570	684	798	912	1026	1140	1254	1368	1482
Ak 0.57	Ps	-0.1	0	0.1	0.1	0.2	0.3	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.3
12X12	CFM	345	414	483	552	621	690	828	966	1104	1242	1380	1518	1656	1794
Ak 0.69	Ps	-0.1	-0.1	0	0.1	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1	1.2
30X6	CFM	430	516	602	688	774	860	1032	1204	1376	1548	1720	1892	2064	2236
Ak 0.86	Ps	-0.1	0	0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
16X12	CFM	460	552	644	736	828	920	1104	1288	1472	1656	1840	2024	2208	2392
Ak 0.92	Ps	-0.1	-0.1	0	0	0	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7
18X12	CFM	515	618	721	824	927	1030	1236	1442	1648	1854	2060	2266	2472	2678
Ak 1.03	Ps	-0.2	-0.1	-0.1	-0.1	0	0	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6
20X12	CFM	575	690	805	920	1035	1150	1380	1610	1840	2070	2300	2530	2760	2990
Ak 1.15	Ps	-0.2	-0.1	-0.1	-0.1	0	0	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5

*Velocity measured 1" from face.

20 Round Diffuser (Page 28)

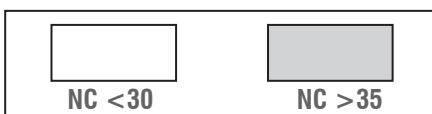
Neck Velocity		400	500	600	700	800	900	1000	1200	1400
6"	CFM	80	100	120	140	160	180	200	235	275
Ak .160	Ps	<.010	<.010	<.010	<.010	0.014	0.02	0.02	0.03	0.03
	Throw	2.00	2.00	2.0	3.0	3.0	4.0	4.0	5.0	6.0
8"	CFM	140	175	210	245	280	315	350	420	490
Ak .280	Ps	<.010	<.010	<.010	<.010	0.01	0.02	0.02	0.03	0.04
	Throw	3.5	3.0	3.0	4.0	4.0	5.0	5.0	7.0	8.0
10"	CFM	218	273	327	382	436	491	545	654	763
Ak .440	Ps	<.010	<.010	<.010	0.01	0.01	0.02	0.02	0.03	0.04
	Throw	3.0	3.0	4.0	5.0	5.0	6.0	7.0	8.0	10.0
12"	CFM	315	390	470	550	630	705	785	940	1100
Ak .660	Ps	<.010	<.010	<.010	0.01	0.01	0.02	0.02	0.03	0.04
	Throw	3.0	4.0	5.0	6.0	7.0	7.0	8.0	10.0	11.0
14"	CFM	425	530	635	745	850	955	1060	1270	1490
Ak .910	Ps	<.010	<.010	<.010	0.01	0.01	0.02	0.02	0.03	0.04
	Throw	4.0	5.0	6.0	7.0	8.0	8.0	9.0	11.0	13.0
16"	CFM	560	700	840	980	1120	1260	1400	1680	1960
Ak 1.200	Ps	<.010	<.010	<.010	0.01	0.01	0.02	0.02	0.03	0.04
	Throw	4.0	5.0	7.0	8.0	9.0	10.0	11.0	13.0	15.0
18"	CFM	710	885	1060	1240	1420	1590	1770	2120	2480
Ak 1.500	Ps	<.010	<.010	<.010	0.01	0.01	0.02	0.02	0.03	0.04
	Throw	5.0	6.0	7.0	9.0	10.0	11.0	12.0	15.0	17.0

24 Square Ceiling Diffuser (Page 29)

Face Velocity		300	400	500	600	700	800	900	1000
Pressure Loss		.006	.010	.016	.022	.031	.040	.050	.062
Neck Size 6"	CFM	50	65	85	100	115	130	150	165
Ak .165	Throw	3.5	4.5	5.5	6.5	8.0	9.0	10.0	11.0
Neck Size 8"	CFM	85	110	140	170	195	225	250	280
Ak .280	Throw	4.5	5.5	7.0	8.5	10.0	11.0	12.0	14.0
Neck Size 10"	CFM	125	170	210	250	295	335	380	420
Ak .420	Throw	5.0	6.5	8.0	9.5	11.5	13.0	15.0	16.0
Neck Size 12"	CFM	180	240	300	355	415	475	535	595
Ak .595	Throw	6.0	8.0	10.0	11.5	13.5	15.5	17.5	19.0
Neck Size 14"	CFM	245	330	410	490	575	655	740	820
Ak .820	Throw	7.0	9.0	11.5	13.5	16.0	18.0	20.0	22.5
Neck Size 16"	CFM	310	410	515	620	720	825	925	1030
Ak 1.030	Throw	7.5	10.0	12.5	15.0	18.0	20.0	22.0	25.0
Neck Size 18"	CFM	400	530	665	800	930	1065	1200	1330
Ak 1.330	Throw	8.5	11.0	14.0	17.0	20.0	23.0	26.0	28.0
Neck Size 20"	CFM	480	640	800	960	1120	1280	1440	1600
Ak 1.600	Throw	9.5	12.0	16.0	18.0	22.0	25.0	28.0	31.0
Neck Size 22"	CFM	570	760	950	1140	1330	1520	1710	1900
Ak 1.900	Throw	10.5	13.5	17.0	19.0	24.0	27.0	30.0	33.0
Neck Size 24"	CFM	690	920	1150	1380	1610	1840	2070	2300
Ak 2.300	Throw	11.0	14.5	18.5	22.0	26.0	30.0	33.0	36.0

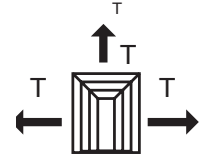
Terminal Velocity of 50 FPM

NOTE: The use of a balancing hood is recommended to balance the system.
 Ak = Effective Area in square feet
 Ps = Static Pressure Loss in inches of water
 NC = Noise Criteria, based on a 10dB room attenuation (Re: 10⁻¹² watts) ASHRAE 36-72.
 Terminal Velocity of 100 fpm
 Product tested with core in "out" position.
 When diffusers are used on an exposed duct, multiply throw by 0.7

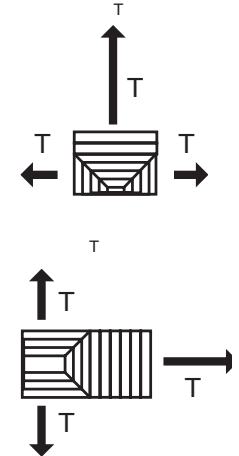


SR/AR Square & Rectangular Ceiling Diffusers — Steel/Aluminum (Page 30-33)
Three-Way Style 3

Face Velocity	500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss	.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
6 x 6 CFM	50	60	70	80	90	100	120	140	160	180	200
Ak .100 Throw X/Y	2-4/1-2	2-4/1-2	3-5/2-3	3-5/2-3	4-7/2-4	4-7/2-4	5-9/3-6	6-10/3-6	6-11/4-7	6-11/4-7	7-13/4-8
9 x 9 CFM	110	135	155	180	205	225	270	315	360	410	450
Ak .220 Throw X/Y	2-4/2-3	3-6/2-3	4-7/2-4	4-8/2-4	5-9/3-6	5-9/3-6	6-12/4-7	7-13/5-9	9-15/6-10	10-18/6-11	11-20/7-12
12 x 12 CFM	200	240	280	320	360	400	480	560	640	725	800
Ak .400 Throw X/Y	4-7/2-5	5-9/3-6	6-10/4-7	6-10/4-7	6-11/4-8	7-13/5-9	9-16/6-10	12-21/7-12	13-22/8-13	14-24/8-14	16-27/9-15
15 x 15 CFM	310	375	440	500	565	625	750	875	1000	1125	1250
Ak .620 Throw X/Y	4-8/2-4	6-11/4-7	7-13/4-7	8-14/4-8	8-15/5-9	9-16/6-10	11-19/7-12	13-23/9-15	15-26/10-18	17-29/11-20	19-33/12-21
18 x 18 CFM	450	540	630	720	810	900	1080	1260	1440	1620	1800
Ak .900 Throw X/Y	4-9/3-5	6-11/4-7	7-13/5-9	9-15/6-10	10-18/6-11	11-20/7-12	13-24/9-15	15-26/10-18	18-32/11-20	20-35/12-22	23-40/14-25
21 x 21 CFM	615	740	860	985	1110	1230	1475	1725	1970	2220	2460
Ak 1.230 Throw X/Y	5-11/3-6	7-13/4-8	11-19/6-11	11-20/7-12	12-21/8-13	13-23/8-14	16-29/10-17	19-34/11-20	21-39/14-23	24-42/16-25	27-45/18-29
24 x 24 CFM	800	960	1120	1275	1440	1600	1925	2240	2570	2890	3200
Ak 1.600 Throw X/Y	7-14/5-9	9-16/6-11	11-19/7-13	13-21/8-14	14-24/9-15	16-27/9-16	17-31/11-19	21-35/14-24	25-39/16-27	28-43/18-31	32-47/20-33
27 x 27 CFM	1010	1215	1420	1615	1820	2020	2430	2840	3240	3650	4040
Ak 2.020 Throw X/Y	7-13/4-9	9-16/6-11	11-20/7-13	13-23/9-15	14-25/9-16	15-27/10-18	18-31/12-21	22-37/14-25	25-41/18-30	28-46/19-33	31-50/21-36


Three-Way Style 31S and Style 31L*

Face Velocity	500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss	.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
9 x 6 CFM	75	90	105	120	135	150	180	210	240	270	300
Ak .150 Throw X/Y	2-3/4-7	2-3/4-7	2-3/4-7	2-4/4-8	3-5/5-8	3-6/5-9	4-7/6-11	4-8/7-12	6-10/9-15	6-11/10-17	6-11/11-19
9 x 9* CFM	115	135	155	180	200	225	270	315	360	405	450
Ak .220 Throw X/Y	1-3/4-7	2-3/5-9	2-3/6-11	2-4/7-12	3-6/8-14	3-6/9-16	4-7/10-18	4-8/12-21	5-9/14-24	6-10/16-28	6-11/18-32
12 x 9 CFM	150	180	210	240	270	300	360	420	480	540	600
Ak .300 Throw X/Y	2-3/4-8	2-4/5-9	3-6/6-10	4-7/7-12	4-8/8-14	4-8/8-14	5-9/9-16	6-10/11-20	7-12/14-24	8-13/15-26	9-15/16-28
12 x 12* CFM	200	240	280	320	360	400	480	560	640	720	800
Ak .40 Throw X/Y	2-3/5-11	2-4/7-13	3-6/9-15	3-6/10-17	4-7/11-19	4-8/12-21	6-10/15-26	6-11/18-32	7-12/20-34	7-13/21-36	8-14/24-42
15 x 15* CFM	310	375	440	500	565	625	750	875	1000	1125	1250
Ak .620 Throw X/Y	2-4/7-13	3-6/10-18	4-7/11-20	4-8/12-21	5-9/14-25	5-9/14-25	6-11/19-34	7-13/22-38	8-14/25-43	9-16/27-44	10-18/30-45
18 x 15 CFM	375	450	525	600	675	750	900	1050	1200	1350	1500
Ak .750 Throw X/Y	3-6/7-13	4-7/9-15	4-8/9-16	5-9/11-20	6-10/13-23	6-11/15-26	7-13/17-30	9-16/19-35	10-18/22-39	11-20/27-40	13-25/30-46
21 x 18 CFM	525	630	735	840	945	1050	1260	1475	1680	1890	2100
Ak 1.050 Throw X/Y	4-7/8-14	4-8/10-18	5-9/11-20	6-10/18-23	6-11/14-25	7-12/16-28	9-15/19-34	10-18/22-39	11-20/27-40	13-23/29-46	15-26/33-51
21 x 21* CFM	615	740	860	985	1110	1230	1475	1725	1970	2210	2460
Ak 1.230 Throw X/Y	3-6/9-17	4-8/12-21	5-9/16-27	6-10/17-30	7-11/19-32	7-12/21-36	9-15/26-40	11-19/30-45	13-22/34-51	15-25/39-56	17-28/43-60
27 x 21 CFM	780	940	1080	1250	1400	1560	1870	2180	2500	2800	3120
Ak 1.560 Throw X/Y	5-9/10-18	5-9/11-20	6-10/13-22	7-12/15-26	8-14/18-32	9-16/21-36	11-19/23-40	13-21/25-43	15-24/29-47	17-29/34-53	19-33/38-59
30 x 24 CFM	1000	1200	1400	1600	1800	2000	2400	2800	3200	3500	4000
Ak 2.000 Throw X/Y	5-9/11-20	6-11/13-23	7-13/16-27	8-14/17-31	9-16/20-35	10-18/22-40	12-21/25-44	14-25/31-48	16-29/34-53	18-32/38-57	20-35/43-61
33 x 27 CFM	1230	1475	1725	1970	2220	2460	2950	3450	3925	4425	4920
Ak 2.460 Throw X/Y	6-10/13-23	7-13/17-28	8-14/19-33	9-16/21-35	11-18/23-39	12-20/25-44	14-25/29-47	16-29/33-51	18-33/37-56	22-37/42-59	25-41/47-64



Note 2: The minimum Throw Dimension is based on a terminal velocity of 170 fpm. The maximum Throw Dimension is based on a terminal velocity of 85 fpm.

*Style 31L not available in square configuration

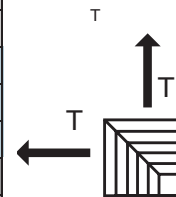
Ceiling Height in Feet	Maximum Recommended Cooling Temperature Differential	Maximum Recommended CFM Per Diffuser			
		SR/AR/ASR	SR/AR		
		Four-Way	Three-Way	Two-Way	One-Way
7	15°	400	300	200	100
8	20°	600	450	300	150
9	25°	1200	900	600	300
10	25°	1800	1350	900	450
12	30°	3200	2400	1600	800
14	30°	4800	3600	2400	1200
16	30°	6000	4500	3000	1500

NC < 30	NC 30	NC 35	NC 40	NC ≥ 45
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SR/AR Square & Rectangular Ceiling Diffusers — Steel/Aluminum (Page 30-33)

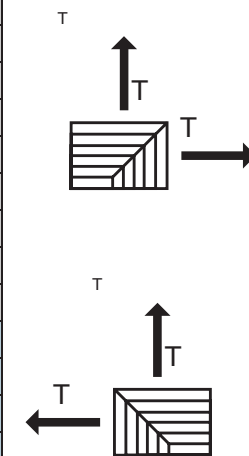
Two-Way Corner Style 2C

Face Velocity	500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss	.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
6 x 6 CFM	45	55	60	70	80	90	105	125	140	160	180
Ak .090 Throw X/Y	1-3/1-3	2-5/2-5	2-5/2-5	3-7/3-7	3-7/3-7	5-8/5-8	5-8/5-8	6-11/6-11	7-12/7-12	8-13/8-13	9-14/9-14
9 x 9 CFM	95	115	135	155	175	195	235	275	315	350	390
Ak .190 Throw X/Y	4-6/4-6	4-6/4-6	5-7/5-7	5-8/5-8	6-10/6-10	6-11/6-11	8-13/8-13	9-14/9-14	10-16/10-16	13-20/13-20	14-22/14-22
12 x 12 CFM	175	210	245	280	315	350	420	480	560	635	700
Ak .350 Throw X/Y	5-7/5-7	5-8/5-8	6-11/6-11	8-13/8-13	8-13/8-13	9-14/9-14	10-16/10-16	13-19/13-19	14-22/14-22	16-26/16-26	19-29/19-29
15 x 15 CFM	275	330	385	440	495	550	660	775	885	995	1100
Ak .550 Throw X/Y	5-9/5-9	7-12/7-12	8-13/8-13	9-14/9-14	10-16/10-16	11-18/11-18	13-21/13-21	15-25/15-25	19-29/19-29	21-33/21-33	23-36/23-36
18 x 18 CFM	390	470	545	625	700	780	935	1090	1250	1410	1560
Ak .780 Throw X/Y	7-12/7-12	9-14/9-14	10-15/10-15	10-16/10-16	12-19/12-19	14-22/14-22	16-25/16-25	18-29/18-29	21-33/21-33	25-38/25-38	28-42/28-42
21 x 21 CFM	540	650	760	865	975	1080	1300	1515	1730	1945	2160
Ak 1.080 Throw X/Y	8-13/8-13	10-15/10-15	12-18/12-18	13-21/13-21	15-23/15-23	17-28/17-28	20-32/20-32	22-35/22-35	25-39/25-39	29-43/29-43	32-47/32-47
24 x 24 CFM	705	845	990	1130	1270	1410	1690	1950	2250	2540	2820
Ak 1.410 Throw X/Y	9-16/9-16	11-18/11-18	13-21/13-21	15-24/15-24	17-27/17-27	19-29/19-29	22-34/22-34	25-38/25-38	29-42/29-42	33-47/33-47	37-51/37-51
27 x 27 CFM	880	1055	1230	1410	1585	1760	2110	2470	2820	3170	3520
Ak 1.760 Throw X/Y	10-17/10-17	12-19/12-19	14-22/14-22	16-26/16-26	19-29/19-29	21-33/21-33	24-37/24-37	28-41/28-41	32-46/32-46	35-50/35-50	39-55/39-55



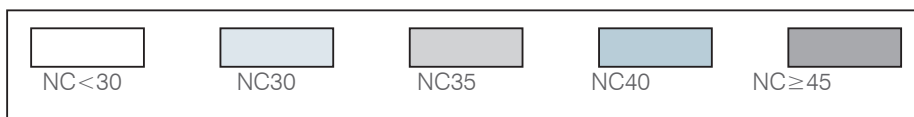
Two-Way Corner Style 2CR

Face Velocity	500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss	.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
9 x 6 CFM	65	80	95	105	120	130	160	185	210	240	260
Ak .130 Throw X/Y	2-4/3-5	3-5/4-7	4-6/5-8	4-6/5-8	5-7/6-11	5-7/6-11	6-9/8-13	6-10/9-14	7-12/11-16	8-13/13-21	10-16/16-25
12 x 6 CFM	90	105	120	140	160	175	210	245	280	315	350
Ak .170 Throw X/Y	2-4/3-6	3-5/5-8	3-5/6-11	4-6/7-12	5-7/8-13	5-7/9-14	5-8/10-15	6-11/13-20	7-12/15-24	8-13/17-26	10-15/19-29
15 x 6 CFM	110	130	155	175	200	220	265	310	350	395	440
Ak .220 Throw X/Y	2-4/5-8	3-5/6-10	3-5/7-12	4-6/8-13	5-7/10-15	5-8/11-17	6-9/13-20	6-10/15-24	8-12/17-27	10-14/20-30	11-17/22-34
12 x 9 CFM	130	155	180	210	235	260	310	365	415	470	520
Ak .260 Throw X/Y	4-6/5-7	4-6/5-8	5-7/6-10	5-8/6-11	6-10/8-12	6-11/9-14	8-13/10-16	11-17/14-21	19-19-16/24	13-20/17-26	14-23/19-30
15 x 9 CFM	165	195	230	260	295	325	390	460	525	590	650
Ak .320 Throw X/Y	4-6/6-10	5-7/6-11	6-8/8-12	6-9/10-14	6-11/10-16	7-12/12-19	9-14/14-22	10-15/16-25	12-17/19-29	13-20/21-33	14-22/23-35
18 x 9 CFM	195	235	275	310	350	390	470	545	625	700	780
Ak .390 Throw X/Y	4-6/6-11	5-7/8-13	5-7/9-14	5-8/10-15	6-10/11-18	7-12/13-21	8-13/16-25	9-15/19-29	11-17/22-33	12-20/23-35	14-22/26-39
21 x 9 CFM	230	275	320	365	410	455	545	635	730	820	910
Ak .450 Throw X/Y	4-6/8-13	5-7/10-15	6-8/11-17	6-9/12-19	6-10/13-21	6-11/15-24	8-13/18-29	10-15/22-34	12-18/24-38	13-21/26-42	15-25/30-47
15 x 12 CFM	220	260	305	350	390	435	525	610	700	785	870
Ak .430 Throw X/Y	5-7/5-8	5-8/6-11	6-10/8-13	7-12/9-14	8-13/10-16	9-14/12-19	11-18/14-22	13-20/16-25	15-24/19-29	16-26/21-32	18-29/24-37
18 x 12 CFM	260	315	370	420	475	525	630	735	840	945	1050
Ak .520 Throw X/Y	4-7/6-11	5-8/8-13	6-10/9-14	7-12/11-17	9-14/13-21	10-15/14-22	12-18/17-26	14-20/21-30	16-24/23-34	18-27/27-38	21-31/29-42
21 x 15 CFM	380	455	530	605	685	760	915	1060	1220	1370	1520
Ak .760 Throw X/Y	6-10/8-13	6-11/9-14	8-13/11-18	9-14/13-20	10-16/15-24	12-19/16-26	13-21/19-29	15-26/22-33	18-29/25-38	21-33/29-44	25-38/32-49
24 x 15 CFM	440	525	615	700	790	875	1050	1225	1400	1575	1750
Ak .870 Throw X/Y	4-9/8-14	6-11/10-16	8-13/13-20	9-14/15-24	10-16/16-26	12-19/19-29	14-22/22-34	16-25/25-38	19-29/29-44	21-32/33-48	25-37/37-52
21 x 18 CFM	460	550	640	735	825	915	1100	1280	1465	1645	1830
Ak .980 Throw X/Y	6-11/8-13	8-13/10-15	10-15/11-18	11-17/12-20	12-19/14-22	13-21/16-25	16-26/19-29	19-30/22-34	22-34/26-39	25-38/29-43	27-42/32-48
27 x 21 CFM	690	830	965	1100	1245	1380	1655	1935	2210	2490	2760
Ak 1.380 Throw X/Y	8-13/10-17	10-15/13-20	12-19/15-24	14-21/17-27	15-23/19-30	16-26/21-33	20-30/25-37	24-36/29-42	28-41/33-46	30-46/37-51	34-51/42-56



Note 3: The minimum Throw Dimension is based on a terminal velocity of 135 fpm. The maximum Throw Dimension is based on a terminal velocity of 65 fpm.

