

# Engineering Data



## 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 Ak .170	CFM	50	70	85	100	120	135
	Spread	4.5	5.0	6.5	7.5	9.0	10.0
	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 Ak 1.045	CFM	420	525	625	730	835
	Throw	17.0	21.0	25.0	29.0	33.0

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 (in<sup>2</sup>) 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 in<sup>2</sup>) 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 (ft<sup>2</sup>) 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.

Pressure Loss (inches of w.c.) – the selection of the face velocity must 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 <sup>2</sup> )	Ton (cfm)	Filter Size	Area (in <sup>2</sup> )	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.  $Y = Y1$

*Recommended Noise Criteria and Face Velocity Ranges are on page 6*

+  $\left[ \frac{(X - X1) * (Y2 - Y1)}{(X2 - X1)} \right]$  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 in<sup>2</sup> (nominal area of 14x14)

X1 = 180 in<sup>2</sup> (nominal area of 18x10)

X2 = 200 in<sup>2</sup> (nominal area of 20x10)

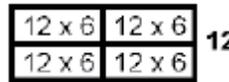
Using equation above computes  $Y = 600 + \left[ \frac{(196 - 180) * (640 - 600)}{(200 - 180)} \right] =$

$600 + \left[ \frac{16 * 40}{20} \right] = 600 + 32 = 632$  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.



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

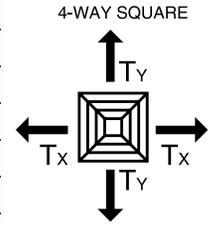
One quarter the size and CFM, multiply the throw by .5

\*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.

**AR Series: ARE, ARS, ART  
Square & Rectangular Ceiling Diffusers — Steel/Aluminum**

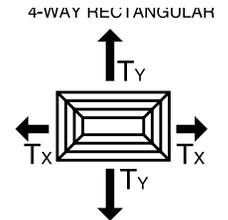
**Four-Way Square**

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
<b>Pressure Loss</b>		.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	2-3/2-3	2-3/2-3	2-4/2-4	2-4/2-4	3-5/3-5	3-5/3-5	4-6/4-6	4-8/4-8	5-8/5-8	5-9/5-9	6-11/6-11
9 x 9	CFM	110	135	155	180	205	225	270	315	360	410	450
Ak .220	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	6-11/6-11	6-12/6-12	7-13/7-13	8-14/8-14
12 x 12	CFM	200	240	280	320	360	400	480	560	640	725	800
Ak .400	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
15 x 15	CFM	310	375	440	500	565	625	750	875	1000	1125	1250
Ak .620	Throw X/Y	4-6/4-6	4-8/4-8	5-9/5-9	6-11/6-11	6-11/6-11	6-12/6-12	8-15/8-15	10-18/10-18	10-19/10-19	12-21/12-21	13-23/13-23
18 x 18	CFM	450	540	630	720	810	900	1080	1260	1440	1620	1800
Ak .900	Throw X/Y	4-8/4-8	5-9/5-9	5-11/5-11	6-12/6-12	7-13/7-13	8-15/8-15	10-17/10-17	11-20/11-20	13-23/13-23	15-27/15-27	16-30/16-30
21 x 21	CFM	615	740	860	985	1110	1230	1475	1725	1970	2220	2460
Ak 1.230	Throw X/Y	5-9/5-9	6-11/6-11	7-13/7-13	8-14/8-14	9-15/9-15	9-17/9-17	11-21/11-21	13-25/13-25	15-29/15-29	17-31/17-31	19-35/19-35
24 x 24	CFM	800	960	1120	1275	1440	1600	1925	2240	2570	2890	3200
Ak 1.600	Throw X/Y	5-11/5-11	7-13/7-13	7-14/7-14	8-15/8-15	9-17/9-17	10-19/10-19	12-23/12-23	14-29/14-29	16-31/16-31	18-35/18-35	20-39/20-39
27 x 27	CFM	1010	1215	1420	1615	1820	2020	2430	2840	3240	3650	4040
Ak 2.020	Throw X/Y	6-12/6-12	7-13/7-13	8-15/8-15	10-18/10-18	10-19/10-19	12-22/12-22	14-27/14-27	16-32/16-32	18-35/18-35	20-38/20-38	23-42/23-42
33 x 33	CFM	1370	1650	1925	2200	2470	2750	3300	3850	4400	4950	5500
Ak 2.750	Throw X/Y	7-13/7-13	9-16/9-16	10-18/10-18	21-21/12-21	14-24/14-24	16-27/16-27	18-33/18-33	19-37/19-37	23-41/23-41	27-46/27-46	31-50/31-50



