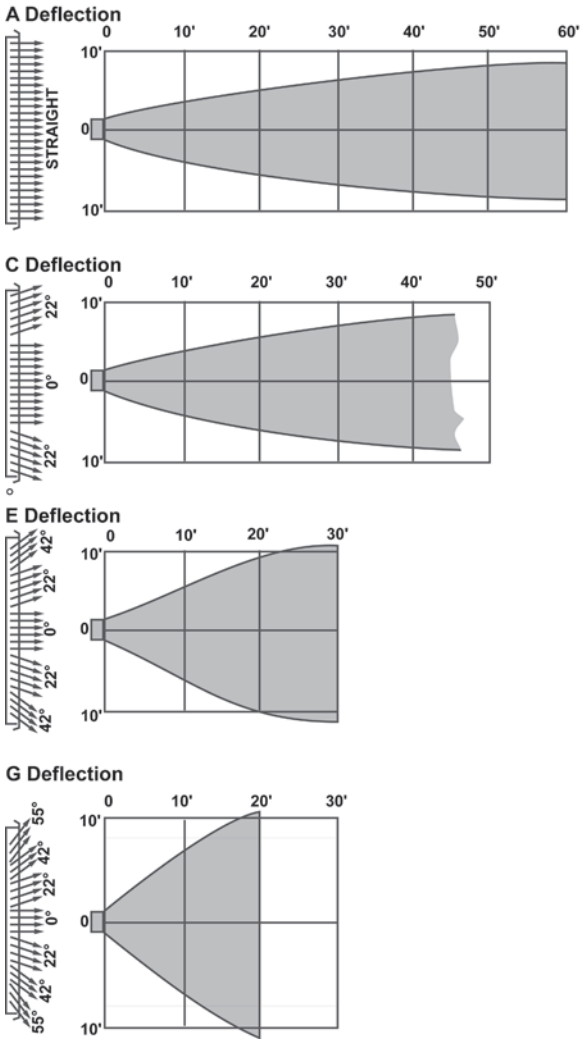
Recommended NC Criteria

	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

Recommended Noise Criteria and Face Velocity Ranges are on page 19.

