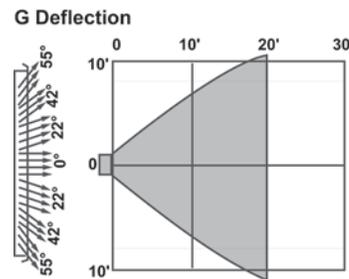
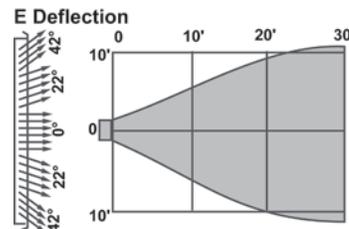
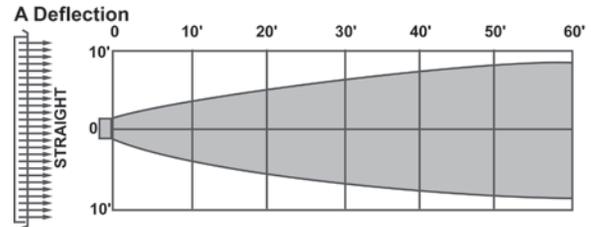


Recommended NC Criteria

	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.

Air Pattern Obtained with Various Deflection Settings



Velocity Limitations for Various Applications

The sound caused by an air outlet in operation is directly proportional to the velocity of the air passing through it. By selecting outlets of proper sizes, face velocities can be controlled within safe sound limits.

The following recommended face velocities are within the safe sound limits for most applications, when NC data are not available.

Application	Recommended Velometer 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