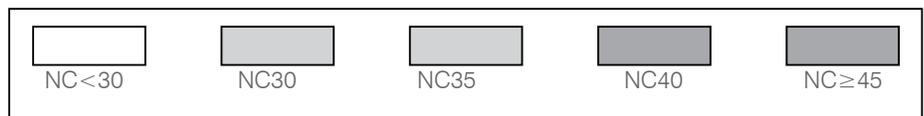
**Four-Way Rectangular**

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
<b>Pressure Loss</b>		.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	1-3/2-4	1-3/3-5	2-4/3-5	2-4/4-6	3-5/4-6	3-5/4-8	4-6/5-9	4-6/5-9	4-8/7-13	5-9/8-15	6-11/8-15
12 x 6	CFM	100	120	140	160	180	200	240	280	320	360	400
Ak .200	Throw X/Y	1-3/3-5	1-3/4-6	2-4/4-8	2-4/4-8	2-4/5-9	3-5/6-11	4-6/7-13	4-8/8-15	4-8/8-15	5-9/10-18	6-11/11-21
12 x 9	CFM	150	180	210	240	270	300	360	420	480	540	600
Ak .300	Throw X/Y	2-4/3-5	2-4/3-5	3-5/4-6	4-6/4-8	4-7/5-10	4-8/6-11	5-9/6-12	6-11/7-13	7-13/9-17	7-13/10-18	8-14/11-19
15 x 9	CFM	185	225	265	300	340	375	450	525	600	675	750
Ak .370	Throw X/Y	2-4/4-6	2-4/4-6	3-5/5-9	4-6/6-11	4-6/6-12	4-8/8-14	5-9/8-15	5-9/9-17	6-12/11-21	7-13/13-25	7-13/13-25
18 x 9	CFM	225	270	315	360	405	450	540	630	720	810	900
Ak .450	Throw X/Y	2-4/4-6	2-4/5-9	3-5/6-11	4-6/6-12	4-6/8-14	4-8/8-15	5-9/10-19	5-10/11-23	6-12/13-25	8-14/15-29	10-17/17-32
21 x 9	CFM	265	320	370	425	475	530	635	740	850	955	1060
Ak .530	Throw X/Y	2-4/5-9	2-4/6-11	3-5/8-14	4-6/8-15	4-8/10-18	4-8/10-19	5-9/11-21	6-17/13-25	8-13/16-31	9-15/19-35	10-17/21-38
15 x 12	CFM	250	300	350	400	450	500	600	700	800	900	1000
Ak .500	Throw X/Y	3-5/4-6	3-5/4-8	4-6/5-9	4-8/6-11	5-9/6-12	6-11/7-13	6-12/8-15	7-13/10-18	8-15/11-21	10-18/13-23	12-21/14-27
18 x 12	CFM	295	355	415	475	535	595	715	835	950	1070	1190
Ak .590	Throw X/Y	2-4/4-8	3-5/5-9	4-6/6-11	4-8/7-13	5-9/8-14	6-11/8-15	6-12/10-18	8-14/11-21	9-16/13-23	10-18/15-27	12-21/17-31
21 x 12	CFM	345	415	485	555	625	690	830	970	1100	1240	1375
Ak .690	Throw X/Y	3-5/5-9	3-5/6-11	4-6/7-13	4-8/8-14	4-8/8-15	5-9/10-18	6-11/11-21	7-13/14-26	8-15/16-29	9-17/17-31	10-19/19-35
24 x 12	CFM	400	480	560	640	720	800	960	1140	1280	1440	1600
Ak .800	Throw X/Y	2-4/6-11	4-6/7-13	4-6/8-14	4-8/9-16	4-8/10-18	5-9/11-21	6-12/14-26	8-14/15-29	9-17/17-31	10-19/19-35	10-19/21-39
18 x 15	CFM	375	450	525	600	675	750	900	1050	1200	1350	1500
Ak .75	Throw X/Y	4-6/4-8	4-8/5-9	5-9/6-11	6-11/6-12	6-12/8-14	7-13/8-15	8-15/10-18	9-17/10-19	10-19/13-23	12-22/15-26	14-25/17-29
24 x 15	CFM	500	600	700	800	900	1000	1200	1400	1600	1800	2000
Ak 1.000	Throw X/Y	4-6/6-11	4-8/6-12	5-9/8-14	6-11/9-17	6-12/10-18	7-13/11-21	8-15/13-25	10-18/15-29	11-21/17-32	13-23/20-36	15-27/22-39
24 x 18	CFM	600	720	840	960	1080	1200	1440	1680	1920	2160	2400
Ak 1.200	Throw X/Y	4-8/6-11	5-9/6-12	6-11/7-14	6-12/8-15	7-14/10-19	8-15/11-21	10-18/13-23	11-21/15-27	13-25/18-34	15-30/21-37	16-32/23-41
33 x 21	CFM	960	1150	1340	1530	1725	1920	2300	2690	3070	3450	3840
Ak 1.920	Throw X/Y	4-8/8-15	6-11/10-18	7-13/12-22	8-14/13-25	8-15/15-29	10-18/17-31	12-21/21-35	14-26/24-39	16-29/26-43	17-31/29-47	21-39/35-56
30 x 24	CFM	1000	1200	1400	1600	1800	2000	2400	2800	3200	3600	4000
Ak 2.000	Throw X/Y	6-11/7-13	6-12/8-15	8-14/10-18	8-15/11-21	10-18/13-23	10-19/14-26	12-23/16-29	15-28/19-35	16-31/21-39	19-35/24-43	22-40/29-51