90H / 90V / AL90H / AL90V Single-Deflection Supply

PERFORMANCE BASED ON NOMINAL SIZES SHOWN IN BOLD

							NC-20		NC-30		NC-40	
Nom. Duct Size (in.)	Nom. Duct Area (ft²)	Core Area (ft²)	Core Vel.	300	400	500	600	700	800	1000	1200	1400
			Vel. Press.	0.006	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122
			0°	0.016	0.029	0.046	0.066	0.090	0.117	0.183	0.263	0.358
			Total 22.5°	0.018	0.033	0.051	0.074	0.100	0.131	0.204	0.294	0.401
			Press. 45°	0.028	0.049	0.077	0.111	0.152	0.198	0.309	0.445	0.606
6x6	0.25	0.19	cfm	57	76	95	114	133	152	190	228	266
			NC	-	-	-	15	20	24	31	36	41
			0°	5-7-14	7-10-16	8-12-18	10-14-20	12-15-21	13-16-23	15-18-25	16-20-28	17-21-30
			Throw 22.5°	4-6-11	5-8-12	6-10-14	8-11-15	9-12-16	10-12-18	11-14-20	12-15-22	13-16-23
			(ft) 45°	2-3-6	3-4-7	4-6-8	4-6-9	5-7-10	6-7-10	7-8-11	7-9-12	8-10-13
8x6	0.33	0.26	cfm	78	104	130	156	182	208	260	312	364
			NC	-	-	11	17	21	25	32	38	42
			0°	5-9-16	8-12-19	10-15-21	12-16-23	14-18-25	15-19-27	17-21-30	19-23-32	20-25-35
			Throw 22.5°	4-7-13	6-9-15	8-11-16	9-13-18	11-14-19	12-15-21	13-16-23	15-18-25	16-19-27
			(ft) 45°	2-4-7	3-5-8	4-7-9	5-7-10	6-8-11	7-8-12	8-9-13	8-10-15	9-11-16
10x6	0.42	0.34	cfm	102	136	170	204	238	272	340	408	476
			NC	-	-	12	18	23	27	33	39	43
			0°	6-10-19	9-13-21	11-17-24	13-19-26	16-20-28	18-21-30	20-24-34	21-26-37	23-28-40
			Throw 22.5°	5-8-14	7-10-17	9-13-19	10-14-20	12-16-22	14-17-23	15-19-26	17-20-29	18-22-31
			(ft) 45°	3-4-8	4-6-10	5-7-11	6-8-12	7-9-13	8-10-14	9-11-15	10-12-17	10-13-18
8x8	0.44	0.37	cfm	111	148	185	222	259	296	370	444	518
			NC	-	-	13	18	23	27	34	39	44
			0°	6-10-19	9-14-22	12-17-25	14-19-27	16-21-30	18-22-32	20-25-35	22-27-39	24-30-42
			Throw 22.5°	5-8-15	7-11-17	9-13-19	11-15-21	13-16-23	14-17-25	16-19-27	17-21-30	19-23-32
			(ft) 45°	3-5-9	4-6-10	5-8-11	6-9-12	7-9-13	8-10-14	9-11-16	10-12-17	11-13-19
12x6	0.50	0.41	cfm	123	164	205	246	287	328	410	492	574
			NC	-	-	13	19	23	27	34	39	44
			0°	7-11-20	10-15-24	12-18-26	15-20-29	17-22-31	19-24-33	21-26-37	24-29-41	25-31-44
			Throw 22.5°	5-8-16	8-11-18	9-14-20	11-16-22	13-17-24	15-18-26	17-20-29	18-22-32	20-24-34
			(ft) 45°	3-5-9	4-7-11	5-8-12	7-9-13	8-10-14	9-11-15	10-12-17	11-13-18	11-14-20
14x6	0.58	0.48	cfm	144	192	240	288	336	384	480	576	672
			NC	-	-	14	19	24	28	35	40	45
			0°	7-12-22	11-16-25	13-20-28	16-22-31	18-24-34	21-25-36	23-28-40	25-31-44	28-34-48
			Throw 22.5°	6-9-17	8-12-20	10-15-22	12-17-24	14-18-26	16-20-28	18-22-31	20-24-34	21-26-37
			(ft) 45°	3-5-10	5-7-11	6-9-13	7-10-14	8-11-15	9-11-16	10-13-18	11-14-20	12-15-21