Ceiling Height in Feet	Maximum Recommended Cooling Temperature Differential	Maximum Recommended CFM Per Diffuser			
		SR/AR/ASR	SR/AR		
		Four-Way	Three-Way	Two-Way	One-Way
7	15°	400	300	200	100
8	20°	600	450	300	150
9	25°	1200	900	600	300
10	25°	1800	1350	900	450
12	30°	3200	2400	1600	800
14	30°	4800	3600	2400	1200
16	30°	6000	4500	3000	1500



SR/AR Square & Rectangular Ceiling Diffusers — Steel/Aluminum (Page 30-33)

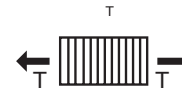
Two-Way Style 2L

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
9 x 6	CFM	65	80	95	105	120	130	160	185	210	240	260
Ak .130	Throw Y	3-5	3-5	5-7	6-8	7-10	7-10	8-12	10-14	11-17	14-20	16-23
12 x 6	CFM	90	105	120	140	160	175	210	245	280	315	350
Ak .170	Throw Y	3-5	5-7	6-8	6-9	7-10	8-12	10-14	12-18	15-21	16-23	17-25
15 x 6	CFM	110	130	155	175	200	220	265	310	350	395	440
Ak .220	Throw Y	4-6	6-8	6-9	7-10	9-13	10-14	10-15	13-19	15-21	18-26	21-30
12 x 9	CFM	130	155	180	210	235	260	310	365	415	470	520
Ak .260	Throw Y	5-7	6-8	6-9	8-12	10-14	10-14	11-17	14-21	16-24	19-27	20-31
15 x 9	CFM	165	195	230	260	295	325	390	460	525	590	650
Ak .320	Throw Y	6-8	7-10	8-12	9-13	10-15	12-18	14-20	16-24	18-26	21-31	24-35
18 x 9	CFM	195	235	275	310	350	390	470	545	625	700	780
Ak .390	Throw Y	6-9	8-12	9-13	10-14	11-17	13-19	15-21	17-25	19-29	22-33	25-39
21 x 9	CFM	230	275	320	365	410	455	545	635	730	820	910
Ak .450	Throw Y	7-10	8-12	9-13	11-16	12-18	14-20	16-24	19-27	22-32	25-36	29-41
15 x 12	CFM	220	260	305	350	390	435	525	610	700	785	870
Ak .430	Throw Y	6-9	8-12	10-14	10-15	12-18	14-20	15-24	18-27	22-32	24-36	28-41
18 x 12	CFM	260	315	370	420	475	525	630	735	840	945	1050
Ak .520	Throw Y	7-11	9-13	11-15	12-18	13-19	15-21	18-26	20-29	23-34	27-39	31-42
21 x 15	CFM	380	455	530	605	685	760	915	1060	1220	1370	1520
Ak .760	Throw Y	9-13	10-15	12-18	14-20	15-23	17-25	20-30	23-34	27-40	31-44	34-48
24 x 15	CFM	440	525	615	700	790	875	1050	1225	1400	1575	1750
Ak .870	Throw Y	8-14	11-16	13-19	15-21	17-25	19-29	22-33	25-38	29-42	33-48	38-54
21 x 18	CFM	460	550	640	735	825	915	1100	1280	1465	1645	1830
Ak .910	Throw Y	10-15	11-17	13-19	16-22	19-25	20-28	23-33	26-38	29-42	34-46	38-51
27 x 21	CFM	690	830	965	1100	1245	1380	1655	1935	2210	2490	2760
Ak 1.300	Throw Y	11-17	14-20	17-24	19-27	21-31	23-35	27-40	34-46	38-51	42-56	47-61



Two-Way Style 2S

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
9 x 6	CFM	65	80	95	105	120	130	160	185	210	240	265
Ak .130	Throw X	3-6	4-7	5-8	6-9	8-12	9-13	10-14	11-17	13-19	15-23	17-26
12 x 6	CFM	90	105	120	140	160	175	210	245	280	315	350
Ak .170	Throw X	4-7	6-8	7-10	8-12	9-13	10-14	11-17	14-20	15-23	17-25	19-29
15 x 6	CFM	110	130	155	175	200	220	265	310	350	395	440
Ak .220	Throw X	5-7	6-9	7-10	9-13	10-15	11-17	13-19	15-23	18-26	21-30	23-34
12 x 9	CFM	130	155	180	210	235	260	310	365	415	470	520
Ak .260	Throw X	6-8	6-9	7-10	9-13	10-15	13-19	15-21	17-25	19-29	21-31	
15 x 9	CFM	165	195	230	260	295	325	390	460	525	590	650
Ak .320	Throw X	7-10	8-12	9-13	10-14	12-18	14-20	16-24	18-26	19-29	23-33	27-39
18 x 9	CFM	195	235	275	310	350	390	470	545	625	700	780
Ak .390	Throw X	7-10	9-13	11-17	12-18	13-19	15-23	18-27	20-30	22-32	25-38	29-43
21 x 9	CFM	230	275	320	365	410	455	545	635	730	820	910
Ak .450	Throw X	9-13	9-14	10-15	12-18	15-21	16-24	19-29	22-33	26-38	29-42	32-47
15 x 12	CFM	220	260	305	350	390	435	525	610	700	785	870
Ak .430	Throw X	7-10	8-12	10-14	11-17	13-19	15-21	16-24	19-27	22-33	25-38	29-42
18 x 12	CFM	260	315	370	420	475	525	630	735	840	945	1050
Ak .520	Throw X	8-11	10-14	10-15	12-18	14-20	15-23	18-27	23-33	25-37	29-42	32-47
21 x 15	CFM	380	455	530	605	685	760	915	1060	1220	1370	1520
Ak .760	Throw X	10-15	11-17	14-20	15-23	18-26	20-29	22-33	26-38	29-42	35-46	39-51
24 x 15	CFM	440	525	615	700	790	875	1050	1225	1400	1575	1750
Ak .870	Throw X	9-14	11-17	15-21	17-25	19-29	22-32	25-37	28-41	33-45	38-51	43-56
21 x 18	CFM	460	550	640	735	825	915	1100	1280	1465	1645	1830
Ak .910	Throw X	11-17	12-18	14-20	16-24	19-27	20-29	23-34	27-40	32-45	37-49	40-55
27 x 21	CFM	690	830	965	1100	1245	1380	1655	1935	2210	2490	2760
Ak 1.300	Throw X	12-18	15-21	18-25	21-29	23-33	25-37	29-43	33-48	38-53	43-59	49-63



Note 3: The minimum Throw Dimension is based on a terminal velocity of 135 fpm. The maximum Throw Dimension is based on a terminal velocity of 65 fpm.

Ceiling Height in Feet	Maximum Recommended Cooling Temperature Differential	Maximum Recommended CFM Per Diffuser			
		SR/AR/ASR	SR/AR		
		Four-Way	Three-Way	Two-Way	One-Way
7	15°	400	300	200	100
8	20°	600	450	300	150
9	25°	1200	900	600	300
10	25°	1800	1350	900	450
12	30°	3200	2400	1600	800
14	30°	4800	3600	2400	1200
16	30°	6000	4500	3000	1500

NC<30	NC30	NC35	NC40	NC≥45
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SR/AR Square & Rectangular Ceiling Diffusers — Steel/Aluminum (Page 30-33)

Two-Way Style 2

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
6 x 6	CFM	45	55	60	70	80	90	105	125	140	160	180
Ak .090	Throw Y	3-5	3-5	4-7	4-7	5-8	5-8	6-9	9-13	10-15	11-17	12-18
9 x 9	CFM	95	115	135	155	175	195	235	275	315	350	390
Ak .190	Throw Y	5-7	6-8	6-8	6-9	8-12	9-13	11-17	12-18	14-20	16-24	18-26
12 x 12	CFM	175	210	245	280	315	350	420	480	560	635	700
Ak .350	Throw Y	4-7	6-9	9-13	10-15	11-17	12-18	14-20	17-23	18-27	21-31	23-35
15 x 15	CFM	275	330	385	440	495	550	660	775	885	995	1100
Ak .550	Throw Y	8-12	10-14	10-15	12-18	14-20	15-23	18-27	22-32	24-36	26-39	29-43
18 x 18	CFM	390	470	545	625	700	780	935	1090	1250	1410	1560
Ak .780	Throw Y	9-15	11-17	12-18	14-20	15-23	18-26	20-30	24-36	27-42	31-45	36-51
21 x 21	CFM	540	650	760	865	975	1080	1300	1515	1730	1945	2160
Ak 1.080	Throw Y	11-17	14-20	15-23	18-26	19-29	23-35	26-40	29-44	34-49	38-54	43-59
24 x 24	CFM	705	845	990	1130	1270	1410	1690	1950	2250	2540	2820
Ak 1.410	Throw Y	12-19	14-22	17-25	20-30	21-33	23-35	27-40	34-46	39-51	42-56	46-60
27 x 27	CFM	880	1055	1230	1410	1585	1760	2110	2470	2820	3170	3520
Ak 1.760	Throw Y	12-20	15-23	18-26	21-31	24-36	26-40	30-45	35-50	39-56	43-61	48-66



One-Way Style

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
6 x 6	CFM	45	55	60	70	80	90	105	125	140	160	180
Ak .090	Throw	3-5	4-7	5-8	6-9	8-10	9-12	10-14	12-18	14-20	15-22	16-24
9 x 9	CFM	95	115	135	155	175	195	235	275	315	350	390
Ak .190	Throw	6-9	7-10	9-13	10-14	11-17	13-19	15-21	18-26	19-29	22-33	25-38
12 x 12	CFM	175	210	245	280	315	350	420	480	560	635	700
Ak .350	Throw	8-12	10-14	12-18	13-19	15-21	18-26	21-31	24-36	27-40	30-43	33-45
15 x 15	CFM	275	330	385	440	495	550	660	775	885	995	1100
Ak .550	Throw	10-16	13-19	14-22	18-26	19-29	21-31	25-37	30-43	35-46	38-50	42-56
18 x 18	CFM	390	470	545	625	700	780	935	1090	1250	1410	1560
Ak .780	Throw	13-21	15-23	18-26	19-29	22-33	25-38	29-42	35-46	42-49	44-52	49-56
21 x 21	CFM	540	650	760	865	975	1080	1300	1515	1730	1945	2160
Ak 1.080	Throw	14-23	17-25	21-30	24-36	27-40	30-43	34-48	39-54	44-60	48-64	53-68
24 x 24	CFM	705	845	990	1130	1270	1410	1690	1950	2250	2540	2820
Ak 1.410	Throw	20-29	23-33	24-36	27-40	30-44	35-48	39-54	43-60	48-65	52-69	56-74
27 x 27	CFM	880	1055	1230	1410	1585	1760	2110	2470	2820	3170	3520
Ak 1.760	Throw	19-27	22-31	25-38	28-42	33-47	36-53	43-58	49-63	54-68	60-73	65-77

1-WAY STYLE



Note 3: The minimum Throw Dimension is based on a terminal velocity of 135 fpm. The maximum Throw Dimension is based on a terminal velocity of 65 fpm.

Ceiling Height in Feet	Maximum Recommended Cooling Temperature Differential	Maximum Recommended CFM Per Diffuser			
		SR/AR/ASR	SR/AR		
		Four-Way	Three-Way	Two-Way	One-Way
7	15°	400	300	200	100
8	20°	600	450	300	150
9	25°	1200	900	600	300
10	25°	1800	1350	900	450
12	30°	3200	2400	1600	800
14	30°	4800	3600	2400	1200
16	30°	6000	4500	3000	1500

NC < 30	NC 30	NC 35	NC 40	NC ≥ 45

SR/AR Square & Rectangular Ceiling Diffusers — Steel/Aluminum (Page 30-33)

One-Way Style 1L

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
9 x 6	CFM	65	80	95	105	120	130	160	185	210	240	265
Ak .130	Throw	5-8	6-9	7-11	8-12	9-13	10-15	12-18	15-21	16-24	19-29	21-32
12 x 6	CFM	90	105	120	140	160	175	210	245	280	315	350
Ak .170	Throw	5-8	6-9	6-13	9-14	10-15	12-18	14-20	17-25	18-27	20-30	23-35
15 x 6	CFM	110	130	155	175	200	220	265	310	350	395	440
Ak .220	Throw	5-8	7-10	9-13	10-15	12-18	14-20	16-24	18-27	21-31	24-36	28-41
12 x 9	CFM	130	155	180	210	235	260	310	365	415	470	520
Ak .260	Throw	7-10	8-12	10-14	11-17	12-18	14-20	17-25	19-29	22-23	25-37	28-41
15 x 9	CFM	165	195	230	260	295	325	390	460	525	590	650
Ak .320	Throw	9-13	10-14	11-17	12-18	15-23	17-25	20-30	22-33	25-37	29-42	32-45
18 x 9	CFM	195	235	275	310	350	390	470	545	625	700	780
Ak .390	Throw	9-13	10-15	12-18	14-20	16-24	18-26	20-30	25-37	27-40	31-44	36-48
15 x 12	CFM	220	260	305	350	390	435	525	610	700	785	870
Ak .430	Throw	10-14	11-17	13-19	15-23	18-26	19-29	22-32	26-39	30-43	35-48	39-54
18 x 12	CFM	260	315	370	420	475	525	630	735	840	945	1050
Ak .520	Throw	10-15	12-18	14-20	17-25	19-27	21-30	25-36	28-41	32-45	36-49	42-54
21 x 15	CFM	380	455	530	605	685	760	915	1060	1220	1370	1520
Ak .760	Throw	13-19	15-21	18-26	19-29	22-34	25-38	29-42	34-46	38-51	43-56	48-61
24 x 15	CFM	440	525	615	700	790	875	1050	1225	1400	1575	1750
Ak .870	Throw	14-22	16-24	18-27	21-31	24-36	27-40	30-43	35-47	41-52	46-57	53-61
21 x 18	CFM	460	550	640	735	825	915	1100	1280	1465	1645	1830
Ak .910	Throw	14-20	16-24	19-29	22-32	24-36	26-39	30-43	35-47	41-51	45-56	49-62
27 x 21	CFM	690	830	965	1100	1245	1380	1655	1935	2210	2490	2760
Ak 1.380	Throw	17-27	19-29	23-35	26-40	30-45	34-49	38-54	43-60	48-67	54-72	59-80

1-WAY STYLE 1L



One-Way Style 1S

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
9 x 6	CFM	65	80	95	105	120	130	160	185	210	240	265
Ak .130	Throw	4-7	5-9	7-11	9-13	11-17	13-19	15-21	16-24	18-27	21-32	23-35
12 x 6	CFM	90	105	120	140	160	175	210	245	280	315	350
Ak .170	Throw	6-10	8-12	10-15	12-17	14-19	15-21	17-25	21-31	23-35	25-37	29-44
15 x 6	CFM	110	130	155	175	200	220	265	310	350	395	440
Ak .220	Throw	9-12	10-14	12-18	14-20	16-24	18-26	21-31	23-35	27-40	31-45	35-51
12 x 9	CFM	130	155	180	210	235	260	310	365	415	470	520
Ak .260	Throw	8-12	10-14	10-15	12-18	14-20	16-24	18-27	23-33	24-37	28-42	30-44
15 x 9	CFM	165	195	230	260	295	325	390	460	525	590	650
Ak .320	Throw	10-15	12-18	13-19	15-21	18-26	22-32	23-35	26-39	30-43	35-46	38-47
18 x 9	CFM	195	235	275	310	350	390	470	545	625	700	780
Ak .390	Throw	11-17	13-19	15-23	17-25	20-30	22-33	25-38	31-44	34-45	38-47	42-51
15 x 12	CFM	220	260	305	350	390	435	525	610	700	785	870
Ak .430	Throw	11-16	12-18	15-21	17-25	19-29	22-32	25-38	28-44	33-45	36-49	42-54
18 x 12	CFM	260	315	370	420	475	525	630	735	840	945	1050
Ak .520	Throw	12-18	14-20	16-24	19-27	21-31	22-33	27-40	32-45	37-47	42-50	45-56
21 x 15	CFM	380	455	530	605	685	760	915	1060	1220	1370	1520
Ak .760	Throw	14-20	16-24	19-29	22-32	24-37	28-41	33-45	39-48	43-52	48-58	54-63
24 x 15	CFM	440	525	615	700	790	875	1050	1225	1400	1575	1750
Ak .870	Throw	16-23	18-26	22-32	25-37	28-41	32-45	37-47	44-54	49-59	54-66	59-71
21 x 18	CFM	460	550	640	735	825	915	1100	1280	1465	1645	1830
Ak .910	Throw	18-24	18-26	21-31	24-33	26-38	28-41	33-47	39-53	44-58	48-63	54-69
27 x 21	CFM	690	830	965	1100	1245	1380	1655	1935	2210	2490	2760
Ak 1.380	Throw	19-29	21-32	25-38	31-44	37-49	40-51	42-55	46-61	51-66	56-71	61-77

1-WAY STYLE 1S



Note 3: The minimum Throw Dimension is based on a terminal velocity of 135 fpm. The maximum Throw Dimension is based on a terminal velocity of 65 fpm.

Ceiling Height in Feet	Maximum Recommended Cooling Temperature Differential	Maximum Recommended CFM Per Diffuser			
		SR/AR/ASR	SR/AR		
		Four-Way	Three-Way	Two-Way	One-Way
7	15°	400	300	200	100
8	20°	600	450	300	150
9	25°	1200	900	600	300
10	25°	1800	1350	900	450
12	30°	3200	2400	1600	800
14	30°	4800	3600	2400	1200
16	30°	6000	4500	3000	1500

NC<30	NC30	NC35	NC40	NC≥45
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ASR Square Supply Return Diffuser — Aluminum (Page 35)

Four-Way Square

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
Supply Performance Data												
12 x 12 Ak .180	CFM	90	105	120	140	155	175	210	250	280	315	350
	Ps	.01	.02	.02	.03	.04	.05	.07	.10	.13	.16	.20
	Throw X/Y	2-4/2-4	2-4/2-4	3-5/3-5	3-5/3-5	4-6/4-6	5-8/5-8	5-9/5-9	6-4/6-4	6-12/6-12	7-13/7-13	8-14/8-14
	NC	<30	<30	<30	<30	<30	<30	<35	<40	<45	<45	<45
Return Performance Data												
9 x 9 Grid Core Ak .340	CFM	65	80	90	105	115	130	160	190	210	235	260
	-Ps	<.01	<.01	<.01	<.01	<.01	<.01	.01	.02	.02	.03	.04
	NC	<30	<30	<30	<30	<30	<30	35	40	>45	>45	>45

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
Supply Performance Data												
15 x 15 Ak .400	CFM	200	240	280	320	360	400	480	560	640	720	800
	Ps	.01	.02	.02	.03	.04	.05	.07	.10	.13	.16	.20
	Throw X/Y	3-5/3-5	4-6/4-6	4-8/4-8	5-8/5-8	5-9/5-9	6-11/6-11	6-12/6-12	7-13/7-13	8-15/8-15	9-17/9-17	10-19/10-19
	NC	<30	<30	<30	<30	<30	<30	35	40	>45	>45	>45
Return Performance Data												
9 x 9 Grid Core Ak .340	CFM	150	180	210	240	270	300	360	420	480	540	600
	-Ps	.01	.02	.02	.03	.04	.05	.07	.09	.12	.16	.19
	NC	<30	<30	<30	<30	<30	<30	35	40	>45	>45	>45

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
Supply Performance Data												
18 x 18 Ak .500	CFM	250	300	350	400	450	500	600	700	800	900	1000
	Ps	.01	.02	.02	.03	.04	.05	.07	.10	.13	.16	.20
	Throw X/Y	3-5/3-5	4-6/4-6	4-8/4-8	5-8/5-8	5-9/5-9	6-11/6-11	6-12/6-12	7-13/7-13	8-15/8-15	9-17/9-17	10-19/10-19
	NC	<30	<30	<30	<30	<30	<30	35	40	>45	>45	>45
Return Performance Data												
12 x 12 Grid Core Ak .640	CFM	190	225	265	300	340	375	450	525	600	675	750
	-Ps	<.01	<.01	.01	.01	.02	.02	.03	.04	.06	.07	.09
	NC	<30	<30	<30	<30	<30	<30	35	40	>45	>45	>45

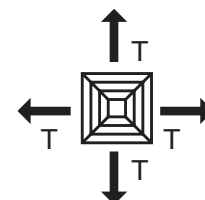
Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
Supply Performance Data												
21 x 21 Ak .600	CFM	300	360	420	480	540	600	720	845	960	1075	1200
	Ps	.01	.02	.02	.03	.04	.05	.07	.10	.13	.16	.20
	Throw X/Y	3-5/3-5	3-7/3-7	4-7/4-7	4-8/4-8	5-9/5-9	5-11/5-11	6-12/6-12	7-14/7-14	8-16/8-16	19-18/9-18	11-21/11-21
	NC	<30	<30	<30	<30	<30	<30	35	40	>45	>45	>45
Return Performance Data												
15 x 15 Grid Core Ak 1.000	CFM	225	270	315	360	405	450	540	635	720	810	900
	-Ps	<.01	<.01	<.01	<.01	.01	.01	.02	.03	.03	.04	.05
	NC	<30	<30	<30	<30	<30	<30	35	40	>45	>45	>45

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
Supply Performance Data												
24 x 24 Ak .700	CFM	350	420	490	560	630	700	840	980	1120	1260	1400
	Ps	.01	.02	.02	.03	.04	.05	.07	.10	.13	.16	.20
	Throw X/Y	3-5/3-5	3-7/3-7	4-7/4-7	4-9/4-9	5-11/5-11	5-11/5-11	6-12/6-12	7-15/7-15	9-17/9-17	11-21/11-21	13-25/13-25
	NC	<30	<30	<30	<30	<30	<30	35	40	>45	>45	>45
Return Performance Data												
18 x 18 Grid Core Ak 1.600	CFM	260	315	365	420	470	525	630	735	840	945	1050
	-Ps	<.01	<.01	<.01	<.01	<.01	<.01	.01	.01	.01	.02	.03
	NC	<30	<30	<30	<30	<30	<30	35	40	>45	>45	>45

Return CFM listed is 75% of supply.
 NC re 8db room Attenuation

NOTES: The minimum Throw Dimension is based on a terminal velocity of 200 FPM. The maximum Throw Dimension is based on a terminal velocity of 100 FPM.