**Note 1:** 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.

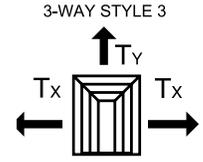
Ceiling Height in Feet	Maximum Recommended Cooling Temperature Differential	Maximum Recommended CFM Per Diffuser			
		SR/AR/ASR		SR/AR	
		Four-Way	Three-Way	Two-Way	One-Way
7	15°	400	300	200	100
8	20°	600	450	300	150
9	25°	1200	900	600	300
10	25°	1800	1350	900	450
12	30°	3200	2400	1600	800
14	30°	4800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



**AR Series: ARE, ARS, ART**  
**Square & Rectangular Ceiling Diffusers — Aluminum**

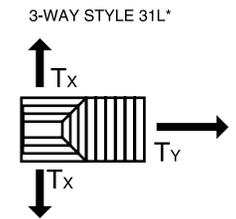
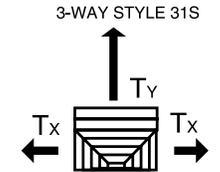
**Three-Way Style 3**

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
<b>Pressure Loss</b>		.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\***

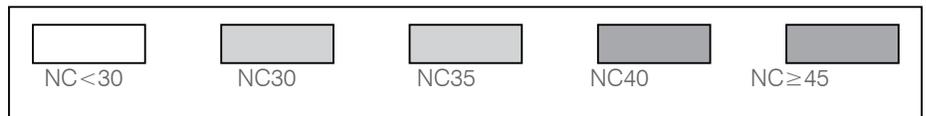
Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
<b>Pressure Loss</b>		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
9 x 6	CFM	75	90	105	120	135	150	180	210	240	270	300
Ak .150	Throw X/Y	2-3/4-7	2-3/4-7	2-3/4-7	2-4/4-8	3-5/5-8	3-6/5-9	4-7/6-11	4-8/7-12	6-10/9-15	6-11/10-17	6-11/11-19
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

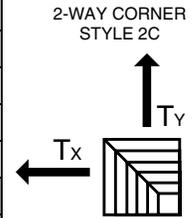
Ceiling Height in Feet	Maximum Recommended Cooling Temperature Differential	Maximum Recommended CFM Per Diffuser			
		SR/AR/ASR	SR/AR		
		Four-Way	Three-Way	Two-Way	One-Way
7	15°	400	300	200	100
8	20°	600	450	300	150
9	25°	1200	900	600	300
10	25°	1800	1350	900	450
12	30°	3200	2400	1600	800
14	30°	4800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