16x6 12x8	0.67	0.57	cfm	171	228	285	342	399	456	570	684	798
			NC	-	-	15	20	25	29	35	41	45
			0°	8-13-24	11-17-28	14-22-31	17-24-34	20-26-37	23-28-39	25-31-44	28-34-48	30-37-52
			Throw 22.5°	6-10-19	9-13-22	11-17-24	13-19-26	16-20-28	18-22-30	20-24-34	22-26-37	23-28-40
			(ft) 45°	4-6-11	5-8-12	6-10-14	8-11-15	9-12-17	10-12-18	11-14-20	12-15-22	13-17-23
10x10	0.69	0.59	cfm	177	236	295	354	413	472	590	708	826
			NC	-	-	15	20	25	29	35	41	46
			0°	8-13-24	12-18-28	15-22-32	18-24-35	20-26-37	23-28-40	26-32-45	28-35-49	31-37-53
			Throw 22.5°	6-10-19	9-14-22	11-17-24	14-19-27	16-20-29	18-22-31	20-24-35	22-27-38	24-29-41
			(ft) 45°	4-6-11	5-8-13	7-10-14	8-11-16	9-12-17	10-13-18	12-14-20	13-16-22	14-17-24
18x6	0.75	0.63	cfm	189	252	315	378	441	504	630	756	882
			NC	-	-	15	20	25	29	36	41	46
			0°	8-14-25	12-18-29	15-23-33	18-25-36	21-27-39	24-29-41	27-33-46	29-36-51	32-39-55
			Throw 22.5°	7-11-20	9-14-23	12-18-25	14-20-28	16-21-30	18-23-32	21-25-36	23-28-39	24-30-42
			(ft) 45°	4-6-11	5-8-13	7-10-15	8-11-16	9-12-17	11-13-19	12-15-21	13-16-23	14-17-25
20x6 12x10	0.83	0.72	cfm	216	288	360	432	504	576	720	864	1008
			NC	-	-	16	21	26	30	36	42	46
			0°	9-15-27	13-19-31	16-24-35	19-27-38	23-29-41	25-31-44	28-35-49	31-38-54	34-41-58
			Throw 22.5°	7-11-21	10-15-24	12-19-27	15-21-30	17-23-32	20-24-34	22-27-38	24-30-42	26-32-45
			(ft) 45°	4-7-12	6-9-14	7-11-16	9-12-17	10-13-19	11-14-20	13-16-22	14-17-24	15-19-26
22x6	0.92	0.77	cfm	231	308	385	462	539	616	770	924	1078
			NC	-	-	16	21	26	30	37	42	47
			0°	9-15-28	13-20-32	17-25-36	20-28-40	23-30-43	26-32-46	29-36-51	32-40-56	35-43-60
			Throw 22.5°	7-12-22	10-16-25	13-19-28	16-22-31	18-23-33	20-25-35	23-28-40	25-31-43	27-33-47
			(ft) 45°	4-7-13	6-9-15	8-11-16	9-13-18	11-14-19	12-15-21	13-16-23	15-18-25	16-19-27
24x6 18x8 12x12	1.00	0.88	cfm	264	352	440	528	616	704	880	1056	1232
			NC	-	-	16	22	26	30	37	43	47
			0°	10-16-30	14-21-34	18-27-39	21-30-42	25-32-46	28-34-49	31-39-55	34-42-60	37-46-65
			Throw 22.5°	8-12-23	11-17-27	14-21-30	17-23-33	19-25-35	22-27-38	24-30-42	27-33-46	29-35-50
			(ft) 45°	4-7-13	6-10-16	8-12-17	10-13-19	11-15-21	13-16-22	14-17-25	16-19-27	17-21-29
30x6 18x10	1.25	1.11	cfm	333	444	555	666	777	888	1110	1332	1554
			NC	-	11	17	23	27	31	38	44	48
			0°	11-18-34	16-24-39	20-30-43	24-34-47	28-36-51	32-39-55	35-43-61	39-47-67	42-51-72
			Throw 22.5°	9-14-26	12-19-30	16-23-34	19-26-37	22-28-40	25-30-42	27-34-47	30-37-52	32-40-56
			(ft) 45°	5-8-15	7-11-17	9-14-19	11-15-21	13-16-23	14-17-25	16-19-28	17-21-30	19-23-33