The minimum Throw Dimension in feet is based on a V_i of 200 FPM with V_a of 65 FPM.
 The maximum Throw Dimension in feet is based on a V_i of 100 FPM with V_a of 35 FPM.



ASR Square Supply Return Diffuser — Aluminum (Page 35)
Four-Way Square

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
Supply Performance Data												
27 x 27 Ak 1.100	CFM	560	675	785	900	1020	1120	1345	1570	1790	2020	2240
	Ps	.01	.02	.02	.03	.04	.05	.07	.10	.13	.16	.20
	Throw X/Y	3-5/3-5	3-5/3-5	4-8/4-8	5-11/5-11	6-14/6-14	7-15/7-15	8-17/8-17	9-18/9-18	11-21/11-21	13-25/13-25	15-29/15-29
	NC	<30	<30	<30	<30	<30	<30	<35	<40	<45	<45	<45
Return Performance Data												
18 x 18 Grid Core Ak 1.600	CFM	345	505	590	675	765	840	1020	1180	1340	1520	1680
	-Ps	<.01	<.01	<.01	.01	.02	.02	.03	.04	.05	.06	.07
	NC	<30	<30	<30	<30	<30	<30	35	40	>45	>45	>45

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
Supply Performance Data												
30 x 30 Ak 1.300	CFM	635	765	890	1015	1140	1270	1520	1775	2030	2290	2540
	Ps	.01	.02	.02	.03	.04	.05	.07	.10	.13	.16	.20
	Throw X/Y	3-7/3-7	4-8/4-8	4-10/4-10	5-12/5-12	6-14/6-14	7-16/7-16	9-17/9-17	10-19/10-19	12-23/12-23	14-27/14-27	16-31/16-31
	NC	<30	<30	<30	<30	<30	<30	35	40	>45	>45	>45
Return Performance Data												
21 x 21 Grid Core Ak 2.100	CFM	475	575	665	760	855	955	1140	1330	1520	1720	1900
	-Ps	<.01	<.01	<.01	<.01	.01	.01	.02	.03	.03	.04	.05
	NC	<30	<30	<30	<30	<30	<35	40	45	>45	>45	>45

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
Supply Performance Data												
33 x 33 Ak 1.800	CFM	900	1080	1260	1440	1620	1800	2160	2520	2880	3250	3600
	Ps	.01	.02	.02	.03	.04	.05	.07	.10	.13	.16	.20
	Throw X/Y	4-8/4-8	5-10/5-10	6-12/6-12	6-13/6-13	7-15/7-15	8-17/8-17	11-23/11-23	14-29/14-29	16-31/16-31	18-35/18-35	20-39/20-39
	NC	<30	<30	<30	<30	<30	<30	35	45	>45	>45	>45
Return Performance Data												
21 x 21 Grid Core Ak 2.100	CFM	675	810	945	1080	1210	1350	1620	1885	2160	2440	2700
	-Ps	<.01	<.01	.01	.02	.02	.03	.04	.05	.07	.09	.10
	NC	<30	<30	<30	<30	<30	<35	40	45	>45	>45	>45

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
Supply Performance Data												
36 x 36 Ak 2.000	CFM	1000	1200	1400	1600	1800	2000	2400	2800	3200	3600	4000
	Ps	.01	.02	.02	.03	.04	.05	.07	.10	.13	.16	.20
	Throw X/Y	3-8/3-8	4-11/4-11	5-12/5-12	6-14/6-14	7-16/7-16	9-19/9-19	12-23/12-23	14-27/14-27	16-31/16-31	18-35/18-35	22-39/22-39
	NC	<30	<30	<30	<30	<30	<30	40	45	>45	>45	>45
Return Performance Data												
24 x 24 Grid Core Ak 2.800	CFM	750	900	1050	1200	1350	1500	1800	2100	2400	2700	3000
	-Ps	<.01	<.01	<.01	.01	.01	.02	.03	.03	.05	.06	.07
	NC	<30	<30	<30	<30	<30	<35	40	45	>45	>45	>45

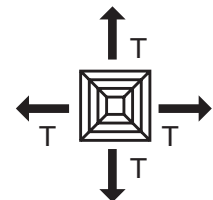
Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
Supply Performance Data												
42 x 42 Ak 2.900	CFM	1450	1740	2030	2320	2610	2900	3480	4060	4640	5225	5800
	Ps	.01	.02	.02	.03	.04	.05	.07	.10	.13	.16	.20
	Throw X/Y	4-11/4-11	5-13/5-13	7-16/7-16	10-21/10-21	12-25/12-25	15-29/15-29	17-33/17-33	19-36/19-36	22-41/22-41	25-48/25-48	29-54/29-54
	NC	<30	<30	<30	<30	<30	<40	45	45	>45	>45	>45
Return Performance Data												
27 x 27 Grid Core Ak 3.600	CFM	1085	1300	1520	1735	1950	2170	2600	3040	3470	3900	4340
	-Ps	<.01	<.01	.01	.01	.02	.02	.03	.04	.06	.07	.09
	NC	<30	<30	<30	<30	<35	<40	40	45	>45	>45	>45

Return CFM listed is 75% of supply.

NC re 8db room Attenuation

NOTES: The minimum Throw Dimension is based on a terminal velocity of 200 FPM. The maximum Throw Dimension is based on a terminal velocity of 100 FPM.

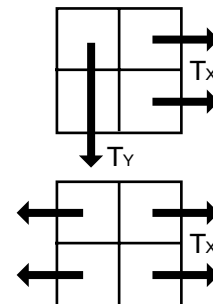
 The minimum Throw Dimension in feet is based on a V_r of 200 FPM with V_a of 65 FPM.

 The maximum Throw Dimension in feet is based on a V_r of 100 FPM with V_a of 35 FPM.


MCD Modular Ceiling Diffuser — Aluminum (Page 36, 37, 71)

Two Way

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
6 x 6 Ak .090	CFM Throw X/Y NC	45 2-5/2-5 <20	55 3-5/3-5 <20	65 3-6/3-6 <20	70 3-6/3-6 <20	80 5-8/5-8 <20	90 5-9/5-9 <20	110 5-11/5-11 21	125 6-12/6-12 24	145 6-14/6-14 28	160 8-15/8-15 31	180 9-17/9-17 34
8 x 8 Ak .150	CFM Throw X/Y NC	80 3-6/3-6 <20	95 3-6/3-6 <20	110 5-8/5-8 <20	130 5-9/5-9 <20	145 5-11/5-11 <20	160 6-11/6-11 <20	190 6-14/6-14 22	225 8-15/8-15 26	255 9-17/9-17 29	290 11-18/11-18 32	320 11-20/11-20 35
10 x 10 Ak .250	CFM Throw X/Y NC	130 3-8/3-8 <20	155 5-9/5-9 <20	180 5-11/5-11 <20	210 6-11/6-11 <20	235 6-12/6-12 <20	260 8-12/8-12 <20	310 9-15/9-15 23	365 11-17/11-17 27	415 12-20/12-20 30	470 14-21/14-21 33	520 15-23/15-23 36
12 x 12 Ak .370	CFM Throw X/Y NC	190 5-9/5-9 <20	230 5-11/5-11 <20	265 6-12/6-12 <20	305 8-14/8-14 <20	340 8-15/8-15 <20	380 9-17/9-17 20	455 11-18/11-18 24	530 12-21/12-21 28	610 14-23/14-23 31	685 15-24/15-24 35	760 17-26/17-26 37
14 x 14 Ak .520	CFM Throw X/Y NC	260 5-11/5-11 <20	310 6-12/6-12 <20	365 8-14/8-14 <20	415 8-17/8-17 <20	470 9-18/9-18 <20	520 11-20/11-20 20	625 12-21/12-21 25	730 14-23/14-23 29	830 17-24/17-24 32	935 18-27/18-27 35	1040 20-29/20-29 38
16 x 16 Ak .700	CFM Throw X/Y NC	350 6-12/6-12 <20	420 8-14/8-14 <20	490 8-17/8-17 <20	560 9-18/9-18 <20	630 11-21/11-21 <20	700 12-23/12-23 21	840 14-26/14-26 26	980 17-29/17-29 30	1120 18-30/18-30 33	1260 21-32/21-32 36	1400 24-33/24-33 39
18 x 18 Ak .900	CFM Throw X/Y NC	450 6-14/6-14 <20	540 8-17/8-17 <20	630 9-18/9-18 <20	720 11-21/11-21 <20	810 12-23/12-23 <20	900 14-24/14-24 22	1080 17-27/17-27 27	1260 18-30/18-30 31	1440 21-33/21-33 34	1620 24-35/24-35 37	1800 27-36/27-36 40
20 x 20 Ak 1.100	CFM Throw X/Y NC	555 8-15/8-15 <20	665 9-18/9-18 <20	775 11-21/11-21 <20	890 12-24/12-24 <20	1000 14-26/14-26 21	1110 15-29/15-29 24	1330 18-32/18-32 28	1555 21-35/21-35 32	1775 24-38/24-38 36	2000 27-39/27-39 39	2220 30-41/30-41 42
22 x 22 Ak 1.330	CFM Throw X/Y NC	665 8-17/8-17 <20	800 9-20/9-20 <20	930 12-23/12-23 <20	1065 14-26/14-26 22	1195 15-27/15-27 25	1330 17-30/17-30 28	1595 20-35/20-35 32	1860 23-38/23-38 36	2130 27-41/27-41 40	2395 29-44/29-44 43	2660 33-45/33-45 46



One-Way

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
6 x 6 Ak .090	CFM Throw NC	45 2-6 <20	55 4-6 <20	65 4-8 <20	70 4-8 <20	80 6-10 <20	90 6-12 <20	110 6-14 21	125 8-16 24	145 8-18 28	160 10-20 31	180 12-22 34
8 x 8 Ak .150	CFM Throw NC	80 4-8 <20	95 4-8 <20	110 6-10 <20	130 6-12 <20	145 6-14 <20	160 8-14 <20	190 8-18 22	225 10-20 26	255 12-22 29	290 14-24 32	320 14-26 35
10 x 10 Ak .250	CFM Throw NC	130 4-10 <20	155 6-12 <20	180 6-14 <20	210 8-14 <20	235 8-16 <20	260 10-16 <20	310 12-20 23	365 14-22 27	415 16-26 30	470 18-28 33	520 20-30 36
12 x 12 Ak .370	CFM Throw NC	190 6-12 <20	230 6-14 <20	265 8-16 <20	305 10-18 <20	340 10-20 <20	380 12-20 20	455 12-22 24	530 14-24 28	610 16-28 31	685 18-30 35	760 20-30 37
14 x 14 Ak .520	CFM Throw NC	260 6-14 <20	310 8-16 <20	365 10-18 <20	415 10-22 <20	470 12-24 <20	520 14-26 20	625 16-28 25	730 18-30 29	830 22-32 32	935 24-36 35	1040 26-38 38
16 x 16 Ak .700	CFM Throw NC	350 8-16 <20	420 10-18 <20	490 10-22 <20	560 12-24 <20	630 14-28 <20	700 16-30 21	840 18-34 26	980 22-38 30	1120 24-40 33	1260 28-42 36	1400 32-44 39
18 x 18 Ak .900	CFM Throw NC	450 8-18 <20	540 10-22 <20	630 12-24 <20	720 14-28 <20	810 16-30 20	900 18-36 22	1080 22-36 27	1260 24-40 31	1440 28-44 34	1620 32-46 37	1800 35-48 40
20 x 20 Ak 1.100	CFM Throw NC	555 10-20 <20	665 12-24 <20	775 14-28 <20	890 16-32 <20	1000 18-34 21	1110 20-38 24	1330 24-42 28	1555 28-46 32	1775 32-50 36	2000 36-52 39	2220 40-54 42
22 x 22 Ak 1.330	CFM Throw NC	665 10-22 <20	800 12-26 <20	930 16-30 <20	1065 18-34 20	1195 20-36 23	1330 22-40 26	1595 26-46 30	1860 30-50 34	2130 36-54 38	2395 38-58 41	2660 44-60 44

840	960	1120	1280	14
18-34	22-38	24-40	26-42	32
28	30	32	36	38
1080	1280	1440	1600	18
22-36	24-40	26-44	28-46	35
27	31	34	37	40
1330	1555	1775	2000	22
24-42	28-46	32-50	36-52	40
29	32	36	39	44
1595	1860	2130	2395	26
26-46	30-50	36-54	38-58	44
30	34	38	41	46

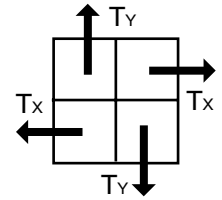
1280	1480	1680	1880	20
288	336	384	432	2
3-10-7	4-8-8	4-8-8	5-10-10	6-11-6
31	34	38	41	44
180	200	220	240	3
4-8-8	5-10-10	6-11-6	7-12-7	7-13-7
22	26	29	32	35

NOTES: The minimum Throw Dimension is based on a terminal velocity of 250 FPM. The maximum Throw Dimension is based on a terminal velocity of 125 FPM.
NC re 10db room Attenuation (LW10⁻¹²W)

MCD Modular Ceiling Diffuser — Aluminum (Page 36, 37, 71)

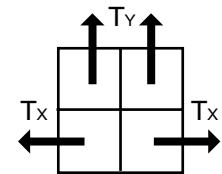
Four-Way

Face Velocity	500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss	.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
6 x 6 Ak .090	CFM Throw X/Y NC 45 1-3/1-3 <20	55 2-3/2-3 <20	65 2-4/2-4 <20	70 2-4/2-4 <20	80 3-5/3-5 <20	90 3-6/3-6 <20	110 3-7/3-7 21	125 4-8/4-8 24	145 4-9/4-9 28	160 5-10/5-10 31	180 6-11/6-11 34
8 x 8 Ak .150	CFM Throw X/Y NC 80 2-4/2-4 <20	95 2-4/2-4 <20	110 3-5/3-5 <20	130 3-6/3-6 <20	145 3-7/3-7 <20	160 4-7/4-7 <20	190 4-9/4-9 22	225 5-10/5-10 26	255 6-11/6-11 29	290 7-12/7-12 32	320 7-13/7-13 35
10 x 10 Ak .250	CFM Throw X/Y NC 130 2-5/2-5 <20	155 3-6/3-6 <20	180 3-7/3-7 <20	210 4-7/4-7 <20	235 4-8/4-8 <20	260 5-8/5-8 <20	310 6-10/6-10 23	365 7-11/7-11 27	415 8-13/8-13 30	470 9-14/9-14 33	520 10-15/10-15 36
12 x 12 Ak .370	CFM Throw X/Y NC 190 3-6/3-6 <20	230 3-7/3-7 <20	265 4-8/4-8 <20	305 5-9/5-9 <20	340 5-10/5-10 <20	380 6-11/6-11 20	455 7-12/7-12 24	530 8-14/8-14 28	610 8-15/8-15 31	685 10-16/10-16 35	760 11-17/11-17 37
14 x 14 Ak .520	CFM Throw X/Y NC 260 3-7/3-7 <20	310 4-8/4-8 <20	365 5-9/5-9 <20	415 5-11/5-11 <20	470 6-12/6-12 <20	520 7-13/7-13 20	625 8-14/8-14 25	730 9-15/9-15 29	830 11-16/11-16 32	935 12-18/12-18 35	1040 13-19/13-19 38
16 x 16 Ak .700	CFM Throw X/Y NC 350 4-8/4-8 <20	420 5-9/5-9 <20	490 5-11/5-11 <20	560 6-12/6-12 <20	630 7-14/7-14 <20	700 8-15/8-15 21	840 9-17/9-17 26	980 11-19/11-19 30	1120 12-20/12-20 33	1260 14-21/14-21 36	1400 16-22/16-22 39
18 x 18 Ak .900	CFM Throw X/Y NC 450 4-9/4-9 <20	540 5-11/5-11 <20	630 6-12/6-12 <20	720 7-14/7-14 <20	810 8-15/8-15 20	900 9-16/9-16 22	1080 11-18/11-18 27	1260 12-20/12-20 31	1440 14-22/14-22 34	1620 16-23/16-23 37	1800 18-24/18-24 40
20 x 20 Ak 1.100	CFM Throw X/Y NC 555 5-10/5-10 <20	665 6-12/6-12 <20	775 7-14/7-14 <20	890 8-16/8-16 <20	1000 9-17/9-17 21	1110 10-19/10-19 24	1330 12-21/12-21 28	1555 14-23/14-23 32	1775 16-25/16-25 36	2000 18-26/18-26 39	2220 20-27/20-27 42
22 x 22 Ak 1.330	CFM Throw X/Y NC 665 5-11/5-11 <20	800 6-13/6-13 <20	930 8-15/8-15 <20	1065 9-17/9-17 20	1195 10-18/10-18 23	1330 11-20/11-20 26	1595 13-23/13-23 30	1860 15-25/15-25 34	2130 18-27/18-27 38	2395 19-29/19-29 41	2660 22-30/22-30 44



Three-Way

Face Velocity	500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss	.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
6 x 6 Ak .090	CFM Throw NC 45 1-3/2-3 <20	55 2-3/3-3 <20	65 2-4/3-6 <20	70 2-4/3-6 <20	80 3-5/5-8 <20	90 3-6/5-9 <20	110 3-7/5-11 21	125 4-8/6-12 24	145 4-9/6-14 28	160 5-10/8-15 31	180 6-11/9-17 34
8 x 8 Ak .150	CFM Throw NC 80 2-4/3-6 <20	95 2-4/3-6 <20	110 3-5/5-8 <20	130 3-6/5-9 <20	145 3-7/5-11 <20	160 4-7/6-11 <20	190 4-9/6-14 22	225 5-10/8-15 26	255 6-11/9-17 29	290 7-12/11-18 32	320 7-13/11-20 35
10 x 10 Ak .250	CFM Throw NC 130 2-5/3-8 <20	155 3-6/5-9 <20	180 3-7/5-11 <20	210 4-7/6-11 <20	235 4-8/6-12 <20	260 5-8/8-12 <20	310 6-10/9-15 23	365 7-11/11-17 27	415 8-13/12-20 30	470 9-14/14-21 33	520 10-15/15-23 36
12 x 12 Ak .370	CFM Throw NC 190 3-6/5-9 <20	230 3-7/5-11 <20	265 4-8/6-12 <20	305 5-9/8-14 <20	340 5-10/8-15 <20	380 6-11/9-17 20	455 7-12/11-18 24	530 8-14/12-21 28	610 9-15/14-23 31	685 10-16/15-24 35	760 11-17/17-26 37
14 x 14 Ak .520	CFM Throw NC 260 3-7/5-11 <20	310 4-8/6-12 <20	365 5-9/8-14 <20	415 5-11/8-17 <20	470 6-12/9-18 <20	520 7-13/11-20 20	625 8-14/12-21 25	730 9-15/14-23 29	830 11-16/17-24 32	935 12-18/18-27 35	1040 13-19/20-29 38
16 x 16 Ak .700	CFM Throw NC 350 4-8/6-12 <20	420 5-9/8-14 <20	490 5-11/8-17 <20	560 6-12/9-18 <20	630 7-14/11-21 <20	700 8-15/12-23 21	840 9-17/14-26 26	980 11-19/17-29 30	1120 12-20/18-30 33	1260 14-21/21-32 36	1400 16-22/24-33 39
18 x 18 Ak .900	CFM Throw NC 450 4-9/6-14 <20	540 5-11/8-17 <20	630 6-12/9-18 <20	720 7-14/11-21 <20	810 8-15/12-23 20	900 9-16/14-24 22	1080 11-18/17-27 27	1260 12-20/18-30 31	1440 14-22/21-33 34	1620 16-23/24-35 37	1800 18-24/27-36 40
20 x 20 Ak 1.100	CFM Throw NC 555 5-10/8-15 <20	665 6-12/9-18 <20	775 7-14/11-21 <20	890 8-16/12-24 <20	1000 9-17/14-26 21	1110 10-19/15-29 24	1330 12-21/18-32 28	1555 14-23/21-35 32	1775 16-25/24-38 36	2000 18-26/27-39 39	2220 20-27/30-41 42
22 x 22 Ak 1.330	CFM Throw NC 665 5-11/8-17 <20	800 6-13/9-20 <20	930 8-15/12-23 <20	1065 9-17/14-26 20	1195 10-18/15-27 23	1330 11-20/17-30 26	1595 13-23/20-35 30	1860 15-25/23-38 34	2130 18-27/27-41 38	2395 19-29/29-44 41	2660 22-30/33-45 44



NOTES: The minimum Throw Dimension is based on a terminal velocity of 250 FPM. The maximum Throw Dimension is based on a terminal velocity of 125 FPM.
 NC re 10db room Attenuation (LW10⁻¹²W)

SS Spiral Diffuser (Page 39)

1/2" wide slot–nonducted

See notes on next page and see page 39 for min. duct diameter.