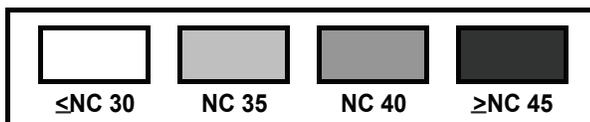


**ALH/ALV, ALHM/ALVM, ALHOB/ALVOB, ALHV/ALVH, ALHVOB/ALVHOB
Supply Register and Grilles**

Deflection A

Face Velocity		400	500	600	700	800	900	1000	1100	1200	1300	1400	1600	1800	2000
Pressure Loss		.010	.016	.022	.031	.040	.050	.062	.075	.090	.105	.122	.160	.202	.249
8x4	CFM	60	80	95	110	125	140	155	170	185	205	220	250	280	310
Ak .156	Throw	6.5	8.5	10	12	13	15	16	18	19	22	23	26	29	33
10x4	CFM	80	100	120	140	160	180	200	220	240	260	275	315	355	395
Ak .198	Throw	7.5	9.5	12	13	15	17	19	20	22	24	26	29	33	37
12x4	CFM	95	120	145	170	190	215	240	265	290	310	335	385	430	480
Ak .240	Throw	8	10	12	14	16	18	20	22	25	26	28	33	36	41
14x4	CFM	115	140	170	195	225	255	280	310	340	365	395	450	510	565
Ak.282	Throw	9	11	13	15	18	20	22	24	27	29	31	35	40	44
12x5	CFM	125	155	185	215	250	280	310	340	370	405	435	495	560	620
Ak .310	Throw	9	12	14	16	19	21	23	25	28	30	32	37	42	46
10x6	CFM	125	155	190	220	250	280	315	345	375	405	440	500	565	625
Ak .313	Throw	9	12	14	16	19	21	23	26	28	30	33	37	42	46
14x5	CFM	145	180	220	255	290	330	365	400	435	475	510	580	655	730
Ak .364	Throw	10	12	15	18	20	23	25	28	30	33	35	40	45	50
12x6	CFM	150	190	225	265	305	340	380	415	455	495	530	605	680	760
Ak .379	Throw	10	13	15	18	21	23	26	28	31	33	36	41	46	51
16x5	CFM	165	210	250	295	335	375	420	460	500	545	585	670	750	835
Ak .418	Throw	11	13	16	19	22	24	27	30	32	35	38	43	48	54
14x6	CFM	180	225	270	310	355	400	445	490	535	580	625	715	805	890
Ak .446	Throw	11	14	17	19	22	25	28	30	33	36	39	44	50	55
16x6	CFM	205	255	305	360	410	460	510	565	615	665	715	820	920	1025
Ak .512	Throw	11	14	17	20	22	25	28	31	34	36	39	45	55	56
20x5	CFM	210	265	315	370	420	475	525	580	630	685	735	840	945	1050
Ak .526	Throw	12	15	18	21	24	27	30	33	36	39	42	48	54	60
24x5	CFM	255	315	380	445	505	570	635	695	760	825	890	1015	1140	1270
Ak .634	Throw	13	16	20	23	26	30	33	36	40	43	46	53	59	66