Performance notes appear at end of table

Recommended Noise Criteria and Face Velocity Ranges are on page 19.

90H / 90V / AL90H / AL90V Single-Deflection Supply

PERFORMANCE BASED ON NOMINAL SIZES SHOWN IN BOLD

							NC-20		NC-30		NC-40		NC-50
Nom. Duct Size (in.)	Nom. Duct Area (ft²)	Core Area (ft²)	Core Vel.	300	400	500	600	700	800	1000	1200	1400
			Vel. Press.	0.006	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122
			0°	0.016	0.029	0.046	0.066	0.090	0.117	0.183	0.263	0.358
			Total 22.5°	0.018	0.033	0.051	0.074	0.100	0.131	0.204	0.294	0.401
			Press. 45°	0.028	0.049	0.077	0.111	0.152	0.198	0.309	0.445	0.606
			cfm	366	488	610	732	854	976	1220	1464	1708
			NC	-	11	18	23	28	32	39	44	49
14x14	**1.36**	**1.22**	0°	12-19-35	17-25-41	21-31-45	25-35-50	29-38-54	33-41-57	37-45-64	41-50-70	44-54-76
			Throw 22.5°	9-15-27	13-20-31	16-24-35	20-27-39	23-29-42	26-31-45	29-35-50	31-39-55	34-42-59
			(ft) 45°	5-8-16	8-11-18	9-14-20	11-16-22	13-17-24	15-18-26	17-20-29	18-22-32	20-24-34
			cfm	405	540	675	810	945	1080	1350	1620	1890
36x6			NC	-	12	18	24	28	32	39	44	49
27x8	**1.50**	**1.35**	0°	12-20-37	18-26-43	22-33-48	26-37-52	31-40-57	35-43-60	39-48-68	43-52-74	46-57-80
18x12			Throw 22.5°	10-15-29	14-21-33	17-26-37	21-29-41	24-31-44	27-33-47	30-37-52	33-41-57	36-44-62
			(ft) 45°	6-9-17	8-12-19	10-15-21	12-17-24	14-18-25	16-19-27	18-21-30	19-24-33	21-25-36
			cfm	411	548	685	822	959	1096	1370	1644	1918
			NC	-	12	18	24	28	32	39	44	49
22x10	**1.53**	**1.37**	0°	12-20-37	18-27-43	22-33-48	27-37-53	31-40-57	35-43-61	39-48-68	43-53-75	46-57-81
			Throw 22.5°	10-16-29	14-21-33	17-26-37	21-29-41	24-31-44	27-33-47	30-37-53	33-41-58	36-44-62
			(ft) 45°	6-9-17	8-12-19	10-15-22	12-17-24	14-18-26	16-19-27	18-22-31	19-24-34	21-26-36
			cfm	447	596	745	894	1043	1192	1490	1788	2086
30x8			NC	-	12	19	24	29	33	39	45	49
24x10	**1.67**	**1.49**	0°	13-21-39	19-28-45	23-35-50	28-39-55	32-42-59	37-45-63	41-50-71	45-55-78	48-59-84
			Throw 22.5°	10-16-30	14-22-35	18-27-39	22-30-43	25-33-46	28-35-49	32-39-55	35-43-60	38-46-65
			(ft) 45°	6-9-17	8-13-20	10-16-23	13-17-25	15-19-27	16-20-29	18-23-32	20-25-35	22-27-38
			cfm	477	636	795	954	1113	1272	1590	1908	2226
42x6			NC	-	12	19	24	29	33	40	45	50
18x14	**1.75**	**1.59**	0°	13-22-40	19-29-46	24-36-52	29-40-57	34-43-61	38-46-66	42-52-73	46-57-80	50-61-87
			Throw 22.5°	10-17-31	15-22-36	19-28-40	22-31-44	26-34-48	29-36-51	33-40-57	36-44-62	39-48-67
			(ft) 45°	6-10-18	9-13-21	11-16-23	13-18-26	15-20-28	17-21-30	19-23-33	21-26-36	23-28-39
			cfm	486	648	810	972	1134	1296	1620	1944	2268
			NC	-	12	19	24	29	33	40	45	50
16x16	**1.78**	**1.62**	0°	14-22-41	19-29-47	24-36-52	29-41-57	34-44-62	38-47-66	43-52-74	47-57-81	51-62-88
			Throw 22.5°	11-17-31	15-22-36	19-28-41	22-31-44	26-34-48	30-36-51	33-41-57	36-44-63	39-48-68