1-Slot	Airflow Rate (CFM/Linear Foot)	7	10	13	17	20	23	27	30	33	37
	Static Pressure	.002	.003	.006	.009	.016	.018	.024	.030	.037	.045
	Horizontal Throw	7-4-2	11-6-4	15-7-5	19-9-6	22-11-7	26-13-9	30-15-10	33-17-11	37-19-12	41-20-14
	Noise Criteria	<15	<15	<15	<15	<15	<15	19	21	23	25
2-Slot	Airflow Rate (CFM/Linear Foot)	10	17	23	30	37	43	50	57	63	70
	Static Pressure	.001	.002	.004	.007	.011	.015	.020	.026	.032	.039
	Horizontal Throw	6-3-2	9-5-3	13-6-4	17-8-6	20-10-7	24-12-8	28-14-9	31-16-10	35-18-12	39-19-13
	Noise Criteria	<15	<15	<15	<15	<15	<15	19	23	27	31
3-Slot	Airflow Rate (CFM/Linear Foot)	13	23	33	43	53	63	73	83	93	103
	Static Pressure	.001	.002	.004	.006	.009	.012	.017	.021	.027	.033
	Horizontal Throw	5-3-2	10-5-3	14-7-5	18-9-6	22-11-7	26-13-9	30-15-10	34-17-11	38-19-13	42-21-14
	Noise Criteria	<15	<15	<15	<15	<15	18	21	25	30	33
4-Slot	Airflow Rate (CFM/Linear Foot)	17	30	43	57	70	83	97	110	123	137
	Static Pressure	.001	.002	.003	.005	.008	.012	.016	.020	.025	.031
	Horizontal Throw	6-3-2	10-5-3	15-8-5	20-10-7	24-12-8	29-14-10	31-17-11	38-19-13	43-21-14	47-24-16
	Noise Criteria	<15	<15	<15	<15	18	20	22	27	32	34

3/4" wide slot–nonducted

See notes on next page and see page 39 for min. duct diameter.

1-Slot	Airflow Rate (CFM/Linear Foot)	10	15	20	25	30	35	40	45	50	55
	Static Pressure	.002	.004	.007	.011	.015	.020	.027	.034	.042	.050
	Horizontal Throw	6-3-2	9-5-3	12-6-4	15-8-5	18-9-6	22-11-7	25-12-8	28-14-9	31-15-10	34-17-11
	Noise Criteria	<15	<15	<15	<15	19	21	25	30	34	39
2-Slot	Airflow Rate (CFM/Linear Foot)	15	25	35	45	55	65	75	85	95	105
	Static Pressure	.001	.003	.005	.008	.012	.017	.022	.029	.036	.044
	Horizontal Throw	5-2-2	8-4-3	11-5-4	14-7-5	17-8-6	20-10-7	23-12-8	26-13-9	29-15-10	32-16-11
	Noise Criteria	<15	<15	<15	<15	19	26	32	35	38	41
3-Slot	Airflow Rate (CFM/Linear Foot)	20	35	50	65	80	95	110	125	140	155
	Static Pressure	.001	.002	.004	.007	.010	.014	.019	.024	.030	.037
	Horizontal Throw	5-2-2	8-4-3	11-6-4	15-7-5	18-9-6	22-11-7	25-12-8	28-14-9	32-16-11	35-18-12
	Noise Criteria	<15	<15	<15	18	23	28	33	37	40	43
4-Slot	Airflow Rate (CFM/Linear Foot)	25	45	65	85	105	125	145	165	185	205
	Static Pressure	.001	.002	.004	.006	.009	.013	.017	.023	.028	.035
	Horizontal Throw	5-2-2	9-4-3	13-6-4	16-8-5	20-10-7	24-12-8	28-14-9	32-16-11	38-19-12	40-20-13
	Noise Criteria	<15	<15	17	22	25	29	33	37	40	43

1" wide slot–nonducted

See notes on next page and see page 39 for min. duct diameter.

1-Slot	Airflow Rate (CFM/Linear Foot)	13	20	27	33	40	47	53	60	67	73
	Static Pressure	.002	.005	.009	.014	.020	.027	.036	.045	.056	.067
	Horizontal Throw	5-2-2	7-4-2	10-5-3	12-6-4	15-7-5	17-9-6	20-10-7	22-11-7	25-12-8	27-14-9
	Noise Criteria	<15	<15	<15	20	25	31	37	41	43	45
2-Slot	Airflow Rate (CFM/Linear Foot)	20	33	47	60	79	87	100	113	127	140
	Static Pressure	.001	.003	.007	.011	.016	.023	.030	.038	.048	.059
	Horizontal Throw	4-2-1	6-3-2	9-4-3	11-6-4	14-7-5	16-8-5	19-9-6	21-10-7	23-12-8	26-13-9
	Noise Criteria	<15	<15	<15	23	32	35	40	44	48	51
3-Slot	Airflow Rate (CFM/Linear Foot)	27	47	67	87	107	127	147	167	187	207
	Static Pressure	.001	.003	.005	.009	.013	.019	.025	.032	.040	.049
	Horizontal Throw	4-2-1	6-3-2	9-5-3	12-6-4	15-7-5	17-9-6	20-10-7	23-11-8	25-13-8	28-14-9
	Noise Criteria	<15	<15	<15	23	32	35	40	44	48	51
4-Slot	Airflow Rate (CFM/Linear Foot)	33	60	87	113	140	167	193	220	247	273
	Static Pressure	.001	.002	.005	.008	.012	.017	.023	.030	.038	.046
	Horizontal Throw	4-2-1	7-3-2	10-5-3	13-7-4	16-8-5	19-10-8	22-11-7	25-13-8	29-14-10	32-16-11
	Noise Criteria	<15	16	22	27	31	37	42	46	50	54

SS Spiral Diffuser (Page 39)
Notes:

1. Tests conducted in accordance with ANSI/ASHRAE 70-1991 at isothermal conditions.
2. Engineering Units: Airflow Rate = CFM/linear foot
 Static Pressure = in. w.c.
 Throw = ft. at 50, 100, and 150 FPM terminal velocity
3. Noise Criteria is based on 10 dB room absorption (Re: 10^{12} watts) evaluated at 125 through 4000 Hz octave bands.
4. Throw data are based on a horizontal discharge in one direction only. For two-way discharge pattern, the throw is determined from the published engineering data based on the number of slots and CFM/linear feet discharging in each direction.
5. Throw data are for 4-foot active diffuser lengths.
 For other active lengths, throw may be determined by applying the following multiplication factors.
6. Sound data are for 4-foot active diffuser lengths. For other lengths, add or deduct the following values to or from the reported NC level.

Diffuser Length (Feet)	Multiplication Factor
1	0.50
2	0.85
3	0.95
4	1.00

Diffuser Length (Feet)	NC Correction
1	-2
2	-2
3	-1
4	0

SV and SVH Spiral Diffusers
USV, USVH Universal Spiral Diffusers
(Page 38-39)

See page 39 for min. duct diameter.

Face Velocity		300	400	500	600	700	800	1000	1200
Total Pressure		.016	.029	.046	.066	.090	.117	.183	.263
10 x 3 Ak .14	CFM	42	56	70	84	98	112	140	168
	Horizontal Throw	7-3	8-4	9-5	10-6	11-7	12-8	13-9	14-10
	Noise Criteria	-	-	-	-	-	23	29	35
12 x 3 Ak .18	CFM	54	72	90	108	126	144	180	216
	Horizontal Throw	8-5	9-6	10-7	11-8	12-8	13-9	14-10	16-11
	Noise Criteria	-	-	-	-	20	24	31	36
10 x 4 14 x 3 Ak .21	CFM	63	84	105	126	147	168	210	252
	Horizontal Throw	8-5	10-7	11-8	12-8	13-9	14-10	16-11	17-12
	Noise Criteria	-	-	-	-	21	25	31	37
16 x 3 12 x 4 Ak .25	CFM	75	100	125	150	175	200	250	300
	Horizontal Throw	9-5	11-7	12-8	13-9	14-10	15-11	17-12	19-13
	Noise Criteria	-	-	-	-	21	25	32	37
24 x 3 12 x 6 Ak .39	CFM	117	156	195	234	273	312	390	468
	Horizontal Throw	12-7	13-9	15-10	17-11	18-12	19-13	21-15	24-16
	Noise Criteria	-	-	-	-	23	27	34	39
24 x 4 16 x 6 Ak .52	CFM	156	208	260	312	364	416	520	624
	Horizontal Throw	13-8	16-11	18-12	19-13	21-14	22-15	25-17	27-19
	Noise Criteria	-	-	-	20	24	28	35	40
14 x 8 18 x 6 Ak .63	CFM	189	252	315	378	441	504	630	756
	Horizontal Throw	15-8	17-12	19-13	21-14	23-16	24-17	27-19	30-20
	Noise Criteria	-	-	-	20	25	29	36	41
20 x 6 Ak .66	CFM	198	264	330	396	462	528	660	792
	Horizontal Throw	15-9	18-12	20-13	22-15	24-16	25-17	28-19	31-21
	Noise Criteria	-	-	-	21	25	29	36	41
16 x 8 Ak .71	CFM	213	284	355	426	497	568	710	852
	Horizontal Throw	16-9	18-13	20-14	23-15	24-17	26-18	30-20	35-22
	Noise Criteria	-	-	-	21	26	30	36	42
24 x 6 18 x 8 Ak .88	CFM	264	352	440	528	616	704	880	1056
	Horizontal Throw	18-10	20-14	23-16	25-17	27-18	29-20	32-22	36-24
	Noise Criteria	-	-	-	22	26	30	37	43
20 x 8 16 x 10 Ak .98	CFM	294	392	490	588	686	784	980	1176
	Horizontal Throw	19-10	21-15	24-17	26-18	28-19	30-21	34-23	38-25
	Noise Criteria	-	-	-	23	27	31	38	44
18 x 10 Ak 1.11	CFM	333	444	555	666	777	888	1110	1332
	Horizontal Throw	20-11	23-16	25-18	28-19	30-21	32-22	36-25	40-27
	Noise Criteria	-	-	-	23	27	31	38	44
36 x 6 18 x 12 Ak 1.35	CFM	405	540	675	810	945	1080	1350	1620
	Horizontal Throw	22-12	25-17	28-19	31-21	34-23	36-24	40-27	44-30
	Noise Criteria	-	-	-	24	28	32	39	44
24 x 10 20 x 12 Ak 1.49	CFM	447	596	745	894	1043	1192	1490	1788
	Horizontal Throw	23-13	26-18	30-20	32-22	35-24	37-26	42-29	46-31
	Noise Criteria	-	-	-	24	29	33	39	45
24 x 12 Ak 1.82	CFM	546	728	910	1092	1274	1456	1820	2184
	Horizontal Throw	25-14	30-20	33-22	36-25	39-27	42-28	47-32	51-35
	Noise Criteria	-	-	-	25	30	34	40	46
36 x 10 30 x 12 Ak 2.29	CFM	687	916	1145	1374	1603	1832	2290	2748
	Horizontal Throw	29-16	33-22	37-25	41-28	44-30	47-32	53-36	61-42
	Noise Criteria	-	-	20	26	30	34	41	47
36 x 12 Ak 2.75	CFM	825	1100	1375	1650	1925	2200	2750	3300
	Horizontal Throw	31-18	36-25	41-28	44-30	48-33	51-35	57-39	63-43
	Noise Criteria	-	-	21	27	31	35	42	47

Terminal Velocity of 75 and 150 FPM, respectively

NOTES:

1. Total Pressure in inches water column.
2. Throw data are in feet at terminal velocities of 75 and 150 FPM, respectively.
3. Noise Criteria based on a 10 dB room attenuation (Re: 10⁻¹² watts).

L Series (Page 40-42)

Table 2 - Continuous Grille Length Factors

Modify Table 1 by listed values for grille lengths above 4 feet.		
Grille Length in Feet	Throw (T)	
	Sidewall Min.-Max.	Sill/Floor Min.-Max.
4-6	No Change	
7-20	T x 1.10	
21-100	T x 1.15	
		NC
		+0
		+5
		+10

Table 3 - Supply Air Temperature Factors

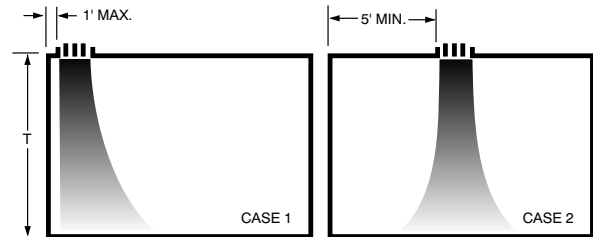
Multiply Throw in Table 1 (or factor in Table 2 if used) by listed value.			
Sidewall Sill/Floor	@-20F T	@ 0F T	@+25F T
	T x 1.00	T x 1.10	T x 1.20

Table 4 - Vertical Down-Throw and Supply Air Temperature Factors

Multiply Throw-Sidewall in Table 1 (or factor in Table 2 if used) by listed value.			
Case	@-20F T Cooling	@ 0F T Ventilating	@+25F T Heating
Case 1	T x 1.00	T x .90	T x .60
Case 2	T x .70	T x .60	T x .40

Table 5 - Supply Grille Areas (per foot of length)

Listed Width in Inches																
	1½	2	2½	3	4	5	6	8	10	12	14	16	18	20	24	30
A _n	.13	.17	.21	.25	.33	.42	.50	.67	.84	1.00	1.20	1.30	1.50	1.70	2.00	2.50
00 and 15 Bar Styles																
A _k	.04	.06	.09	.11	.16	.20	.25	.35	.45	.55	.68	.79	.90	1.00	1.30	1.60
30 and 01 Bar Styles																
A _k	.03	.05	.08	.09	.14	.17	.21	.30	.38	.47	.58	.67	.77	.85	1.10	1.40



Return Air CFM per Foot of Length

Listed Width in Inches	A _k Area	Bar Style	NC 20-25 Nonducted		NC 30 Ducted		NC 35-40 Ducted	
			-.02" P _s CFM	-.03" P _s CFM	-.08" P _s CFM	-.10" P _s CFM	-.15" P _s CFM	-.20" P _s CFM
1½	.13	00 and 15	20	25	40	45	55	65
	.12	01 and 30	15	20	35	40	45	55
2	.18	00 and 15	30	40	65	70	90	100
	.17	01 and 30	25	35	55	60	75	85
2½	.23	00 and 15	45	50	85	95	115	135
	.22	01 and 30	35	45	70	80	100	115
3	.27	00 and 15	55	65	105	120	145	165
	.25	01 and 30	45	55	90	100	120	140
4	.34	00 and 15	75	90	150	165	205	235
	.33	01 and 30	60	75	125	140	170	195
5	.41	00 and 15	95	120	190	215	260	305
	.39	01 and 30	80	100	160	180	220	255
6	.46	00 and 15	120	145	240	265	325	375
	.44	01 and 30	100	120	200	220	270	315
8	.57	00 and 15	160	200	325	360	445	515
	.54	01 and 30	135	165	270	305	370	430
10	.68	00 and 15	210	255	415	465	570	655
	.64	01 and 30	175	215	350	390	475	550
12	.76	00 and 15	255	310	510	565	695	800
	.72	01 and 30	210	260	425	475	580	670
16	.93	00 and 15	350	430	700	785	960	1100
	.86	01 and 30	285	350	570	635	780	900
20	1.10	00 and 15	445	545	885	990	1220	1410
	1.00	01 and 30	365	445	730	815	1000	1160
24	1.25	00 and 15	540	660	1080	1210	1475	1710
	1.15	01 and 30	440	540	880	985	1200	1390

S Series (Page 43-47)

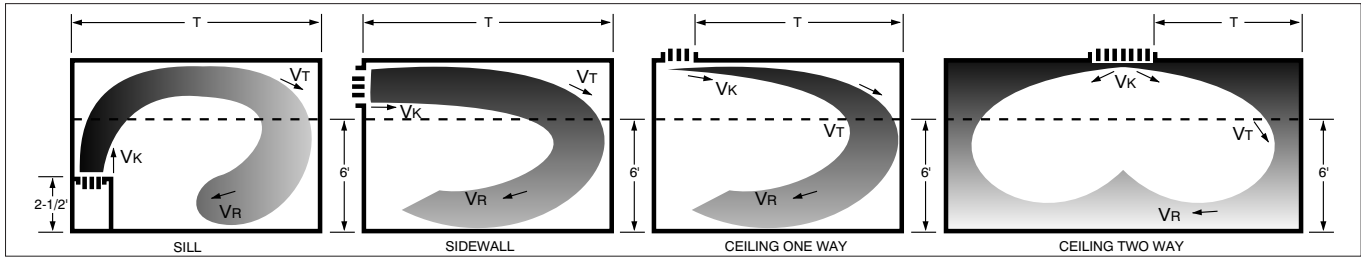


Table 1 - Supply Air

Type 50 (1/2" Slot)

CFM/Ft of total Slot length	Number of Slots	Min. P _s in H ₂ O	Outlet Velocity (V _t) FPM	Throw (T) in Feet			Minimum Ceiling Height in Feet				NC
				Ceiling	Sidewall	Sill					
				Min.-Max.	Min.-Max.	Min.-Max.	@ -18F	T	@ -25F	T	
10	1	.02	500	5-7	3-5	1-2	7½		9		<20
	2	<.01	335	4-6	2-4	1-2					<20
20	1	.08	1000	10-13	8-11	1-3	8		9		20
	2	.02	670	8-11	6-9	2-3					<20
	3	.01	400	6-9	4-7	1-2					<20
30	1	.08	1500	11-16	10-14	4-6	9		10		25
	2	.05	1000	10-14	8-12	3-4					20
	3	.02	600	8-11	6-9	2-3					<20
	4	.01	430	7-9	5-7	1-2					<20
40	2	.08	1330	13-17	11-15	4-6	9		11		25
	3	.04	800	10-14	8-12	3-5					20
	4	.02	570	9-12	7-10	2-3					20
	5	.01	445	8-11	6-9	2-3					<20
	6	.01	500	8-12	7-10	1-3					<20
50	3	.06	1000	11-15	9-13	4-6	9½		11		25
	4	.03	710	10-14	8-12	3-4					20
	5	.02	560	9-13	7-11	2-4					20
	6	.01	500	8-12	7-10	1-3					<20
60	3	.08	1200	13-17	11-15	5-8	9½		12		25
	4	.05	855	12-16	10-14	4-7					25
	5	.03	670	11-15	9-13	3-6					20
	6	.02	600	10-14	8-12	3-5					<20
	7	.01	500	9-13	7-11	2-4					<20
70	3	.12	1400	15-20	13-18	6-11	10		12		25
	4	.06	1000	13-18	11-16	5-9					25
	5	.04	780	12-16	10-14	4-7					20
	6	.03	700	11-15	9-13	3-6					20
	7	.02	580	10-15	8-13	2-5					20
80	4	.08	1140	14-20	12-18	6-11	10½		12½		25
	5	.05	890	13-19	11-17	5-10					25
	6	.04	800	13-18	11-16	5-9					25
	7	.03	670	13-17	11-15	4-8					20
	8	.02	570	12-16	10-14	3-7					20
90	4	.10	1280	17-24	15-21	8-14	11		13		30
	5	.07	1000	16-22	14-20	7-13					25
	6	.05	900	16-21	14-19	7-12					25
	7	.04	750	15-20	13-18	6-11					25
	8	.03	640	14-18	12-16	5-9					20
100	9	.02	600	13-17	11-15	5-8	11		13		20
	5	.09	1120	18-25	16-22	9-15					25
	6	.06	1000	17-24	15-21	8-14					25
	7	.05	830	16-23	14-20	7-13					25
	8	.03	710	14-20	12-18	6-11					20
	9	.03	670	13-19	11-17	5-10					20
120	10	.02	590	12-18	10-16	5-10	11½		13		<20
	6	.09	1200	19-27	17-24	10-16					30
	7	.07	1000	18-25	16-23	8-15					25
	8	.05	860	17-25	15-22	7-14					25
	9	.04	800	16-24	14-21	6-13					20
	10	.03	705	15-22	13-19	5-11					20
140	7	.10	1170	20-30	18-27	10-19	11½		14		25
	8	.06	1000	19-28	17-25	9-17					25
	9	.05	930	18-27	16-24	8-16					20
	10	.04	825	17-25	15-22	7-14					20
160	8	.08	1140	21-32	19-29	10-20	12		15		25
	9	.07	1070	20-30	18-27	9-18					25
	10	.05	940	19-28	17-25	8-17					20
180	8	.10	1280	24-35	21-31	12-22	12		15		30
	9	.08	1200	23-34	20-30	11-21					25
	10	.07	1060	22-32	19-29	10-20					25
200	9	.10	1335	25-39	22-35	-	12		15		30
	10	.08	1175	24-37	21-33	-					25