20x6	CFM	260	325	385	450	515	580	645	710	775	840	905	1030	1160	1290
Ak .645	Throw	13	17	20	23	27	30	33	37	40	43	47	53	60	67
24x6	CFM	310	390	465	545	620	700	775	855	930	1010	1090	1245	1400	1555
Ak .777	Throw	15	18	22	26	29	33	37	40	44	48	51	59	66	73
20x8	CFM	355	440	530	615	705	795	880	970	1060	1145	1235	1410	1590	1765
Ak .882	Throw	16	19	23	27	31	35	39	43	47	51	55	62	70	78
30x6	CFM	390	490	585	685	780	880	975	1075	1170	1270	1365	1560	1755	1950
Ak .976	Throw	16	21	25	29	33	37	41	45	49	53	57	66	74	82
24x8	CFM	425	530	635	740	850	955	1060	1165	1270	1380	1485	1695	1910	2120
Ak 1.06	Throw	17	21	23	30	34	38	43	47	51	56	60	68	77	85
30x8	CFM	535	670	805	940	1070	1205	1340	1475	1610	1740	1875	2145	2410	2680
Ak 1.34	Throw	19	24	29	34	38	43	48	53	58	62	67	77	87	96
24x10	CFM	540	675	810	945	1080	1215	1350	1485	1620	1755	1890	2160	2430	2700
Ak 1.35	Throw	19	24	29	34	39	43	48	53	58	63	68	77	87	97
36x8	CFM	645	805	965	1125	1290	1450	1610	1770	1930	2095	2255	2575	2900	3220
Ak 1.61	Throw	21	26	32	37	42	47	52	58	63	68	73	84	94	105
24x12	CFM	655	820	985	1150	1310	1475	1640	1805	1970	2130	2295	2625	2950	3280
Ak 1.64	Throw	21	27	32	37	43	48	53	59	64	69	75	85	96	107
30x10	CFM	675	845	1015	1185	1350	1520	1690	1860	2030	2195	2365	2705	3040	3380
Ak 1.69	Throw	21	27	32	38	43	48	54	59	65	70	75	86	97	108
36x10	CFM	815	1020	1225	1430	1630	1835	2040	2245	2450	2650	2855	3265	3670	4080
Ak 2.04	Throw	24	30	36	42	47	53	59	65	71	77	83	95	107	119
30x12	CFM	820	1025	1230	1435	1640	1845	2050	2255	2460	2665	2870	3280	3690	4100
Ak 2.05	Throw	24	30	36	42	48	54	59	65	71	77	83	95	107	119
36x12	CFM	990	1235	1480	1730	1975	2225	2470	2715	2965	3210	3460	3950	4445	4940
Ak 2.47	Throw	26	33	39	46	52	59	65	72	78	85	91	104	114	130

Terminal Velocity of 75 FPM



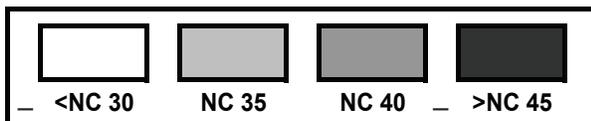


ALH/ALV, ALHM/ALVM, ALHOBD/ALVOBD, ALHV/ALVH, ALHVOBD/ALVHOBD
Supply Register and Grilles