**AR Series: ARE, ARS, ART  
Square & Rectangular Ceiling Diffusers — Aluminum**

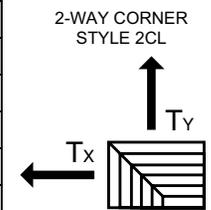
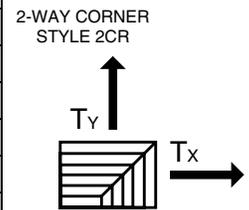
**Two-Way Corner Style 2C**

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
<b>Pressure Loss</b>		<b>.020</b>	<b>.020</b>	<b>.030</b>	<b>.040</b>	<b>.050</b>	<b>.060</b>	<b>.090</b>	<b>.120</b>	<b>.160</b>	<b>.200</b>	<b>.250</b>
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



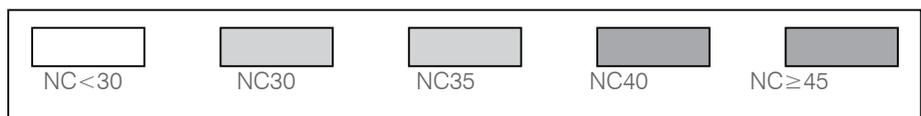
**Two-Way Corner Style 2CR**

Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
<b>Pressure Loss</b>		<b>.020</b>	<b>.020</b>	<b>.030</b>	<b>.040</b>	<b>.050</b>	<b>.060</b>	<b>.090</b>	<b>.120</b>	<b>.160</b>	<b>.200</b>	<b>.250</b>
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

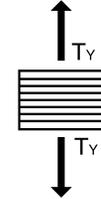


**AR/SR Series: ARE, ARS, ART, SRE**  
**Square & Rectangular Ceiling Diffusers — Steel/Aluminum**

**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	265
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

2-WAY STYLE 2L



**Two-Way Style 2S**

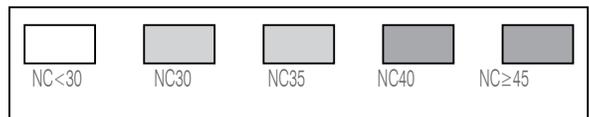
Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
9 x 6	CFM	65	80	95	105	120	130	160	185	210	240	265
Ak .130	Throw X	3-6	4-7	5-8	6-9	8-12	9-13	10-14	11-17	13-19	15-23	17-26
12 x 6	CFM	90	105	120	140	160	175	210	245	280	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	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

2-WAY STYLE 2S



**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



AR/SR Series: ARE, ARS, ART, SRE  
 Square & Rectangular Ceiling Diffusers — Steel/Aluminum

### 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

2-WAY STYLE 2



### One-Way Style

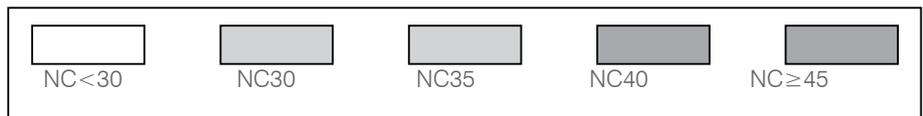
Face Velocity		500	600	700	800	900	1000	1200	1400	1600	1800	2000
Pressure Loss		.020	.020	.030	.040	.050	.060	.090	.120	.160	.200	.250
6 x 6	CFM	45	55	60	70	80	90	105	125	140	160	180
Ak .090	Throw	3-5	4-7	5-8	6-9	8-10	9-12	10-14	12-18	14-20	15-22	16-24
9 x 9	CFM	95	115	135	155	175	195	235	275	315	350	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.

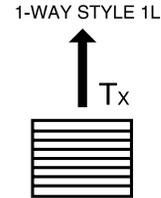
Ceiling Height in Feet	Maximum Recommended Cooling Temperature Differential	Maximum Recommended CFM Per Diffuser			
		SR/AR/ASR	SR/AR		
		Four-Way	Three-Way	Two-Way	One-Way
7	15°	400	300	200	100
8	20°	600	450	300	150
9	25°	1200	900	600	300
10	25°	1800	1350	900	450
12	30°	3200	2400	1600	800
14	30°	4800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



**AR/SR Series: ARE, ARS, ART, SRE**  
**Square & Rectangular Ceiling Diffusers — Steel/Aluminum**

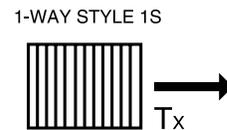
**One-Way Style 1L**

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



**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



**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