Outlet Velocity (V _t) FPM											
500	600	700	800	900	1000	1200	1400	1600	1800	2000	
Total Pressure (P _t) inches H ₂ O											
.02	.02	.03	.04	.05	.06	.09	.12	.16	.20	.25	

Symbols:

- V_t Terminal Velocity in FPM
 V_r Room Velocity in FPM
 V_k Face Velocity in FPM
 A_k Outlet Area in Square Feet
 A_n Neck Area in Square Feet
 P_s Static Pressure in H₂O
 NC 18dB Room Attenuation
 T Throw in Feet: see Note 6.
 ΔT Temperature Differential

S Series (Page 43-47)

Table 1 - Supply Air

Type 75 (¾" Slot)

CFM per Foot	Number of Slots	Min. P _s in H ₂ O	Outlet Velocity (V _k) FPM	Throw (T) in Feet			Minimum Ceiling Height in Feet				NC
				Ceiling	Sidewall	Sill					
				Min.-Max.	Min.-Max.	Min.-Max.	@ -18F	T	@ -25F	T	
10	1	.01	335	4-6	2-4	1-2	7½		9	<20	
20	1	.04	670	8-11	6-9	2-3	8		9	20	
	2	<.01	400	6-9	4-7	1-2				<20	
30	1	.09	1000	10-14	8-12	3-4	9		10	25	
	2	.02	600	8-11	6-9	2-3				20	
	3	<.01	430	7-9	5-7	1-2				<20	
40	1	.16	1340	13-17	11-15	4-6	9		11	30	
	2	.04	800	10-14	8-12	3-4				25	
	3	.02	575	9-12	7-10	2-3				20	
	4	.01	445	8-11	6-9	2-3				<20	
50	2	.06	1000	11-15	9-13	4-6	9½		11	25	
	3	.03	715	10-14	8-12	3-4				20	
	4	.02	555	9-13	7-11	2-4				<20	
	5	<.01	415	7-12	6-10	2-3				<20	
60	2	.09	1200	13-17	11-15	5-8	9½		12	30	
	3	.04	860	12-16	10-14	4-7				25	
	4	.02	665	11-15	9-13	3-6				20	
	5	.01	500	9-13	7-11	3-4				<20	
70	2	.13	1400	15-20	13-18	6-11	10		12	30	
	3	.06	1000	13-18	11-16	5-9				25	
	4	.03	775	12-16	10-14	4-7				20	
	5	.02	585	10-15	8-13	3-5				<20	
	6	.01	500	9-14	7-12	2-5				<20	
80	3	.07	1140	14-20	12-18	6-11	10½		12½	30	
	4	.04	885	13-19	11-17	5-10				25	
	5	.03	665	13-17	11-15	4-8				20	
	6	.02	575	12-16	10-14	3-7				<20	
	7	<.01	500	11-15	9-13	3-6				<20	
90	3	.09	1290	17-24	15-21	8-14	11		13	30	
	4	.05	1000	16-22	14-20	7-13				25	
	5	.03	750	15-20	13-18	6-11				20	
	6	.02	645	14-18	12-16	5-9				20	
	7	.01	560	13-17	11-15	4-8				<20	
100	3	.13	1430	19-26	17-23	10-16	11		13	35	
	4	.06	1110	18-25	16-22	9-15				30	
	5	.04	830	16-23	14-20	7-13				25	
	6	.03	715	14-20	12-18	6-11				20	
	7	.02	630	13-19	11-17	5-10				<20	
120	4	.09	1330	19-27	17-24	10-16	11½		13	30	
	5	.06	1000	18-26	16-23	8-15				25	
	6	.04	860	17-25	15-22	7-14				20	
	7	.03	750	16-23	14-20	6-12				20	
	8	.02	630	15-20	13-18	5-10				<20	
140	5	.08	1170	20-30	18-27	10-19	11½		14	30	
	6	.06	1000	19-28	17-25	9-17				25	
	7	.04	875	18-26	16-23	8-15				25	
	8	.03	740	16-24	14-21	6-13				20	
	9	.02	665	15-21	13-19	5-11				<20	
160	6	.07	1150	21-32	19-29	10-20	12		15	25	
	7	.05	1000	20-30	18-27	9-18				25	
	8	.04	840	18-27	16-24	8-16				20	
	9	.03	760	17-26	15-23	6-14				<20	
	10	.02	695	16-25	14-22	5-13				<20	
180	6	.09	1290	24-35	21-31	12-22	12		15	30	
	7	.07	1130	23-34	20-30	11-21				30	
	8	.05	950	20-31	18-28	9-19				25	
	9	.04	860	19-30	17-27	8-18				20	
	10	.03	780	18-29	16-26	7-17				<20	
200	6	.11	1440	26-40	23-36	-	12		15	30	
	7	.08	1250	25-38	22-34	-				30	
	8	.06	1110	24-36	21-32	-				25	
	9	.05	955	22-33	20-30	-				25	
	10	.04	870	21-31	19-28	-				20	
250	8	.10	1315	26-46	23-41	-	13		15	35	
	9	.07	1190	25-42	22-38	-				30	
	10	.06	1085	24-39	21-35	-				25	

S Series (Page 43-47)

Table 1 - Supply Air

Type 10 (1" Slot)

CFM per Foot	Number of Slots	Min. P _s in H ₂ O	Outlet Velocity (V _k) FPM	Throw (T) in Feet			Minimum Ceiling Height in Feet				NC
				Ceiling	Sidewall	Sill					
				Min.-Max.	Min.-Max.	Min.-Max.	@ -18F	T	@ -25F	T	
20	1	.02	500	6-8	4-7	1-2	8		9		20
30	1	.03	750	9-13	7-10	2-3	9		10		20
	2	.02	500	7-9	5-7	1-2					20
40	1	.06	1000	10-14	9-14	4-6	9		11		25
	2	.03	670	8-10	6-9	2-3					20
50	1	.09	1250	12-15	10-14	3-5	9½		11		30
	2	.04	835	10-14	8-12	3-4					20
	3	.02	555	9-11	7-10	2-3					20
60	2	.06	1000	13-15	9-13	4-6	9½		12		30
	3	.03	665	10-13	7-11	2-4					20
	4	.02	500	8-11	6-9	2-3					20
70	2	.09	1165	13-17	11-15	5-8	10		12		30
	3	.04	780	11-16	9-14	4-6					25
	4	.02	585	10-14	7-11	3-4					20
80	2	.11	1335	15-19	14-17	6-10	10½		12½		35
	3	.05	890	12-17	10-14	4-7					25
	4	.03	665	10-14	8-12	3-5					20
	5	.02	533	9-13	7-11	2-4					20
90	3	.06	1000	14-19	11-17	5-10	11		13		30
	4	.04	750	13-18	11-15	4-8					20
	5	.02	600	12-16	10-14	3-7					20
100	6	.02	500	11-15	9-13	3-6	11		13		20
	3	.08	1110	16-21	14-20	7-12					30
	4	.04	835	15-20	13-28	6-11					25
	5	.03	665	14-18	12-16	5-9					20
120	6	.02	555	13-17	11-15	4-8	11½		13		20
	3	.11	1335	18-25	16-22	8-13					35
	4	.06	1000	17-24	15-20	7-13					30
	5	.04	800	16-23	14-21	6-12					25
	6	.03	665	15-21	13-19	5-11					20
140	7	.02	570	14-20	12-17	4-10	11½		14		20
	4	.09	1165	18-25	16-21	8-15					30
	5	.05	935	18-26	16-22	8-14					30
	6	.04	780	17-25	15-22	7-14					25
	7	.03	665	16-23	14-20	6-12					20
160	8	.02	585	15-20	13-20	5-10	12		15		20
	4	.11	1335	19-27	17-24	10-16					35
	5	.07	1065	18-26	16-23	8-15					30
	6	.05	890	17-25	15-22	7-14					25
	7	.04	760	16-23	14-20	6-12					25
180	8	.03	665	15-20	13-18	5-10	12		15		20
	9	.02	590	14-19	12-17	4-9					20
	5	.09	1200	20-30	18-27	10-19					35
	6	.06	1000	19-28	17-25	9-17					30
	7	.05	850	18-26	16-23	8-15					25
200	8	.04	750	16-24	14-21	6-13	12		15		20
	9	.03	665	15-21	13-19	5-11					20
	10	.02	600	14-19	12-18	4-10					20
	5	.11	1335	23-33	20-30	12-21					35
	6	.08	1110	21-32	19-29	10-20					30
250	7	.06	950	20-31	18-27	9-18	13		15		30
	8	.04	835	18-27	16-24	8-16					25
	9	.03	740	17-26	15-23	6-14					20
	10	.03	665	16-25	14-22	5-10					20
	6	.12	1390	24-35	21-31	-					13
7	.09	1190	23-34	20-30	-	35					
8	.07	1040	21-32	19-28	-	30					
9	.05	925	20-31	18-27	-	25					
300	10	.04	833	19-30	17-26	-	13		16		25
	7	.13	1430	25-40	23-35	-					35
	8	.10	1250	24-36	22-32	-					35
	9	.08	1110	23-34	20-30	-					30
350	10	.06	1000	22-32	19-28	-	14		16		30
	8	.13	1460	27-47	24-43	-					40
	9	.11	1300	26-45	23-41	-					35
	10	.09	1165	25-42	22-39	-					30

S Series (Page 43-47)

NOTES:

- Table 1 based on 4-foot diffuser length. For longer lengths, correct throw and NC per Table 2.
- For 2-way ceiling throw, proportion cfm and number of slots in each direction of T and select from 1-way data, Table 1.
- When using continuous diffuser lengths with alternate active and inactive sections, a reduction in throw can be obtained by omitting the factors contained in Table 2.
- P_s constant for horizontal 1-way, 2-way and vertical pattern adjustment.
- Supply air temperature effect on horizontal throw is shown in Table 3. Vertical throw at varying supply air temperatures is shown in Table 4.
- Terminal velocities (V_t) at the minimum and maximum throw (T) positions are rated at 150 FPM and 100 FPM respectively with corresponding room velocities (V_r) of 50 FPM and 35 FPM.

Table 2 - Continuous Diffuser Length Factors

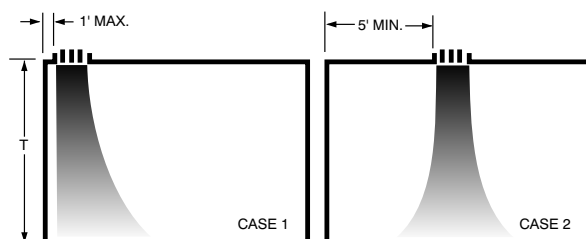
Modify Table 1 by listed values for diffuser lengths above 4 feet.				
Diffuser Length in Feet	Throw (T)			NC
	Ceiling Min.-Max.	Sidewall Min.-Max.	Sill Min.-Max.	
4-6	No change			+ 0
7-20	T x 1.10			+ 5
21-100	T x 1.15			+ 10

Table 3 - Supply Air Temperature Factors

Multiply Throw in Table 1 (or factor in Table 2 if used) by listed value.			
Ceiling Sidewall Sill	@-20F T	@ 0F T	@+25F T
	T x 1.00	T x 1.10	T x 1.20

Table 4 - Vertical Down-Throw and Supply Air Temperature Factors

Multiply Throw-Sidewall in Table 1 (or factor in Table 2 if used) by listed value.			
Case	@-20F T Cooling	@ 0F T Ventilating	@+25F T Heating
Case 1	T x 1.00	T x .90	T x .60
Case 2	T x .70	T x .60	T x .40



AIR MEASUREMENT		
SUPPLY HORIZONTAL	SUPPLY VERTICAL	RETURN AIR
VELOMETER JET FOR V_k VELOCITY		

Type 50 Supply Diffuser Areas per Foot of Length

	No. of Slots									
	1	2	3	4	5	6	7	8	9	10
A_k Area	.02	.03	.05	.07	.09	.10	.12	.14	.15	.17
A_n Area	.08	.17	.25	.33	.42	.50	.58	.67	.75	.84

Type 75 Supply Diffuser Areas per Foot of Length

	No. of Slots									
	1	2	3	4	5	6	7	8	9	10
A_k Area	.03	.05	.07	.09	.12	.14	.16	.19	.21	.23
A_n Area	.12	.24	.36	.48	.60	.72	.84	.96	1.10	1.20

Type 10 Supply Diffuser Areas per Foot of Length

	No. of Slots									
	1	2	3	4	5	6	7	8	9	10
A_k Area	.04	.06	.09	.12	.15	.18	.21	.24	.27	.30
A_n Area	.17	.33	.50	.67	.83	1.00	1.17	1.33	1.50	1.67

A_k constant for horizontal 1-way, 2-way, and vertical pattern.
CFM = A_k x length in feet x V_k

Type 50 Return Air CFM per Foot of Length*

No. of Slots	A_k Area	NC 20-25 Application Nonducted		NC 30 Application Ducted		NC 35-40 Application Ducted	
		-.02" P_s CFM	-.03" P_s CFM	-.08" P_s CFM	-.10" P_s CFM	-.15" P_s CFM	-.20" P_s CFM
		CFM	CFM	CFM	CFM	CFM	CFM
1	.03	15	20	30	35	40	45
2	.06	35	45	70	80	95	110
3	.08	55	70	110	125	150	175
4	.11	70	85	140	155	190	220
5	.14	90	110	180	200	245	285
6	.16	110	135	220	245	300	345
7	.20	130	160	260	290	355	410
8	.22	140	170	280	310	385	440
9	.25	165	200	330	370	450	520
10	.28	185	225	370	415	505	585

Type 75 Return Air CFM per Foot of Length*

No. of Slots	A_k Area	NC 20-25 Application Nonducted		NC 30 Application Ducted		NC 35-40 Application Ducted	
		-.02" P_s CFM	-.03" P_s CFM	-.08" P_s CFM	-.10" P_s CFM	-.15" P_s CFM	-.20" P_s CFM
		CFM	CFM	CFM	CFM	CFM	CFM
1	.04	25	35	50	65	75	90
2	.08	50	60	100	110	135	160
3	.12	80	100	160	180	220	250
4	.16	100	120	200	225	275	320
5	.20	130	160	260	295	360	420
6	.24	160	195	320	360	440	510
7	.28	175	215	350	390	475	550
8	.32	200	245	400	445	545	630
9	.36	235	290	470	525	640	740
10	.40	260	320	520	580	710	820

Type 10 Return Air CFM per Foot of Length*

No. of Slots	A_k Area	NC 20-25 Application Nonducted		NC 30 Application Ducted		NC 35-40 Application Ducted	
		-.02" P_s CFM	-.03" P_s CFM	-.08" P_s CFM	-.10" P_s CFM	-.15" P_s CFM	-.20" P_s CFM
		CFM	CFM	CFM	CFM	CFM	CFM
1	.06	35	43	70	80	95	110
2	.11	70	85	140	155	190	220
3	.17	105	130	210	235	285	330
4	.23	140	170	280	310	380	440
5	.28	175	215	350	390	475	550
6	.33	210	255	420	465	570	660
7	.39	245	300	490	545	665	770
8	.44	280	340	560	620	760	880
9	.50	315	385	630	700	855	990
10	.55	350	425	700	775	950	1100

* Capacity based on diffuser without pattern controller. When pattern controller is used, CFM capacities are reduced by 65% at listed P_s , NC, and A_k .

DL Drum Louver (Page 48)

6-Inch

Size (H x W)	A _k Area	Neck Area (Ft ²)	Outlet* Velocity	800	1000	1200	1400	1600	1800	2100
			Static Pressure	.007	.010	.015	.025	.030	.040	.052
			Total Pressure	.039	.065	.100	.147	.194	.254	.330
6 x 9	.16	.375	CFM Throw	128 6-7-13	160 8-11-14	192 10-14-23	224 12-17-26	256 4-19-29	228 16-21-32	336 17-23-35
6 x 12	.21	.500	CFM Throw	168 8-10-18	210 10-15-24	252 12-17-27	294 14-18-30	336 15-20-33	378 17-22-37	441 18-23-41
6 x 18	.32	.750	CFM Throw	256 10-14-23	320 13-18-30	384 15-20-34	448 18-23-38	512 20-26-43	576 23-30-48	672 25-32-52
6 x 24	.41	1.000	CFM Throw	328 12-17-28	410 16-21-35	492 19-25-40	574 22-29-45	656 24-33-51	738 27-36-56	861 30-38-61
6 x 30	.52	1.250	CFM Throw	416 15-20-33	520 18-24-39	624 22-28-44	728 25-32-50	832 27-37-56	936 30-40-61	1092 33-43-66
6 x 36	.62	1.500	CFM Throw	496 17-23-37	620 20-26-43	744 24-30-47	868 28-35-54	992 31-40-60	1116 34-44-65	1302 37-46-72
6 x 48	.83	2.000	CFM Throw	664 20-26-41	830 23-29-47	996 26-35-55	1162 32-41-62	1328 36-45-66	1494 40-49-72	1743 44-53-78
6 x 60	1.05	2.500	CFM Throw	840 22-29-45	1000 25-32-52	1260 29-39-61	1470 36-46-70	1680 41-50-79	1890 46-54-86	2205 49-59-96

Data based on 8dB room attenuation

10-Inch

Size (H x W)	A _k Area	Neck Area (Ft ²)	Outlet* Velocity	800	1000	1200	1400	1600	1800	2100
			Static Pressure	.007	.010	.015	.025	.030	.040	.052
			Total Pressure	.039	.065	.100	.147	.194	.254	.330
10 x 10	.60	1.390	CFM Throw	480 19-23-33	600 23-27-40	720 26-31-46	840 29-35-53	960 32-39-58	1080 35-42-64	1260 38-46-69
10 x 25	.75	1.740	CFM Throw	600 21-24-38	750 25-29-46	900 28-34-53	1050 32-38-60	1200 35-42-66	1350 38-46-73	1575 41-50-79
10 x 30	.90	1.080	CFM Throw	720 22-25-41	900 27-31-51	1080 31-36-58	1260 35-41-66	1440 39-46-74	1620 42-50-81	1890 46-54-88
10 x 35	1.05	2.440	CFM Throw	840 22-27-43	1050 27-33-53	1260 32-39-62	1470 37-45-71	1680 41-50-81	1890 45-54-89	2205 49-59-98
10 x 40	1.20	2.780	CFM Throw	960 23-28-47	1200 28-34-58	1440 34-41-59	1680 39-48-79	1920 44-59-88	2160 48-59-96	2520 53-65-105
10 x 50	1.50	3.470	CFM Throw	1200 25-31-52	1500 31-39-63	1800 37-46-74	2100 44-53-82	2400 48-59-91	2700 54-65-100	3150 60-72-110
10 x 60	1.85	4.170	CFM Throw	1480 25-33-59	1850 33-42-73	2220 40-50-84	2590 47-58-95	2960 54-55-108	3330 61-74-118	3885 68-81-128
10 x 70	2.15	4.860	CFM Throw	1720 28-36-62	2150 35-46-78	2580 43-54-93	3010 50-63-108	3440 58-71-123	3870 65-79-135	4515 72-87-147

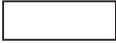
Data based on 8dB room attenuation

*Outlet velocity and Ak based on 15° deflection

Throw data is based on Terminal Velocities of 150 FPM, 100 FPM, and 50 FPM respectively.

THROW-NC-TOTAL PRESSURE are based on 15° blade deflection. For 0° or 30° deflection the following correction factors should be applied to the table values.