Deflection C

Face Velocity		400	500	600	700	800	900	1000	1100	1200	1300	1400	1600	1800	2000
Pressure Loss		.010	.016	.022	.031	.040	.050	.062	.075	.090	.105	.122	.160	.202	.249
8x4	CFM	55	70	85	100	115	125	140	155	170	185	195	225	255	280
Ak .141	Throw	5	6.5	7.5	9	10	11	13	14	15	17	18	20	23	25
10x4	CFM	70	90	105	125	140	160	180	195	215	230	250	285	320	355
Ak .178	Throw	5.5	7	8.5	10	11	13	14	16	17	18	20	23	26	29
12x4	CFM	85	110	130	150	175	195	215	240	260	280	300	345	390	430
Ak .216	Throw	6	8	9.5	11	13	14	16	18	19	20	22	25	28	31
14x4	CFM	100	125	150	180	205	230	255	280	305	330	355	405	455	510
Ak.254	Throw	7	8.5	10	12	14	16	17	19	21	22	24	27	31	34
12x5	CFM	110	140	165	195	225	250	280	305	335	365	390	445	500	560
Ak .279	Throw	7	9	11	13	14	16	18	20	22	23	25	29	32	36
10x6	CFM	115	140	170	195	225	255	280	310	340	365	395	450	510	565
Ak .282	Throw	7.5	9	11	12	14	16	18	20	22	23	25	29	33	36
14x5	CFM	130	165	195	230	260	295	330	360	395	425	460	525	590	655
Ak .328	Throw	7.5	10	12	14	15	17	20	21	23	25	27	31	35	39
12x6	CFM	135	170	205	240	275	310	340	375	410	445	480	545	615	685
Ak .342	Throw	8	10	12	14	16	18	20	22	24	26	28	32	36	40
16x5	CFM	150	190	225	265	300	340	375	415	450	490	525	605	680	755
Ak .377	Throw	8.5	11	12	15	17	19	21	23	25	27	29	34	38	41
14x6	CFM	165	205	245	290	330	370	410	455	495	535	575	660	740	825
Ak .412	Throw	9	11	13	16	18	22	22	24	27	28	31	35	40	44
16x6	CFM	185	230	275	325	370	415	460	510	555	600	645	740	830	925
Ak .462	Throw	9	11	13	15	18	20	22	24	26	28	31	35	39	44
20x5	CFM	190	235	285	330	380	425	475	520	570	615	665	760	855	950
Ak .474	Throw	9.5	12	14	16	19	21	23	26	28	30	33	38	42	47
24x5	CFM	230	285	345	400	460	515	570	630	685	745	800	915	1030	1145
Ak .572	Throw	10	13	15	18	21	23	26	28	33	33	36	41	46	51
20x6	CFM	230	290	350	405	465	525	580	640	695	755	815	930	1045	1160
Ak .581	Throw	10	13	16	18	21	23	26	29	31	34	36	41	47	52
24x6	CFM	280	350	420	490	560	630	700	770	840	910	980	1120	1260	1400
Ak .701	Throw	11	14	17	20	23	26	28	31	34	37	40	45	51	57
20x8	CFM	320	400	475	555	635	715	795	875	955	1035	1115	1270	1430	1590
Ak .795	Throw	12	15	18	21	24	27	30	33	36	39	42	48	54	61
30x6	CFM	350	440	530	615	705	790	880	970	1055	1145	1230	1410	1585	1760
Ak .880	Throw	13	16	19	22	26	29	32	35	38	41	46	51	57	64
24x8	CFM	385	480	575	670	765	865	960	1055	1150	1245	1345	1535	1725	1920
Ak .959	Throw	13	17	20	23	27	30	33	37	40	43	47	53	60	67
30x8	CFM	480	600	720	840	960	1080	1200	1320	1440	1560	1680	1920	2160	2400
Ak 1.20	Throw	15	19	22	26	30	33	37	41	45	48	52	60	67	74
24x10	CFM	490	610	730	855	975	1100	1220	1340	1465	1585	1710	1950	2200	2440
Ak 1.22	Throw	15	19	22	26	30	34	38	41	45	49	53	60	68	75
36x8	CFM	580	725	870	1015	1160	1305	1450	1595	1740	1885	2030	2320	2610	2900
Ak 1.45	Throw	16	20	25	29	33	37	41	45	49	53	57	65	74	82
24x12	CFM	590	735	880	1030	1175	1325	1470	1615	1765	1910	2060	2350	2645	2940
Ak 1.47	Throw	17	21	25	29	33	37	41	45	49	53	58	66	74	82
30x10	CFM	610	765	920	1070	1225	1375	1530	1685	1835	1990	2140	2450	2755	3060
Ak 1.53	Throw	17	21	25	29	34	38	42	46	50	55	59	67	76	84
36x10	CFM	735	920	1105	1290	1470	1655	1840	2025	2210	2390	2575	2945	3310	3680
Ak 1.84	Throw	18	23	28	32	37	42	46	51	55	60	65	74	83	92
30x12	CFM	740	925	1110	1295	1480	1665	1850	2035	2220	2405	2590	2960	3330	3700
Ak 1.85	Throw	19	23	28	32	37	42	46	51	56	60	65	74	83	93
36x12	CFM	890	1115	1340	1560	1785	2000	2230	2455	2675	2900	3120	3570	4015	4460
Ak 2.23	Throw	20	25	31	36	41	46	51	56	61	66	71	81	92	102