			(ft) 45°	6-10-18	9-13-21	11-16-24	13-18-26	15-20-28	17-21-30	19-24-33	21-26-36	23-28-39
48x6			cfm	546	728	910	1092	1274	1456	1820	2184	2548
36x8			NC	-	13	19	25	30	34	40	46	50
24x12	**2.00**	**1.82**	0°	14-23-43	20-31-50	26-38-55	31-43-61	36-46-66	41-50-70	45-55-78	50-61-86	54-66-93
18x16			Throw 22.5°	11-18-33	16-24-38	20-30-43	24-33-47	28-36-51	31-38-54	35-43-61	38-47-67	42-51-72
			(ft) 45°	6-10-19	9-14-22	12-17-25	14-19-27	16-21-30	18-22-32	20-25-35	22-27-39	24-30-42
			cfm	621	828	1035	1242	1449	1656	2070	2484	2898
			NC	-	13	20	25	30	34	41	46	51
18x18	**2.25**	**2.07**	0°	15-25-46	22-33-53	27-41-59	33-46-65	38-49-70	43-53-75	48-59-84	53-65-92	57-70-99
			Throw 22.5°	12-19-36	17-25-41	21-32-46	25-36-50	30-38-54	33-41-58	37-46-65	41-50-71	44-54-77
			(ft) 45°	7-11-21	10-15-24	12-18-27	15-21-29	17-22-31	19-24-34	22-27-38	24-29-41	26-31-45
			cfm	642	856	1070	1284	1498	1712	2140	2568	2996
42x8			NC	-	13	20	26	30	34	41	46	51
24x14	**2.33**	**2.14**	0°	16-25-47	22-33-54	28-42-60	33-47-66	39-50-71	44-54-76	49-60-85	54-66-93	58-71-101
			Throw 22.5°	12-19-36	17-26-42	22-32-47	26-36-51	30-39-55	34-42-59	38-47-66	42-51-72	45-55-78
			(ft) 45°	7-11-21	10-15-24	13-19-27	15-21-30	18-23-32	20-24-34	22-27-38	24-30-42	26-32-45
			cfm	687	916	1145	1374	1603	1832	2290	2748	3206
36x10			NC	-	14	20	26	30	34	41	47	51
30x12	**2.50**	**2.29**	0°	16-26-48	23-34-56	29-43-62	34-48-68	40-52-74	45-56-79	51-62-88	56-68-96	60-74-104
			Throw 22.5°	12-20-37	18-27-43	22-33-48	27-37-53	31-40-57	35-43-61	39-48-68	43-53-75	47-57-81
			(ft) 45°	7-12-22	10-16-25	13-19-28	16-22-31	18-23-33	20-25-35	23-28-40	25-31-43	27-33-47
			cfm	738	984	1230	1476	1722	1968	2460	2952	3444
48x8			NC	-	14	21	26	31	35	41	47	51
24x16	**2.67**	**2.46**	0°	17-27-50	24-36-58	30-45-64	36-50-71	42-54-76	47-58-82	53-64-91	58-71-100	62-76-108
			Throw 22.5°	13-21-39	18-28-45	23-35-50	28-39-55	32-42-59	36-45-63	41-50-71	45-55-77	48-59-84
			(ft) 45°	8-12-22	11-16-26	13-20-29	16-22-32	19-24-34	21-26-37	24-29-41	26-32-45	28-34-49
			cfm	771	1028	1285	1542	1799	2056	2570	3084	3598
			NC	-	14	21	26	31	35	42	47	52
20x20	**2.78**	**2.57**	0°	17-27-51	24-37-59	30-46-66	37-51-72	43-55-78	48-59-83	54-66-93	59-72-102	64-78-110
			Throw 22.5°	13-21-40	19-28-46	24-35-51	28-40-56	33-43-60	37-46-65	42-51-72	46-56-79	49-60-85
			(ft) 45°	8-12-23	11-16-27	14-21-30	16-23-32	19-25-35	22-27-38	24-30-42	27-32-46	29-35-50
			cfm	825	1100	1375	1650	1925	2200	2750	3300	3850
36x12			NC	-	15	21	27	31	35	42	47	52
24x18	**3.00**	**2.75**	0°	18-28-53	25-38-61	31-47-68	38-53-75	44-57-81	50-61-86	56-68-96	61-75-106	66-81-114
			Throw 22.5°	14-22-41	20-29-47	24-37-53	29-41-58	34-44-63	39-47-67	43-53-75	47-58-82	51-63-88
			(ft) 45°	8-13-24	11-17-27	14-21-31	17-24-34	20-26-36	22-27-39	25-31-43	27-34-48	30-36-51