	Throw	Total Pressure	NC
0°	1.2	0.795	-4
30°	0.8	1.430	+5

		
NC<30	NC<35	NC<40

DL Drum Louver (Page 48)

12-Inch

Size (H x W)	A _k Area	Neck Area (Ft ²)	Outlet* Velocity	800	1000	1200	1400	1600	1800	2100
			Static Pressure	.007	.010	.015	.025	.030	.040	.052
			Total Pressure	.039	.065	.100	.147	.194	.254	.330
12 x 20	.70	1.670	CFM	560	700	840	980	1120	1260	1470
			Throw	10-20-35	18-25-43	23-31-51	26-35-58	29-39-64	33-44-71	36-49-78
12 x 30	1.05	2.500	CFM	840	1050	1260	1470	1680	1890	2205
			Throw	17-25-42	24-32-53	28-38-63	33-43-72	38-49-81	43-55-90	48-60-99
12 x 40	1.40	3.330	CFM	1120	1400	1680	1960	2240	2520	2940
			Throw	20-28-49	27-36-62	32-43-74	38-50-86	44-57-97	49-64-107	55-61-120
12 x 50	1.75	4.160	CFM	1400	1750	2100	2450	2800	3150	3675
			Throw	22-29-56	29-39-71	37-48-85	44-56-99	51-64-117	58-73-127	64-81-138
12 x 60	2.15	5.000	CFM	1720	2150	2580	3010	3440	3870	4515
			Throw	25-33-61	33-44-78	42-53-94	49-63-110	58-74-125	66-83-140	75-92-155
12 x 70	2.50	5.830	CFM	2000	2500	3000	3500	4000	4500	5250
			Throw	28-37-68	37-49-87	47-61-107	57-73-125	67-86-142	76-97-160	86-110-180

Data based on 8dB room attenuation

15-Inch

Size (H x W)	A _k Area	Neck Area (Ft ²)	Outlet* Velocity	800	1000	1200	1400	1600	1800	2100
			Static Pressure	.007	.010	.015	.025	.030	.040	.052
			Total Pressure	.039	.065	.100	.147	.194	.254	.330
15 x 15	.75	1.560	CFM	600	750	900	1050	1200	1350	1575
			Throw	3-10-28	9-18-36	14-24-36	21-27-50	24-30-56	25-32-58	29-38-69
15 x 20	1.00	2.080	CFM	800	1000	1200	1400	1600	1800	2100
			Throw	9-17-35	17-24-43	22-28-52	25-32-60	29-37-68	31-40-72	35-44-80
15 x 25	1.25	2.600	CFM	1000	1250	1500	1750	2000	2250	2625
			Throw	13-21-38	21-26-48	25-32-58	29-38-68	34-43-77	38-48-86	42-54-95
15 x 30	1.55	3.120	CFM	1240	1550	1860	2170	2480	2790	3255
			Throw	14-23-42	22-28-54	27-35-65	32-41-76	37-47-86	41-54-97	46-59-107
15 x 40	2.05	4.170	CFM	1640	2050	2460	2870	3280	3690	4305
			Throw	19-25-48	27-35-66	35-43-79	39-50-93	45-58-105	51-65-118	57-72-130
15 x 50	2.55	5.210	CFM	2040	2550	3060	3570	4080	4590	5355
			Throw	24-30-61	31-40-78	38-48-96	45-58-114	52-66-130	58-75-145	65-83-163
15 x 60	3.00	6.250	CFM	2400	3000	3600	4200	4800	5400	6300
			Throw	27-34-68	35-46-88	43-58-106	52-68-125	60-79-143	68-89-160	76-100-176
15 x 70	3.50	7.300	CFM	2800	3500	4200	4900	5600	6300	7350
			Throw	29-38-72	40-51-95	50-64-118	60-76-140	71-89-160	81-101-184	90-112-195

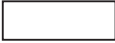
Data based on 8dB room attenuation

*Outlet velocity and Ak based on 15° deflection

Throw data is based on Terminal Velocities of 150 FPM, 100 FPM, and 50 FPM respectively.

THROW-NC-TOTAL PRESSURE are based on 15° blade deflection. For 0° or 30° deflection the following correction factors should be applied to the table values.

	Throw	Total Pressure	NC
0°	1.2	0.795	-4
30°	0.8	1.430	+5

		
NC<30	NC<35	NC<40

4-Way Rezzin TBar Diffuser (Page 60)

		Neck Velocity FPM									
		400	500	600	700	800	900	1000	1200	1400	1600
6"	CFM	79	98	118	137	157	177	196	236	275	314
	Static Pressure	.003	.005	.006	.008	.011	.013	.016	.023	.031	.041
	Total Pressure	.015	.024	.034	.046	.060	.076	.094	.134	.183	.238
	NC	-	-	-	-	-	-	15	22	26	31
8"	CFM	140	175	209	244	279	314	349	419	489	559
	Static Pressure	.009	.014	.021	.028	.037	.046	.057	.082	.111	.145
	Total Pressure	.019	.030	.043	.058	.076	.096	.118	.170	.231	.301
	NC	-	-	-	-	18	22	23	31	35	39
10"	CFM	218	273	327	382	436	491	545	654	764	873
	Static Pressure	.009	.014	.021	.028	.037	.047	.058	.083	.113	.148
	Total Pressure	.019	.029	.042	.058	.075	.095	.117	.169	.230	.300
	NC	-	-	-	-	18	22	26	31	36	40
12"	CFM	314	393	471	550	628	707	785	942	1100	1257
	Static Pressure	.015	.022	.032	.044	.059	.076	.095	.142	.198	.264
	Total Pressure	.025	.038	.054	.074	.098	.126	.157	.231	.319	.422
	NC	-	-	-	18	20	26	29	36	41	45
14"	CFM	428	535	641	748	855	962	1069	1283	1497	1710
	Static Pressure	.015	.023	.033	.044	.057	.072	.089	.128	.175	.228
	Total Pressure	.025	.037	.053	.072	.094	.119	.146	.211	.287	.375
	NC	-	-	-	15	21	25	29	35	40	44

Throw Data - Terminal Velocity of 75 FPM

Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
CFM	79	98	118	137	157	177	196	236	275	314
6"	3.1	3.9	4.6	5.4	6.2	7.0	7.7	9.3	10.8	12.4
CFM	140	175	209	244	279	314	349	419	489	559
8"	5.3	6.7	8.0	9.3	10.7	12.0	13.3	16.0	18.7	21.3
CFM	218	273	327	382	436	491	545	654	764	873
10"	6.3	7.9	9.4	11.0	12.6	14.1	15.7	18.8	22.0	25.1
CFM	314	393	471	550	628	707	785	942	1100	1257
12"	7.1	8.8	10.6	12.4	14.2	15.9	17.7	21.2	24.8	28.3
CFM	428	535	641	748	855	962	1069	1283	1497	1710
14"	9.1	11.3	13.6	15.9	18.1	20.4	22.7	27.2	31.8	36.3

Throw Data - Terminal Velocity of 150 FPM

Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
CFM	79	98	118	137	157	177	196	236	275	314
6"	1.3	1.7	2.0	2.4	2.7	3.0	3.4	4.0	4.7	5.4
CFM	140	175	209	244	279	314	349	419	489	559
8"	2.2	2.7	3.3	3.8	4.4	4.9	5.5	6.6	7.7	8.8
CFM	218	273	327	382	436	491	545	654	764	873
10"	2.5	3.1	3.7	4.4	5.0	5.6	6.2	7.5	8.7	10.0
CFM	314	393	471	550	628	707	785	942	1100	1257
12"	3.8	4.8	5.8	6.7	7.7	8.6	9.6	11.5	13.4	15.3
CFM	428	535	641	748	855	962	1069	1283	1497	1710
14"	4.2	5.2	6.3	7.3	8.3	9.4	10.4	12.5	14.6	16.7

Rezzin Modular Core Tbar Diffuser (Page 60)

		Neck Velocity FPM									
		400	500	600	700	800	900	1000	1200	1400	1600
6"	CFM	79	98	118	137	157	177	196	236	275	314
	Static Pressure	.003	.005	.007	.010	.013	.017	.021	.030	.041	.054
	Total Pressure	.018	.023	.026	.035	.043	.067	.086	.120	.166	.209
	NC	-	-	-	-	-	16	20	24	30	34
8"	CFM	140	175	209	244	279	314	349	419	489	559
	Static Pressure	.004	.006	.008	.011	.014	.017	.020	.028	.036	.045
	Total Pressure	.013	.021	.030	.041	.053	.066	.081	.115	.155	.201
	NC	-	-	-	-	17	22	24	34	37	41
10"	CFM	218	273	327	382	436	491	545	654	764	873
	Static Pressure	.004	.007	.010	.013	.017	.022	.027	.039	.053	.069
	Total Pressure	.014	.021	.031	.042	.055	.070	.086	.124	.170	.222
	NC	-	-	-	17	22	26	34	42	44	48
12"	CFM	314	393	471	550	628	707	785	942	1100	1257
	Static Pressure	.006	.009	.012	.017	.022	.028	.034	.048	.065	.084
	Total Pressure	.015	.024	.035	.047	.061	.077	.095	.137	.186	.242
	NC	-	-	-	20	24	27	35	40	45	49
14"	CFM	428	535	641	748	855	962	1069	1283	1497	1710
	Static Pressure	.008	.013	.018	.024	.031	.040	.048	.069	.093	.120
	Total Pressure	.017	.030	.041	.056	.071	.090	.114	.144	.200	.278
	NC	-	-	15	23	27	34	39	44	48	51
16"	CFM	559	698	838	977	1117	1257	1396	1676	1955	2234
	Static Pressure	.012	.019	.028	.037	.048	.061	.075	.107	.145	.189
	Total Pressure	.022	.034	.049	.066	.086	.108	.134	.192	.260	.339
	NC	-	-	24	27	31	38	40	45	49	51

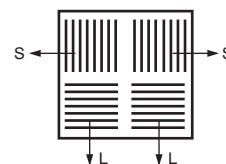
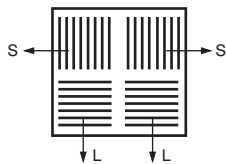
Rezzin Modular Core Tbar Diffuser (Page 60)

Throw Data - Terminal Velocity of 75 FPM

	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	79	98	118	137	157	177	196	236	275	314
6"	1-direction	3.5	4.4	5.3	6.2	7.1	7.9	8.8	10.6	12.4	14.1
	2-direction	4.5	5.6	6.8	7.9	9.0	10.2	11.3	13.6	15.8	18.1
	3-direction Short	0.9	1.1	1.3	1.5	1.7	2.0	2.2	2.6	3.0	3.5
	3-direction Long	1.2	1.5	1.8	2.1	2.5	2.8	3.1	3.7	4.3	4.9
	4-direction	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.8	2.1	2.5
8"	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	140	175	209	244	279	314	349	419	489	559
	1-direction	3.1	3.9	4.6	5.4	6.2	7.0	7.7	9.3	10.8	12.4
	2-direction	4.4	5.5	6.6	7.7	8.8	9.9	11.0	13.2	15.4	17.6
	3-direction Short	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.1	8.1
10"	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	218	273	327	382	436	491	545	654	764	873
	1-direction	6.1	7.6	9.2	10.7	12.2	13.7	15.3	18.3	21.4	24.4
	2-direction	7.1	8.9	10.7	12.5	14.3	16.1	17.8	21.4	25.0	28.5
	3-direction Short	2.1	2.6	3.1	3.7	4.2	4.7	5.2	6.3	7.3	8.4
12"	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	314	393	471	550	628	707	785	942	1100	1257
	1-direction	9.8	12.2	14.7	17.1	19.6	22.0	24.5	29.3	34.2	39.1
	2-direction	9.1	11.4	13.6	15.9	18.2	20.5	22.7	27.3	31.8	36.4
	3-direction Short	3.6	4.5	5.4	6.3	7.2	8.1	9.0	10.8	12.6	14.4
14"	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	428	535	641	748	855	962	1069	1283	1497	1710
	1-direction	12.1	15.1	18.2	21.2	24.2	27.3	30.3	36.3	42.4	48.5
	2-direction	8.4	10.5	12.6	14.7	16.8	18.9	21.0	25.2	29.4	33.6
	3-direction Short	3.9	4.9	5.9	6.8	7.8	8.8	9.8	11.7	13.7	15.7
16"	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	559	698	838	977	1117	1257	1396	1676	1955	2234
	1-direction	24.3	30.4	36.5	42.5	48.6	54.7	60.8	72.9	85.1	97.2
	2-direction	14.1	17.6	21.1	24.6	28.1	31.7	35.2	42.2	49.3	56.3
	3-direction Short	11.2	14.0	16.8	19.7	22.5	25.3	28.1	33.7	39.3	44.9

Throw Data - Terminal Velocity of 150 FPM

	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	79	98	118	137	157	177	196	236	275	314
6"	1-direction	1.5	1.9	2.3	2.6	3.0	3.4	3.8	4.2	4.5	4.9
	2-direction	1.7	2.1	2.5	3.0	3.4	3.8	4.2	4.7	5.1	5.5
	3-direction Short	0.6	0.7	0.9	1.0	1.2	1.3	1.5	1.6	1.8	1.9
	3-direction Long	0.3	0.4	0.4	0.5	0.6	0.7	0.7	0.8	0.9	0.9
	4-direction	0.6	0.7	0.8	1.0	1.1	1.2	1.4	1.5	1.7	1.8
8"	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	140	175	209	244	279	314	349	419	489	559
	1-direction	1.6	2.1	2.5	2.9	3.3	3.7	4.1	4.5	4.9	5.4
	2-direction	1.7	2.1	2.5	2.9	3.3	3.8	4.2	4.6	5.0	5.4
	3-direction Short	1.3	1.6	1.9	2.3	2.6	2.9	3.2	3.5	3.9	4.2
10"	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	218	273	327	382	436	491	545	654	764	873
	1-direction	3.0	3.7	4.5	5.2	6.0	6.7	7.5	8.2	9.0	9.7
	2-direction	2.8	3.5	4.1	4.8	5.5	6.2	6.9	7.6	8.3	9.0
	3-direction Short	1.5	1.9	2.2	2.6	3.0	3.4	3.7	4.1	4.5	4.8
12"	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	314	393	471	550	628	707	785	942	1100	1257
	1-direction	3.4	4.3	5.2	6.0	6.9	7.8	8.6	9.5	10.3	11.2
	2-direction	2.1	2.6	3.1	3.6	4.1	4.7	5.2	5.7	6.2	6.7
	3-direction Short	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.7	7.3	7.9
14"	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	428	535	641	748	855	962	1069	1283	1497	1710
	1-direction	5.3	6.6	7.9	9.3	10.6	11.9	13.2	14.5	15.9	17.2
	2-direction	3.0	3.8	4.6	5.3	6.1	6.8	7.6	8.3	9.1	9.9
	3-direction Short	2.3	2.9	3.5	4.1	4.6	5.2	5.8	6.4	6.9	7.5
16"	Neck Velocity	400	500	600	700	800	900	1000	1200	1400	1600
	CFM	559	698	838	977	1117	1257	1396	1676	1955	2234
	1-direction	14.9	18.6	22.3	26.0	29.7	33.5	37.2	40.9	44.6	48.3
	2-direction	7.0	8.7	10.4	12.2	13.9	15.6	17.4	19.1	20.9	22.6
	3-direction Short	5.2	6.5	7.8	9.1	10.4	11.7	13.0	14.3	15.6	16.9



Rezzin Square Ceiling Diffuser (Page 61)

Rezzin Square (two-way corner)

Neck Velocity			300	400	500	600	700
Neck Size	6"	CFM	60	80	100	120	135
Ak	0.284	Ps	0.002	0.004	0.006	0.008	0.011
Vt	75	Throw	2.5	3.5	4.0	5.0	6.0
Vt	100	Throw	2.5	3.0	4.0	4.5	5.5
Vt	150	Throw	1.5	2.0	2.5	3.0	3.5
Neck size	7"	CFM	82	109	136	164	191
Ak	0.267	Ps	0.009	0.016	0.025	0.037	0.050
Vt	75	Throw	4.0	5.0	6.0	7.5	8.5
Vt	100	Throw	3.5	4.5	5.5	7.0	8.0
Vt	150	Throw	2.5	3.0	4.0	4.5	5.5
Neck size	8"	CFM	105	140	175	209	244
Ak	0.251	Ps	0.016	0.029	0.045	0.065	0.088
Vt	75	Throw	5.0	6.5	8.0	9.5	11.0
Vt	100	Throw	4.5	6.0	7.5	9.0	10.5
Vt	150	Throw	3.0	4.0	5.0	6.0	7.0

Rezzin Square (three-way)

Neck Velocity			300		400		500		600		700	
Neck Size 6"		CFM	60		80		100		120		135	
Ak	0.247	Ps	0.002		0.004		0.006		0.008		0.011	
Vt	75 S/L	Throw	2.0	2.5	3.0	3.5	3.5	4.5	4.5	5.5	5.0	6.0
Vt	100 S/L	Throw	2.0	2.5	3.0	3.5	3.5	4.0	4.0	5.0	5.0	6.0
Vt	150 S/L	Throw	1.5	1.5	2.0	2.0	2.5	3.0	3.0	3.5	3.0	4.0
Neck Size 7"		CFM	80		110		135		165		190	
Ak	0.243	Ps	0.009		0.016		0.026		0.037		0.050	
Vt	75 S/L	Throw	2.5	4.0	3.5	5.5	4.5	7.0	5.5	8.5	6.0	9.5
Vt	100 S/L	Throw	2.5	3.5	3.5	5.3	4.0	6.3	5.0	7.5	5.5	9.0
Vt	150 S/L	Throw	1.8	2.5	2.5	3.5	3.0	4.5	3.5	5.5	4.0	6.0
Neck Size 8"		CFM	105		140		175		210		245	
Ak	0.239	Ps	0.016		0.029		0.046		0.066		0.090	
Vt	75 S/L	Throw	3.0	5.5	4.0	7.5	5.0	9.0	6.0	11.0	7.0	13.0
Vt	100 S/L	Throw	3.0	5.0	3.5	7.0	4.5	8.5	5.5	10.5	6.5	12.0
Vt	150 S/L	Throw	2.0	3.5	2.5	4.5	3.0	6.0	3.5	7.0	4.5	8.0

Rezzin Square (four-way)

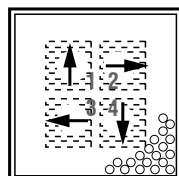
Neck Velocity			300	400	500	600	700
Neck Size	6"	CFM	60	80	100	120	135
Ak	0.210	Ps	0.001	0.002	0.003	0.005	0.006
Vt	75	Throw	3.0	3.5	4.5	5.5	6.5
Vt	100	Throw			4.5	5.0	6.0
Vt	150	Throw	1.5	2.5	3.0	3.5	4.0
Neck Size	7"	CFM	80	110	135	165	190
Ak	0.209	Ps	0.003	0.005	0.008	0.011	0.015
Vt	75	Throw			6.0	7.5	8.5
Vt	100	Throw	3.5	4.5	5.5	7.0	8.0
Vt	150	Throw	2.5	3.0	4.0	4.5	5.5
Neck Size	8"	CFM	105	140	175	210	245
Ak	0.209	Ps	0.005	0.008	0.013	0.018	0.025
Vt	75	Throw	4.5	6.0	7.5	9.0	10.5
Vt	100	Throw	4.0	5.5	7.0	8.5	10.0
Vt	150	Throw	3.0	3.5	4.5	5.5	6.5

Rezzin Round Ceiling Diffuser (Page 61)

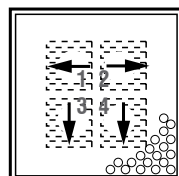
Face Velocity		300	400	500	600	700	800	900	1000
Neck Size 6" Ak .224	CFM	67	89	112	134	157	179	201	224
	Ps	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
	Throw	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00
Neck Size 7" Ak .229	CFM	69	92	115	137	160	183	206	229
	Ps	0.05	0.09	0.13	0.19	0.26	0.34	0.43	0.53
	Throw	1.75	2.25	2.75	3.25	3.75	4.25	5.00	5.50
Neck Size 8" Ak .235	CFM	70	94	117	141	164	188	211	235
	Ps	0.10	0.17	0.26	0.38	0.52	0.67	0.85	1.05
	Throw	2.00	2.50	3.00	3.50	4.00	4.50	5.50	6.00

Terminal Velocity of 50 FPM

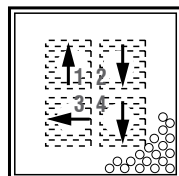
Probe Position: The probe is held 1 inch in from the outer edge of the diffuser, flush with the face.



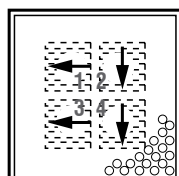
Four-Way (Short Throw)
• For throw in all four directions, use short throw data.



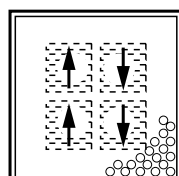
Three-Way (Short Throw)
• For throw in all three directions, use short throw data.



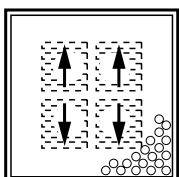
Three-Way (Long & Short)
• For throw in the #2 & #4 direction use long throw data.
• For throw in the #1 & #3 directions, use short throw data.