Terminal Velocity of 75 FPM



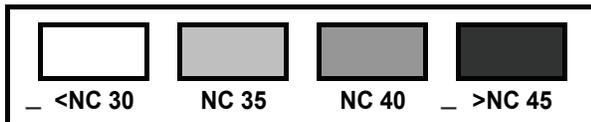


**ALH/ALV, ALHM/ALVM, ALHOB/ALVOB, ALHV/ALVH, ALHVOB/ALVHOB
Supply Register and Grilles**

Deflection E

Face Velocity		400	500	600	700	800	900	1000	1100	1200	1300	1400	1600	1800	2000
Pressure Loss		.010	.016	.022	.031	.040	.050	.062	.075	.090	.105	.122	.160	.202	.249
8x4	CFM	45	60	70	85	95	105	120	130	140	155	165	190	210	235
Ak .127	Throw	2.5	3.5	4	5	5.5	6	6.5	7.5	8	8.5	9.5	11	12	13
10x4	CFM	60	75	90	105	120	135	150	165	180	195	210	240	270	300
Ak .162	Throw	3	3.5	4.5	5	6	6.5	7.5	8	9	9.5	10	12	13	15
12x4	CFM	80	100	120	140	160	175	195	215	235	255	275	315	355	395
Ak .197	Throw	4.5	6	7.5	8.5	10	11	12	13	14	16	17	19	22	24
14x4	CFM	90	115	140	160	185	210	230	255	275	300	325	370	415	460
Ak.231	Throw	5	6.5	8	9	11	12	13	14	16	17	18	21	23	26
12x5	CFM	100	125	150	180	205	230	255	280	305	330	355	405	455	510
Ak .254	Throw	5.5	6.5	8	9.5	12	12	14	15	16	18	19	22	25	27
10x6	CFM	105	130	155	180	205	230	255	285	310	335	360	410	465	515
Ak .257	Throw	5.5	7.5	8.5	9.5	11	12	14	15	17	18	19	22	25	28
14x5	CFM	120	150	180	210	240	270	300	330	360	385	415	475	535	595
Ak .291	Throw	6	7.5	9	10	12	13	15	16	18	19	21	24	27	30
12x6	CFM	125	155	185	220	250	280	310	340	375	405	435	500	560	620
Ak .311	Throw	6	7.5	9	11	12	14	15	17	18	20	21	24	28	30
16x5	CFM	135	170	205	240	275	310	345	375	410	445	480	550	615	685
Ak .343	Throw	6.5	8	9.5	11	13	14	16	17	19	21	22	26	29	32
14x6	CFM	145	185	220	255	290	330	365	400	440	475	510	585	655	730
Ak .365	Throw	6.5	8.5	10	11	13	15	16	18	20	21	23	26	29	33
16x6	CFM	170	215	260	300	345	390	430	475	545	560	605	690	775	860
Ak .431	Throw	7	9	11	12	14	16	18	20	21	23	25	28	32	36
20x5	CFM	190	235	280	330	375	425	470	515	565	610	660	750	845	940
Ak .470	Throw	7.5	9.5	11	13	15	17	19	20	22	24	26	30	33	37
24x5	CFM	210	260	310	365	415	470	520	570	625	675	730	830	935	1040
Ak .520	Throw	8	10	12	14	16	18	20	21	24	25	27	31	35	39
20x6	CFM	210	265	315	370	420	475	530	580	635	685	740	845	950	1055
Ak .528	Throw	8	10	12	14	16	18	20	22	24	26	28	32	35	39
24x6	CFM	255	320	380	445	510	575	635	700	765	830	890	1020	1145	1275
Ak .637	Throw	8.5	11	13	15	17	20	22	24	26	28	30	35	39	43
20x8	CFM	290	360	435	505	580	650	725	795	870	940	1010	1155	1300	1445
Ak .723	Throw	9	12	14	16	19	21	23	25	28	30	32	37	42	46
30x6	CFM	320	400	480	560	640	720	800	880	960	1040	1120	1280	1440	1600
Ak .800	Throw	10	12	15	17	19	22	24	27	29	32	34	39	44	49
24x8	CFM	350	435	525	610	700	785	870	960	1045	1135	1220	1400	1570	1745
Ak .872	Throw	10	13	15	18	20	23	25	28	30	33	36	41	48	51
30x8	CFM	435	545	655	765	870	980	1090	1200	1310	1415	1525	1745	1960	2180
Ak 1.09	Throw	11	14	17	20	23	25	28	31	34	37	40	45	51	57
24x10	CFM	445	555	665	775	890	1000	1110	1220	1330	1445	1555	1775	2000	2220
Ak 1.11	Throw	11	14	17	20	23	26	29	31	34	37	40	46	52	57
36x8	CFM	530	660	790	925	1055	1190	1320	1450	1585	1715	1850	2110	2375	2640
Ak 1.32	Throw	14	17	21	24	27	31	34	38	41	45	48	55	62	69
24x12	CFM	535	670	805	940	1070	1205	1340	1475	1610	1740	1875	2145	2410	2680
Ak 1.34	Throw	13	16	19	22	25	28	31	35	38	41	44	50	57	63
30x10	CFM	555	695	835	975	1110	1250	1390	1530	1670	1805	1945	2225	2500	2780
Ak 1.39	Throw	13	16	19	22	26	29	32	38	38	42	45	51	58	64
36x10	CFM	670	835	1000	1170	1335	1505	1670	1835	2005	2170	2340	2670	3005	3340
Ak 1.67	Throw	14	18	21	25	28	32	35	39	42	46	49	56	63	70
30x12	CFM	670	840	1010	1175	1345	1510	1680	1850	2015	2185	2350	2690	3025	3360
Ak 1.68	Throw	14	16	21	25	28	32	35	39	42	46	49	56	63	70
36x12	CFM	810	1015	1220	1420	1625	1825	2030	2235	2435	2640	2840	3250	3655	4060
Ak 2.03	Throw	15	19	23	27	31	35	39	43	46	50	54	62	70	78

Terminal Velocity of 75 FPM



ALH/ALV, ALHM/ALVM, ALHOBD/ALVOBD, ALHV/ALVH, ALHVOBD/ALVHOBD
Supply Register and Grilles

Deflection G

Face Velocity		400	500	600	700	800	900	1000	1100	1200	1300	1400	1600	1800	2000
Pressure Loss		.010	.016	.022	.031	.040	.050	.062	.075	.090	.105	.122	.160	.202	.249
8x4	CFM	45	60	70	85	95	105	120	130	140	155	165	190	210	235
Ak .118	Throw	2.5	3.5	4	5	5.5	6	6.5	7.5	8	8.5	9.5	11	12	13
10x4	CFM	60	75	90	105	120	135	150	165	180	195	210	240	270	300
Ak .149	Throw	3	3.5	4.5	5	6	6.5	7.5	8	9	9.5	10	12	13	15
12x4	CFM	70	90	110	125	145	165	180	200	215	235	255	290	325	360
Ak .181	Throw	3	4	5	5.5	6.5	7.5	8	9	10	11	12	13	15	16
14x4	CFM	85	105	125	150	170	190	210	235	255	275	300	340	380	425
Ak.212	Throw	3.5	4.5	5	6.5	7	8	9	10	11	12	13	14	16	18
12x5	CFM	95	115	140	165	185	210	235	255	280	305	325	375	420	465
Ak .233	Throw	4	4.5	5.5	6.5	7.5	8.5	9.5	10	11	12	13	15	17	19
10x6	CFM	95	120	140	165	190	210	235	260	285	305	330	380	425	470
Ak .236	Throw	4	5	5.5	6.5	7.5	8.5	9.5	10	11	12	13	15	17	19
14x5	CFM	110	135	165	190	220	245	275	300	330	355	385	440	495	550
Ak .274	Throw	4	5	6	7	8	9	10	11	12	13	14	16	18	20
12x6	CFM	115	145	170	200	230	255	285	315	345	370	400	460	515	570
Ak .286	Throw	4	5	6	7	8.5	9	10	11	12	13	14	17	19	21
16x5	CFM	125	160	190	220	250	285	315	345	380	410	440	505	565	630
Ak .315	Throw	4.5	5.5	6.5	7.5	8.5	10	11	12	13	14	15	17	19	22
14x6	CFM	135	170	200	235	270	300	335	370	405	435	470	540	605	670
Ak .336	Throw	4.5	5.5	6.5	8	9	10	11	12	13	13	16	18	20	22
16x6	CFM	155	195	230	270	310	345	385	425	465	500	540	620	695	770
Ak .386	Throw	4.5	5.5	6.5	8	9	10	11	12	14	15	16	18	20	23
20x5	CFM	160	200	240	280	320	355	395	435	475	515	555	635	715	795
Ak .397	Throw	5	6	7.5	8.5	10	11	12	13	15	16	17	19	22	24
24x5	CFM	190	240	285	335	380	430	480	525	575	620	670	765	860	955
Ak .478	Throw	5.5	6.5	8	9.5	11	12	13	15	16	17	19	21	24	27
20x6	CFM	195	245	290	340	390	435	485	535	585	630	680	780	875	970
Ak .486	Throw	5.5	7	8	9.5	11	12	13	15	16	17	19	22	24	27
24x6	CFM	235	295	350	410	470	525	585	645	705	760	820	940	1055	1170
Ak .586	Throw	6	7.5	9	10	12	13	15	16	18	19	21	24	27	29
20x8	CFM	265	335	400	465	530	600	665	730	800	865	930	1065	1195	1330
Ak .665	Throw	6.5	8	9.5	11	13	14	16	17	19	21	22	25	28	32
30x6	CFM	295	370	440	515	590	660	735	810	885	955	1030	1180	1325	1470
Ak .736	Throw	6.5	8.5	10	12	13	15	17	18	20	21	23	27	30	33
24x8	CFM	320	400	480	560	640	720	800	880	960	1045	1125	1285	1445	1605
Ak .802	Throw	7	8.5	10	12	14	15	17	19	21	22	24	28	31	35
30x8	CFM	405	505	605	705	810	910	1010	1110	1210	1315	1415	1615	1820	2020
Ak 1.01	Throw	8	9.5	12	14	16	17	19	21	23	25	27	31	35	39
24x10	CFM	410	510	610	715	815	920	1020	1120	1225	1325	1430	1630	1835	2040
Ak 1.02	Throw	8	9.5	12	14	16	18	19	21	23	25	27	31	35	40
36x8	CFM	485	605	725	845	970	1090	1210	1330	1450	1575	1695	1935	2180	2420
Ak 1.21	Throw	8.5	11	13	15	17	19	21	23	25	28	30	34	38	42
24x12	CFM	490	615	740	860	985	1105	1230	1355	1475	1600	1720	1970	2215	2460
Ak 1.23	Throw	8.5	11	13	15	17	19	21	24	26	28	30	34	39	43
30x10	CFM	510	640	770	900	1025	1150	1280	1410	1535	1665	1790	2050	2305	2560
Ak 1.28	Throw	8.5	11	13	15	18	20	22	24	26	28	31	35	39	44
36x10	CFM	615	770	925	1080	1230	1385	1540	1695	1850	2000	2155	2465	2770	3080
Ak 1.54	Throw	9.5	12	14	17	19	22	24	26	29	31	34	38	43	48
30x12	CFM	620	775	930	1085	1240	1395	1550	1705	1860	2015	2170	2480	2790	3100
Ak 1.55	Throw	9.5	12	14	17	19	22	24	26	29	31	34	38	43	48
36x12	CFM	745	930	1115	1300	1490	1675	1860	2045	2230	2420	2605	2975	3350	3720
Ak 1.86	Throw	11	13	16	18	21	24	26	29	31	34	37	42	47	52

Terminal Velocity of 75 FPM