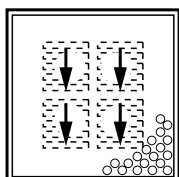
Two-Way Corner (Long & Short)
• For throw in the #2 & #4 direction use long throw data.
• For throw in the #1 & #3 directions, use short throw data.



Two-Way (Long Throw)
• For throw in both directions use long throw data.



Two-Way (Short Throw)
• For throw in both directions use short throw data.



One-Way (Long Throw)
• For throw use long throw data.

SBP (Page 67)

Neck Velocity		300	400	500	600	700	800	900	1000	1200	1400
Velocity Pressure		.006	.010	.016	.022	.031	.040	.051	.062	.090	.122
6" Diameter	CFM	60	80	100	120	140	160	180	200	240	280
	Total Pressure	.005	.008	.013	.025	.025	.032	.041	.050	.027	.098
	Short Horizontal Throw	2-1-1	2-1-1	3-1-1	3-2-1	4-2-1	4-2-1	5-2-2	5-3-2	6-3-2	7-4-2
	Long Horizontal Throw	3-1-1	4-2-1	5-2-2	6-3-2	7-3-2	8-4-3	9-4-3	10-5-3	12-6-4	14-7-5
	Noise Criteria	<20	<20	<20	<20	<20	22	24	26	31	37
8" Diameter	CFM	105	140	175	210	245	280	315	350	420	490
	Total Pressure	.009	.015	.024	.034	.046	.061	.077	.095	.136	.185
	Short Horizontal Throw	3-1-1	4-2-1	5-2-2	6-4-3	7-3-2	8-4-3	9-4-3	10-5-3	12-6-4	14-7-5
	Long Horizontal Throw	5-3-2	7-4-2	9-5-3	11-5-4	13-6-4	15-7-5	16-8-5	18-9-6	22-11-7	25-13-8
	Noise Criteria	<20	<20	<20	<20	20	25	30	34	39	44
10" Diameter	CFM	165	220	275	330	385	440	495	550	660	770
	Total Pressure	.013	.023	.036	.052	.071	.092	.117	.144	.208	.283
	Short Horizontal Throw	5-2-2	6-3-2	8-4-3	10-5-3	11-6-4	13-6-4	14-7-5	16-8-5	19-10-6	23-11-8
	Long Horizontal Throw	9-5-3	12-6-4	15-8-5	18-9-6	21-11-7	24-12-8	27-14-9	30-15-10	36-18-12	42-21-14
	Noise Criteria	<20	<20	<20	22	25	28	33	36	41	47
12" Diameter	CFM	240	320	400	480	560	640	720	800	960	1120
	Total Pressure	.017	.030	.047	.068	.093	.121	.153	.189	.273	.371
	Short Horizontal Throw	7-4-2	10-5-3	12-6-4	15-7-5	17-9-6	20-10-7	22-11-7	25-12-8	30-15-10	35-17-12
	Long Horizontal Throw	14-7-5	19-9-6	23-12-8	28-14-9	33-16-11	37-19-12	42-21-14	47-23-16	56-28-19	65-33-22
	Noise Criteria	<20	<20	21	25	29	32	35	38	44	50
14" Diameter	CFM	330	440	550	660	770	880	990	1100	1320	1540
	Total Pressure	.020	.036	.057	.081	.111	.145	.183	.226	.326	.443
	Short Horizontal Throw	11-6-4	15-7-5	18-9-6	22-11-7	26-13-9	29-15-10	33-17-11	37-18-12	44-22-15	52-26-17
	Long Horizontal Throw	21-10-7	28-14-9	34-17-11	41-21-14	48-24-16	55-28-18	62-31-21	69-34-23	83-41-28	97-48-32
	Noise Criteria	<20	<20	25	31	36	40	43	45	48	53

Notes:

1. Tests conducted in accordance with ANSI/ASHRAE 70-1991 at isothermal conditions.
2. Tests conducted with a straight rigid inlet condition. Other inlet conditions may alter performance.
3. Unit of measure: Neck Velocity = FPM; Velocity Pressure = in. w.c. Air Flow Rate = CFM; Total Pressure = in. w.c. Throw = ft at 50, 100, and 150 fpm terminal velocity
4. Noise Criteria (NC) is based upon 10 dB room absorption (Re: 10⁻¹² watts) evaluated at 125 thru 4000 Hz octave bands.
5. Flow hoods are recommended for system balancing.

PD, PDR, RENP (Page 65, 68, 69)

Neck Velocity		200	300	400	500	600	700	800
6" Diameter	CFM	40	60	80	100	120	135	155
	-Ps	.003	.007	.012	.019	.027	.034	.044
8" Diameter	CFM	70	105	140	175	210	245	380
	-Ps	.004	.010	.017	.026	.037	.051	.068
10" Diameter	CFM	110	165	220	275	325	380	435
	-Ps	.005	.011	.020	.030	.043	.058	.076
12" Diameter	CFM	155	235	315	395	470	550	630
	-Ps	.005	.012	.021	.033	.046	.063	.083
14" Diameter	CFM	215	320	430	535	640	750	855
	-Ps	.006	.013	.023	.035	.050	.069	.090
16" Diameter	CFM	280	420	560	700	840	975	1115
	-Ps	.008	.018	.031	.048	.070	.094	.120
18" Diameter	CFM	355	530	705	885	1060	1235	1415
	-Ps	.008	.018	.031	.049	.070	.092	.125
24" x 24"	CFM	735	1100	1470	1835	2200	2570	2935
	-Ps	.008	.018	.032	.050	.070	.095	.130

Note: The use of a balancing hood is recommended to balance the system.
NC is based on 10 db room attenuation (Re: 10 - 12 watts) ASHRAE 36-72.
X=less than 20.
Terminal velocity of 75 FPM.

CBPS Supply (Page 66)**Four-Way Supply**

		Neck Velocity - V_N							
Neck Size		300	400	500	600	700	800	1000	1200
6"	CFM	60	80	100	120	140	160	200	240
	Ps	<.010	.010	.020	.030	.040	.050	.080	.120
	Throw	1.5-2.0-2.5	1.5-2.5-3.0	2.0-3.0-4.0	2.5-3.5-4.5	3.0-4.5-5.5	3.5-5.0-6.0	4.0-6.0-7.0	5.0-7.5-9.0
	NC	<20	<20	<20	<20	21	24	32	38
8"	CFM	105	140	175	210	245	280	350	420
	Ps	<.010	.010	.020	.030	.040	.060	.090	.120
	Throw	1.5-2.5-3.0	2.0-3.0-4.0	2.5-4.0-5.0	3.5-5.0-6.0	4.0-5.5-7.0	4.5-6.5-8.0	5.5-8.0-10.0	6.5-9.5-11.5
	NC	<20	<20	<20	<20	25	31	37	42
10"	CFM	165	220	275	325	380	435	545	650
	Ps	0.01	.020	.030	.040	.060	.070	.110	.160
	Throw	3.0-4.0-5.0	3.5-5.5-6.5	4.5-6.5-8.0	5.5-8.0-10.0	6.0-9.0-11.0	7.0-10.5-12.5	9.0-13.0-15.5	10.5-15.5-18.5
	NC	<20	<20	<20	21	27	32	39	44
12"	CFM	235	315	395	470	550	630	790	940
	Ps	.010	.020	.030	.040	.060	.080	.120	.170
	Throw	2.5-3.5-4.0	3.0-4.5-5.5	3.5-5.5-6.5	4.5-7.0-8.5	5.5-8.0-9.5	6.0-7.0-11.0	7.5-11.5-14.0	9.0-13.5-16.0
	NC	<20	<20	20	26	32	37	42	>45
14"	CFM	325	430	535	640	750	860	1075	1275
	Ps	.010	.020	.030	.050	.060	.080	.130	.180
	Throw	2.0-3.0-3.5	2.5-4.0-5.0	3.5-5.0-6.0	4.0-6.0-7.0	4.5-7.0-8.5	5.5-8.0-10.0	6.5-10.0-12.0	7.5-11.5-14.0
	NC	<20	<20	<20	24	30	35	42	>45
16"	CFM	420	560	700	840	980	1120	1400	1680
	Ps	.020	.040	.060	.080	.110	.140	.220	.260
	Throw	3.0-4.0-5.0	4.0-6.0-7.0	5.0-8.0-11.0	6.0-9.0-12.0	8.0-11.0-14.0	9.0-13.0-16.0	10.0-15.0-19.0	12.0-17.0-22.0
	NC	<20	<20	26	34	39	43	>45	>45

NOTES:

1. **Ps** is static Pressure Loss in inches of H_2O
2. **NC** is based on 10db room attenuation (Re: 10^{-12} watts)
3. Throw is iso-thermal air at 150, 100, 75 FPM terminal velocities.
4. The use of a balancing hood is recommended to balance the system.

CBPR Return (Page 66)

Neck Velocity - V_N		200	300	400	500	600	700	800
-Ps		.01	.02	.03	.05	.07	.10	.12
6" Diameter	CFM	40	60	80	100	120	140	160
8" Diameter	CFM	70	105	140	175	210	245	280
10" Diameter	CFM	110	165	220	275	330	385	440
12" Diameter	CFM	160	240	320	395	475	550	630
14" Diameter	CFM	215	320	430	535	640	750	855
16" Diameter	CFM	281	420	563	698	836	975	1114
18" Diameter	CFM	356	531	712	881	1056	1231	1406

DPD12 (Page 64)

Neck Velocity		400	500	600	700	800	900	1000	1200	1400
6"	CFM	80	100	120	135	155	175	195	235	275
	Ps	.006	.010	.014	.018	.023	.030	.037	.054	.073
	NC	<20	<20	<20	<20	<20	20	25	30	35
	Throw	1.0	2.0	2.0	2.5	3.0	3.5	4.0	4.5	5.5
7"	CFM	107	134	160	187	214	240	267	320	374
	Ps	.008	.012	.017	.025	.031	.043	.052	.075	.103
	NC	<20	<20	<20	20	25	30	30	35	40
	Throw	2.5	3.5	4.0	4.5	5.0	5.5	6.0	7.0	8.0
8"	CFM	140	175	210	245	280	315	350	420	490
	Ps	.010	.015	.022	.029	.038	.049	.060	.086	.117
	NC	<20	<20	<20	20	25	30	30	35	40
	Throw	2.5	3.5	4.0	4.5	5.0	5.5	6.0	7.0	8.0

Terminal Velocity of 75 FPM

An = Neck Area in Sq. Ft.

NC = Noise Criteria based on 10dB room absorption (Re: 10^{-12} watts).**FPD12 (Page 63)**

Neck Velocity		400	500	600	700	800	1000	1200	1400	1600
6"	CFM	80	100	120	135	155	195	235	275	315
	Ps	.008	.012	.019	.025	.033	.052	.074	.101	.131
	NC	<20	<20	<20	<20	<20	25	30	35	40
	Throw	4	5	5	6	7	8	9	10	11
7"	CFM	107	134	160	187	214	267	321	374	428
	Ps	.01	.015	.023	.031	.041	.064	.091	.125	.162
	NC	<20	<20	<20	<20	20	30	35	40	45
	Throw	4	5	6	7	8	10	11	12	13
8"	CFM	140	175	210	245	280	350	420	490	560
	Ps	.012	.019	.028	.038	.05	.078	.112	.153	.199
	NC	<20	<20	<20	<20	20	30	35	40	45
	Throw	5	6	7	8	9	11	12	14	15

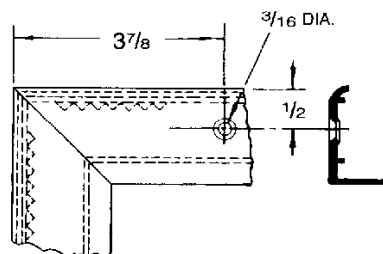
Terminal Velocity of 75 FPM

An = Neck Area in Sq. Ft.

NC = Noise Criteria based on 10dB room absorption (Re: 10^{-12} watts).

Screw Hole Chart for Extruded Aluminum Line V Series, H Series, C Series, RH Series

		WIDTH			
		4	16	28	48
HEIGHT	4	LONG DIMENSION 2 SCREWS 10 THRU 16 4 SCREWS	LONG DIMENSION 4 SCREWS	LONG DIMENSION 6 SCREWS	LONG DIMENSION 8 SCREWS
	8				
	16	LONG DIMENSION 4 SCREWS	LONG DIMENSION 6 SCREWS	LONG DIMENSION 8 SCREWS	LONG DIMENSION 10 SCREWS
	20				
	22	LONG DIMENSION 4 SCREWS	LONG DIMENSION 8 SCREWS	LONG DIMENSION 10 SCREWS	LONG DIMENSION 12 SCREWS
	28				
	30	LONG DIMENSION 6 SCREWS	LONG DIMENSION 10 SCREWS	LONG DIMENSION 12 SCREWS	LONG DIMENSION 14 SCREWS
	46				
	48	LONG DIMENSION 8 SCREWS	LONG DIMENSION 12 SCREWS	LONG DIMENSION 14 SCREWS	LONG DIMENSION 16 SCREWS
	48				



821, 831, 92 Series, 98VOH, H and V Series Drop Chart, Use with size selection charts

Instructions for use of Drop Chart

The drop of the air stream is determined by using the throw and velocity of the register selected. On the drop chart, lay a straight edge connecting these values. The total drop of the air stream will be the sum of the drop due to temperature (D_t) and the drop due to spread (D_s).

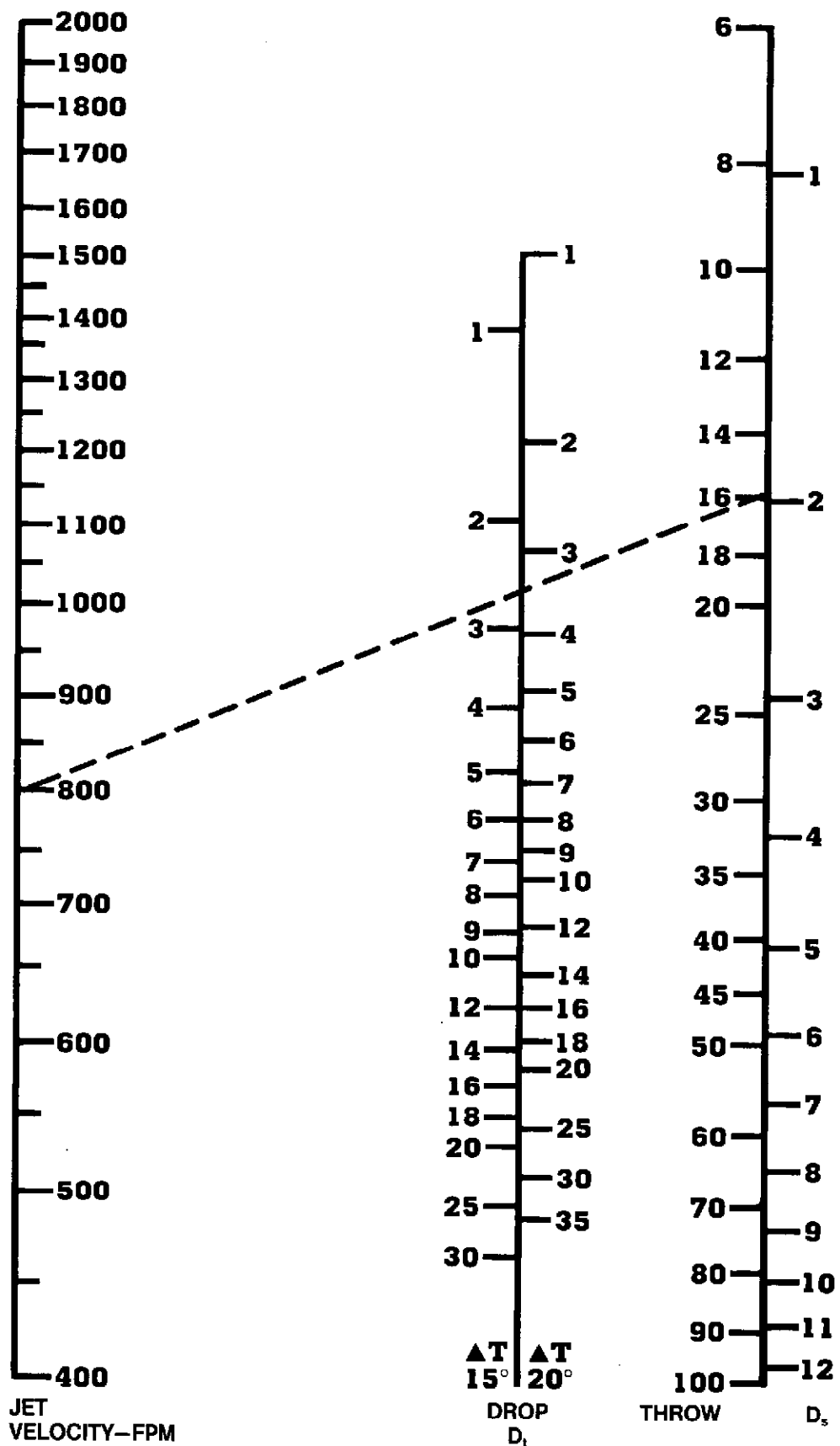
Example: The drop for a 92 Series register "C" deflection 16x5 size has an 800 fpm velocity and a 16 foot throw. Connect these two points on the chart and read the drops as follows:

$$D_t = 2.7' \quad D_s = 2'$$

$$D_{\text{total}} = 2.7 + 2 = 4.7'$$

D_t = Drop along line of throw due to temperature difference.

D_s = Drop resulting from vertical spread.



92 Series, H and V Series Alternate Sizing Graph

Grille Width
in Inches

Turning
Line

Grille Height
in Inches

Method of Determining Alternate Grille Sizes

Extensive tests indicate that by varying dimensions of a grille there is no appreciable effect on the air throw, provided the same area is maintained. To change the dimensions of a grille, place a straight edge across the width and height scales on dimensions as selected from charts. Place a pointer at the crossing point on the turning line and rotate the straight edge around this point until it crosses width and height scale at dimensions desired.

NOTE: Grille sizes determined from this chart are the nominal or duct dimensions.

General Conclusions on Air Distribution

1. The throw from a straight flow grille varies with the square root of the daylight area of the grille and with the face velocity.
2. The ratio of the width to the height (aspect ratio) of a grille has no appreciable effect on the distance of air throw.
3. If the air streams from a grille are converged, it results only in cutting down the effective area of the grille.
4. Breaking the air stream up into jets has no effect on either the rate of mixing or the flow.
5. Fanning out the air stream shortens the throw. The amount depends on the degree of deflection.
6. The drop, for a given throw, of an air stream below room temperature varies about inversely as the face velocity and directly as the temperature differential.
7. For any given velocity neither the aspect ratio of the grille, breaking the air stream up into jets, nor impinging the air streams together equally have any effect on the drop of the air stream.

Basic formulae determined through elaborate test work and used in the compilation of the charts contained herein are:

$$(1) \quad T = \frac{K_t \times CFM}{\sqrt{A} \times V_t}$$
$$(2) \quad CFM = V \times A_k$$
$$(3) \quad CFM = A_n \times V_n$$

Where: T = Throw (feet)
Kt = Throw factor determined by test
CFM = Air flow rate (cubic feet per minute)
A = Core Area, sq. ft.
Vt = Terminal Velocity
Vk = Face Velocity (Feet per minute)
Ak = Effective area
Where: Vn = Neck Velocity in feet per minute
An = Neck area in square feet

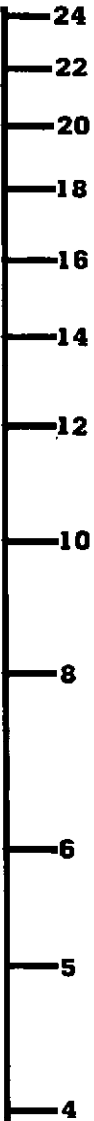
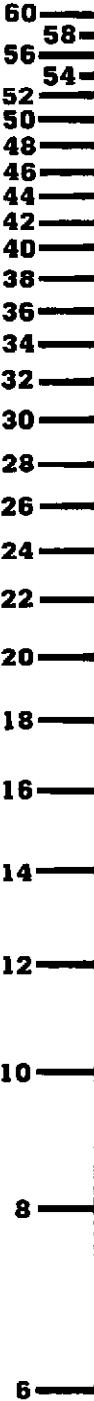
For further definition see the glossary pg. 121

Listed Size	6	8	10	12
An (Round)	.20	.35	.55	.79
An (Square)	.25	.44	.69	1.00

Listed Size	14	16	18	20
An (Round)	1.10	1.40	1.80	2.20
An (Square)	1.40	1.80	2.30	2.80

Air Velocity (FPM) and Velocity Pressure (Pv, inches water column) relationships:

$$Vel = 4005 \sqrt{P_v}$$
$$P_v = \left(\frac{Vel}{4005} \right)^2$$
$$CFM = \frac{BTUH}{\Delta T \times 1.085}$$



Surfaire® T-Bar Diffusers

Furnish and install Hart & Cooley SurfAire® insulated ceiling diffusers as shown on the plans. The diffuser shall be a 2'x2' T-Bar lay-in. Face shall be stucco embossed aluminum with off-white baked enamel finish for ceiling aesthetics, corrosion protection and ease of cleaning. Face will have formed deflector apertures which distribute air in thin layers along the ceiling surface and which provide for optimum dispersion in one, two, three, four-way or two-way corner patterns.

Back panel shall be formed galvanized steel covered with glass fiber insulation and an aluminum foil vapor barrier. Insulation is held securely in place by face margin edge fold over. Insulation will be prescored to accept specified collar sizes.

5400 Series collars will be supplied providing efficient, tight attachment with bayonet fasteners to mating prepunched holes in back panel. Collars will provide flex duct locking tabs and damper mounting slots. Collar damper slots provide for damper attachment or removal at any time.

3800 Series, fully adjustable, butterfly dampers shall be supplied (if specified). Damper adjustment handle is inserted before or after damper is mounted and is removable at any time.

Perforated Insulated T-Bar Diffusers and Return Grilles
Contractor shall furnish and install Hart & Cooley PDS perforated diffuser or PDS perforated diffuser with deflectors as indicated on the plans. Perforated diffusers shall be 2'x2' T-Bar lay-in. Exposed face will have a minimum 51% free area and be coated with off-white baked enamel finish. Deflectors (if specified) shall be fully adjustable, externally providing one, two, three, four-way or two-way corner air diffusion capability.

Back panel shall be black pre-coated formed steel covered with glass fiber insulation and an aluminum foil vapor barrier. Insulation is held securely in place by face margin edge fold over. Insulation is prescored to accept specified collar sizes.

5400 Series collars will be supplied providing efficient, tight attachment with bayonet fasteners to mating pre-punched holes in back panel. Collars will provide flex duct locking tabs and damper mounting slots. Collar damper slots provide for damper attachment or removal at any time.

3800 Series fully adjustable butterfly dampers shall be supplied (if specified). Damper adjustment handle is inserted before or after damper is mounted and is removable at any time.

Matching Hart & Cooley PDR perforated return air grilles shall be furnished according to the plans.

Removable Face Perforated T-Bar Diffusers and Return Grilles
Contractor shall furnish and install Hart & Cooley RFPS series perforated diffusers as indicated on the plans. Exposed face will be of a removable hinged style with a minimum 51% free area and be coated with white baked enamel finish. Deflectors are to be the patented, directable deflector to ensure proper adjustable air deflection. Back panel shall be black, pre-coated, formed steel to minimize sight into diffuser.

5400 Series collars will be supplied providing efficient, tight attachment with bayonet fasteners to mating pre-punched holes in back panel. Collars will provide flex duct locking tabs and amper mounting slots. Collar damper slots provide for damper attachment or removal at any time.

3800 Series fully adjustable butterfly dampers shall be supplied (if specified). Damper adjustment handle is inserted before or after damper is mounted and is removable at any time.

Matching Hart & Cooley RFPR perforated return air grilles shall be furnished according to the plans.

High Volume Supply T-Bar Diffuser

Contractor shall furnish and install Hart & Cooley HVS high volume supply 2'x2' T-Bar lay-in diffuser as shown on the plans. This diffuser will consist of a formed back panel and three stepdown formed elements, all made of heavy gauge steel. Finish shall be an off-white baked enamel. Interior air diffusion elements are easily removable at any time without tools for access to damper control rod. The air diffusion pattern shall be a full 360°.

The back panel shall be fully insulated with fiberglass having an aluminum foil vapor barrier. Insulation is held rigidly in place with adhesive and will be prescored to accept specified collar sizes.

5400 Series collars will be supplied providing efficient, tight attachment with bayonet fasteners to mating pre-punched holes in back panel. Collars will provide flex duct locking tabs and amper mounting slots. Collar damper slots provide for damper attachment or removal at any time.

3800 Series fully adjustable butterfly dampers shall be supplied (if specified). Damper adjustment handle is inserted before or after damper is mounted and is removable at any time.

Fixed Pattern T-Bar Diffuser

Contractor shall furnish and install Hart & Cooley FPD fixed pattern diffuser 2'x2' T-Bar lay-in as shown on the plans. This diffuser will consist of a formed back panel and two stepdown formed elements, all made of heavy gauge steel. Finish shall be an off-white baked enamel. Interior air diffusion elements are easily removable at any time without tools for access to damper or neck. The air diffusion pattern shall be a full 360°.

3800 Series fully adjustable butterfly dampers shall be supplied (if specified) and can be adjustable through the face.

Glossary of Terms

Ceiling or Wall Effect

The tendency of an air stream moving along a wall or ceiling surface to remain in contact with that surface.

Core Area

The total plane area of that portion of a grille, face, or register bounded by a line tangent to the outer opening through which air can pass. The core area is less than the register size. Example, a 14-in. x 8-in. register may have a core that is 1 in. less than the listed size; so, the core area is 13 in. x 7 in. — 91 sq. in.

Diffuser

An outlet discharging supply air in a spreading pattern.

Diffusion

Distribution of air within a space by an outlet discharging supply air in a spreading pattern.

Drop

The vertical distance between the base of the outlet and the bottom of the air stream at the end of the horizontal throw.

Effective Area, A_k (Sq. Ft.)

The calculated area of an outlet based on the average measured velocity between the fins.

Envelope

The outer boundary of an air stream moving at a specific velocity (for example, a 50 fpm envelope).

Free Area

The total minimum area of the openings in the air outlet or inlet through which air can pass.

Grille

A louvered covering for an opening through which air passes.

Induction

The process of drawing room air into the projected air stream due to the velocity of the projected air stream (sometimes called aspiration).

Jet Velocity, Fpm (Face Velocity)

The average measured velocity of air passing between the fins.

Natural Convection Currents

Air currents created by a buoyancy effect caused by the difference in temperature between the room air and the air in contact with a warm or cold surface.

Outlet

Any opening through which air is delivered to condition a space.

Outlet Velocity, Fpm

The average velocity of the supply air, measured as it passes through the plane of the opening in the supply outlet.

Pressure Loss, WG

Indicates how much total pressure is required to move air through a register.

Primary Air

The mixture of supply air from the outlet and room air within the 1 50 fpm envelope.

Radius of Diffusion, Ft.

The horizontal distance (throw) from a ceiling diffuser to the point of terminal velocity.

Register

A grille which is equipped with a damper or control valve, and which directs air in a nonspreading jet.

Return

Any opening through which air is removed from a conditioned space.

Spread, Ft.

The maximum width of the total air stream at the point of terminal velocity.

Static Pressure, PS

The outward force of air within a duct measured in inches of water.

Stratification Boundary

The boundary between room air currents moving faster than 1 5 fpm and the stratification zone.

Stratified Zone

A region in which room air velocity is less than 1 5 fpm.

Temperature Differential

The temperature difference between the primary and the room air.

Temperature Variation (ΔT)

The temperature difference between points within the same space.

Terminal Velocity, Fpm

When the velocity of total air drops to 50 or 75 fpm, depending on the particular application, it reaches terminal velocity. Terminal velocity is not sharply defined for all applications.

Throw (Blow), Ft.

The horizontal distance an air stream travels after leaving a horizontal sidewall outlet before maximum velocity is reduced to terminal velocity. For a perimeter outlet, throw is the vertical distance the air stream travels before maximum velocity is reduced to terminal velocity.

Total Air

The mixture of projected air and room air set in motion by the supply air.

Total Pressure, Pt

The sum of the velocity and static pressures measured in inches of water.

Vane Ratio

The ratio showing depth of vane to minimum width between two adjacent vanes.

Velocity Pressure, Pv

The forward-moving force of air within a duct measured in inches of water.

NC Noise Criteria

A single number noise rating system that indicates what Broad Band, continuous sounds are reasonably acceptable.

Alpha-Numeric Index

A500P	Steel—Panel Extruded Aluminum Face	72	
AD	Damper	75	
ADPD	Aluminum - Detachable Plate Diffuser Fixed Collar	64	115
AFPD/AFPDR6	Square Two-Core Face Fixed Collar with molded R6 Insulation Option.....	62	115
APF	Aluminum Plaster Frame	76	
AR6	Control Grid	33	
AR7	OB Damper	33	
ARE	Directional, Flat Frame.....	32	89
ARENPS	Aluminum—Perforated Face with Fiberglass Back.....	65	115
ARF	Directional, Flush Frame.....	32	89
ARS	Directional, Step Frame	33	89
ART	Extruded Aluminum—Square Neck.....	70	89
ASRE	Supply/Return, Flat Frame.....	35	95
ASRS	Supply/Return, Step Frame	35	95
BV	Brick/Block Vents	49	
C3	Curved Blade Three-Way Horizontal	19	85
C4	Curved Blade Four-Way Horizontal	20	85
CBPR	Steel—Perforated Face	66	118
CBPS	Steel—Perforated Face with Curved Blade Deflection.....	66	117
CD3	Curved Blade Three-Way Horizontal, w/OB	19	85
CD4	Curved Blade Four-Way Horizontal, w/OB	20	85
CH1	Curved Blade One-Way Horizontal.....	17	84
CH2	Curved Blade Two-Way Horizontal.....	18	84
CHD1	Curved Blade One-Way Horizontal, w/OB.....	17	84
CHD2	Curved Blade Two-Way Horizontal, w/OB.....	18	84
CHM1	Curved Blade One-Way Horizontal, w/MS.....	17	84
CHM2	Curved Blade Two-Way Horizontal, w/MS.....	18	84
CH2CL	Two-Way Corner, Down and Left.....	21	84
CH2CR	Two-Way Corner, Down and Right	21	84
CM3	Curved Blade Three-Way Horizontal, w/MS	19	85
CM4	Curved Blade Four-Way Horizontal, w/MS	20	85
DL	Drum Louver	48	108
DP	Distribution Plenum.....	47	
DPD	Steel—Detachable Plate Diffuser, Fixed Collar	64	115
DPD R6	Steel—Detachable Plate Diffuser, Fixed Collar with Insulation	64	115
DPD12	Steel—Detachable Plate Diffuser 1' x 1'	64	118
DT	Air Diverter	76	
ECBXT	Steel—With Adjustable Damper	72	98
FBR	Steel—Stamped Curved Blade	67	
FPD/FPDR6	Steel—Square Two-Core Face, Fixed Collar, R6 Insulation Option.....	62	115
FPD12	Steel—Square Two-Core Face, Fixed Collar.....	63	118
FPD3/FPD3R6	Steel—Square Three-Core Face, Fixed Collar, R6 Insulation Option.....	63	115
FBCS	Steel—Stamped Curved Blade with Fiberglass Back.....	67	
FT	Flexiturn.....	76	
HD	Horizontal Single Deflector, w/OB	12	82
HV	Double Deflection Horizontal Face.....	13	82
HVD	Double Deflection Horizontal Face, w/OB.....	14	82
HVS/HVSR6	Steel—Square Three-Core Face Adjustable Collar with Insulation Options	62	115
HM	Horizontal Single Deflection, w/MS	13	82
HX	Horizontal Single Deflection.....	12	82
L	L Series	40	102
MCD/MCDD	Modular Diffuser (OB Option), Flat Frame	36	97
MCDS	Modular Diffuser, Step Frame	36	97
MCDSD	Modular Diffuser with OBD, Step Frame	37	
MCDST	Extruded Aluminum—Curved-Blade Face	71	97

		Product Information	Engineering Data
MFB	Molded Fiberglass Back Features.....	54	
P Panel	Filler Panel	75	
PD	Perforated Face Only	69	116
PDF	Perforated Face with Frame	69	
PDR	Steel—Perforated Face	69	116
PDS	Steel—Perforated Face with Fixed Deflector.....	68	115
PDSD	Steel—Perforated Face with Adjustable Deflector	69	115
PFT	Steel—Perforated Face	56	114
PFTI	Steel—Perforated Face with Fiberglass Back	56	114
PFG	Steel—Perforated Face Grille	11	81
RCB/RCBD	Curved Blade Return , w/OBD Option.....	22	86
RCBF	Curved Blade Filter Grille	22	86
RCBFT	Extruded Aluminum—Curved Blade Face	55	
RCBT	Extruded Aluminum—Curved-Blade Face	57	
RD	Radial Blade Damper	74	
RE5	1/2" Grid Core Return	23	87
RE5T	Extruded Aluminum—1/2" Core Grid Face	58	114
RE5TI	Extruded Aluminum—1/2" Core Grid Face with Fiberglass Back.....	58	114
RED5	1/2" Grid Core Return, w/OB	23	87
REF5	1/2" Grid Filter Grille	24	87
REF5T	Extruded Aluminum—1/2" Core Grid Face	56	114
REF5TI	Extruded Aluminum—1/2" Core Grid Face with Insulation	56	114
REN4	Aluminum—One-Piece Stamped Face with Fiberglass Back.....	59	115
RENP	Steel—Perforated Face	65	116
RENPS	Steel—Perforated Face with Deflector	65	115
RFPR	Steel—Perforated Face	68	116
RFPS	Steel—Perforated Face with Directional Deflector	68	115
RH45	Fixed Horizontal Deflected	25	86
RH45T	Extruded Aluminum—Fixed-Bar Face	57	114
RH90	Fixed Horizontal Return Grille	26	87
RHD90	Fixed Horizontal Return Grille, w/OB	26	87
RHF45	Fixed Horizontal Deflected Filter Grille	25	86
RHD45	Fixed Horizontal Deflected, w/OB.....	25	86
RHF45T	Extruded Aluminum—Fixed Bar Face	55	114
RZ-Round	Rezzin™ Plastic Round Ceiling Diffuser	61	113
RZ-Square	Rezzin™ Plastic Square Ceiling Diffuser	61	113
Back Panel	Rezzin™ Plastic Back Panel	60	
Mod Core	Rezzin™ Plastic T-Bar Modular Core Diffuser	60	111
Egg Crate	Rezzin™ Plastic T-Bar Egg Crate Filter Grille	58	114
Sq to Rd	Rezzin™ Plastic Square-to-Round Back Panel	60	
4-Way Tbar	Rezzin™ Plastic T-Bar Directional Diffuser	60	111
S	S Series.....	43	104
SBP	Steel—Perforated Face Shallow Back.....	67	116
SCBPS	Steel—Stamped Curved-Blade Perforated Supply Diffuser.....	66	118
SMF	Extruded Aluminum—Surface Mount Frame.....	74	
SR	Galvanized Steel—Square-to-Round Transition	74	
SR/AR	Air Patterns and Listed Sizes	34	
SR6	Control Grid	31	
SR7	OB Damper.....	31	
SRT	Steel—Square Neck	70	89
SR/AR	Air Patterns and Listed Sizes	34	
SRET/SRET R6	Ceiling Diffuser.....	70	
SRE	Directional, Flat Frame.....	30	89

		Product Information	Engineering Data
SRS	Directional, Step Frame	30	89
SS	Linear Face Diffuser	39	99
SV	Single-Deflection Diffuser	38	101
SVH	Double-Deflection Diffuser	38	101
T19	Steel—Multi-Blade Damper	74	
T-Bar Panel	Panel for Modular Diffuser	37	
TG/TGF	Transfer Grille and Frame	27	88
USV	Single-Deflection Universal Diffuser	38	101
USVH	Double-Deflection Universal Diffuser	39	101
VD	Vertical Single Deflector, w/OB	15	82
VH	Double Deflection Vertical Face	16	82
VHD	Double Deflection Vertical Face, w/OB	16	82
VM	Vertical Single Deflection, w/MS	15	82
VX	Vertical Single Deflection	14	82
4ABC	Adjustable Louver	50	110
19	Round OB Damper	28	
20	Round Adjustable	28	88
21	Steel Square Mounting Frame	29	
22	Steel Butterfly Damper with Mounting Frame	29	
23	Steel Opposed Blade Damper	29	
24	Steel Square (Ceiling) Diffuser	29	88
245	Stationary Louvers	51	110
444, 441-445	Aluminum—One-Piece Stamped Face	59	114
445	Stationary Louvers	51	110
645	Stationary Louvers	51	110
659T	Steel—Lanced Face	53	114
659TI	Steel—Lanced Face with Fiberglass Back	53	114
673T	Steel—Filter Grille	53	
673TI	Steel—Filter Grille with Insulated Back	53	
673TPI R6	Steel—Filter Grille with Steel Plenum, R6 Insulation	54	114
811-814	Curved Blade Steel One Through Four-Way	5	
821	Vertical Single Deflection, w/MS	6	79
831	Horizontal Single Deflection, w/MS	6	79
92HVO	Double Deflection Horizontal Face	7	79
92HVV	Double Deflection Horizontal Face, w/OB	7	79
92VHO	Double Deflection Vertical Face	8	79
92VHV	Double Deflection Vertical Face, w/OB	8	79
94	Return Horizontal	9	81
94A	Return Horizontal Deflected	10	81
94AHOV	Return Horizontal Deflected, w/OB	10	81
94HOV	Return Horizontal, w/OB	9	81
94AT	Steel—Fixed-Bar Face	57	114
96AFB	Steel Fixed-Bar Filter Grille	10	81
96AFBT	Steel—Fixed-Bar Face	54	114
96AFBTI	Steel—Fixed-Bar Face with Fiberglass Back	55	114
98VOH/98VOHP	Supply Grille With Deflection	11	79
1530	Stationary Louvers	50	110
1545	Stationary Louvers	50	110
3800	Adjustable Butterfly Damper	73	
5400PP	Push Pins	73	
5400	Snap-In Collar Ring	73	
6400	Tab Collar	73	
9200V	Opposed-Blade Damper	11	

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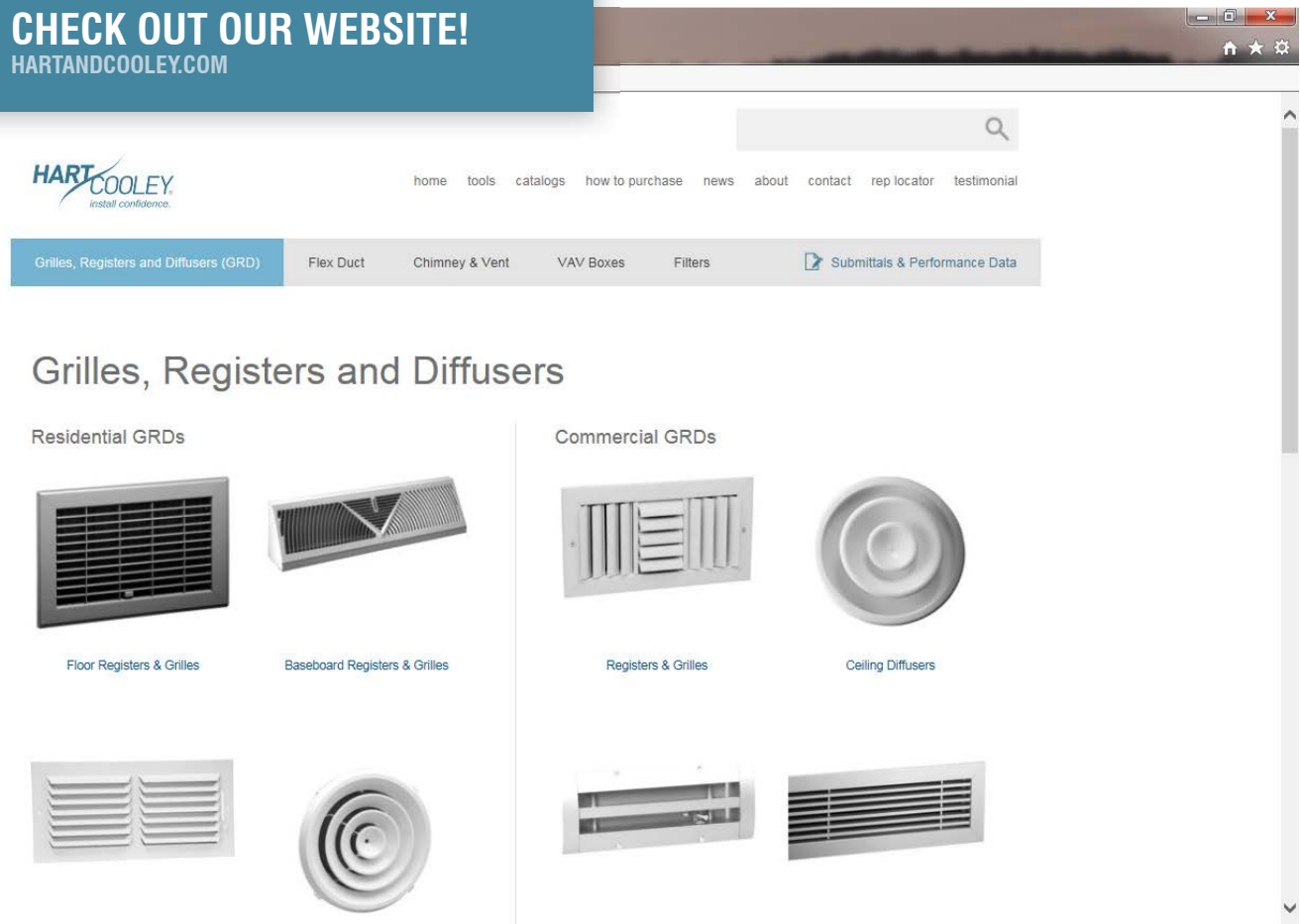
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