Performance notes appear at end of table

Recommended Noise Criteria and Face Velocity Ranges are on page 19.

90H / 90V / AL90H / AL90V Single-Deflection Supply

PERFORMANCE BASED ON NOMINAL SIZES SHOWN IN BOLD

				NC-20		NC-30		NC-40		NC-50		
Nom. Duct Size (in.)	Nom. Duct Area (ft²)	Core Area (ft²)	Core Vel.	300	400	500	600	700	800	1000	1200	1400
			Vel. Press.	0.006	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122
			0°	0.016	0.029	0.046	0.066	0.090	0.117	0.183	0.263	0.358
			Total 22.5°	0.018	0.033	0.051	0.074	0.100	0.131	0.204	0.294	0.401
			Press. 45°	0.028	0.049	0.077	0.111	0.152	0.198	0.309	0.445	0.606
48x10 30x16 **24x20**	**3.33**	**3.11**	cfm	933	1244	1555	1866	2177	2488	3110	3732	4354
			NC	-	15	22	27	32	36	42	48	52
			0°	19-30-56	27-40-65	33-50-72	40-56-79	47-61-86	53-65-92	59-72-103	65-79-112	70-86-121
			Throw 22.5°	15-23-44	21-31-50	26-39-56	31-44-62	36-47-66	41-50-71	46-56-79	50-62-87	54-66-94
			(ft) 45°	8-14-25	12-18-29	15-23-33	18-25-36	21-27-39	24-29-41	27-33-46	29-36-51	32-39-55
22x22	**3.36**	**3.14**	cfm	942	1256	1570	1884	2198	2512	3140	3768	4396
			NC	-	15	22	27	32	36	42	48	53
			0°	19-30-56	27-40-65	34-50-73	40-56-80	47-61-86	53-65-92	59-73-103	65-80-113	70-86-122
			Throw 22.5°	15-23-44	21-31-50	26-39-56	31-44-62	37-47-67	41-50-71	46-56-80	50-62-87	55-67-94
			(ft) 45°	8-14-25	12-18-29	15-23-33	18-25-36	21-27-39	24-29-41	27-33-46	29-36-51	32-39-55
42x12 36x14	**3.50**	**3.22**	cfm	966	1288	1610	1932	2254	2576	3220	3864	4508
			NC	-	15	22	27	32	36	43	48	53
			0°	19-31-57	27-41-66	34-51-74	41-57-81	48-62-87	54-66-93	60-74-104	66-81-114	71-87-123
			Throw 22.5°	15-24-44	21-32-51	26-40-57	32-44-63	37-48-68	42-51-72	47-57-81	51-63-89	55-68-96
			(ft) 45°	9-14-26	12-18-30	15-23-33	18-26-36	21-28-39	24-30-42	27-33-47	30-36-51	32-39-56
24x22	**3.67**	**3.43**	cfm	1029	1372	1715	2058	2401	2744	3430	4116	4802
			NC	-	15	22	28	32	36	43	48	53
			0°	20-32-59	28-42-68	35-53-76	42-59-83	49-64-90	56-68-96	62-76-108	68-83-118	74-90-127
			Throw 22.5°	15-25-46	22-33-53	27-41-59	33-46-65	38-49-70	43-53-75	48-59-83	53-65-91	57-70-99
			(ft) 45°	9-14-27	13-19-31	16-24-34	19-27-38	22-29-41	25-31-43	28-34-48	31-38-53	33-41-57
30x18	**3.75**	**3.5**	cfm	1050	1400	1750	2100	2450	2800	3500	4200	4900
			NC	-	16	22	28	32	36	43	48	53
			0°	20-32-60	28-43-69	36-53-77	43-60-84	50-64-91	56-69-97	63-77-109	69-84-119	74-91-129
			Throw 22.5°	15-25-46	22-33-53	28-41-60	33-46-65	39-50-71	44-53-75	49-60-84	53-65-92	58-71-100
			(ft) 45°	9-14-27	13-19-31	16-24-35	19-27-38	22-29-41	25-31-44	28-35-49	31-38-54	33-41-58
48x12 36x16 **24x24**	**4.00**	**3.75**	cfm	1125	1500	1875	2250	2625	3000	3750	4500	5250
			NC	-	16	22	28	33	37	43	49	53
			0°	21-33-62	29-44-71	37-55-80	44-62-87	51-67-94	58-71-101	65-80-113	71-87-123	77-94-133
			Throw 22.5°	16-26-48	23-34-55	29-43-62	34-48-68	40-52-73	45-55-78	50-62-87	55-68-96	60-73-103
			(ft) 45°	9-15-28	13-20-32	17-25-36	20-28-39	23-30-42	26-32-45	29-36-51	32-39-55	35-42-60
36x18	**4.50**	**4.22**	cfm	1266	1688	2110	2532	2954	3376	4220	5064	5908
			NC	-	16	23	28	33	37	44	49	54
			0°	22-35-65	31-47-76	39-59-84	47-65-93	55-71-100	62-76-107	69-84-119	76-93-131	82-100-141
			Throw 22.5°	17-27-51	24-36-59	30-45-65	36-51-72	42-55-77	48-59-83	53-65-93	59-72-101	63-77-110
			(ft) 45°	10-16-29	14-21-34	18-26-38	21-29-42	25-32-45	28-34-48	31-38-54	34-42-59	37-45-64
36x20 30x24	**5.00**	**4.71**	cfm	1413	1884	2355	2826	3297	3768	4710	5652	6594
			NC	-	17	23	29	33	37	44	50	54
			0°	23-37-69	33-49-80	41-62-89	49-69-98	58-75-106	65-80-113	73-89-126	80-98-138	86-106-149
			Throw 22.5°	18-29-54	26-38-62	32-48-69	38-54-76	45-58-82	50-62-87	56-69-98	62-76-107	67-82-116
			(ft) 45°	10-17-31	15-22-36	19-28-40	22-31-44	26-34-48	29-36-51	33-40-57	36-44-62	39-48-67
42x18	**5.25**	**4.94**	cfm	1482	1976	2470	2964	3458	3952	4940	5928	6916
			NC	-	17	24	29	34	38	44	50	54
			0°	24-38-71	34-51-82	42-63-91	51-71-100	59-76-108	67-82-116	75-91-129	82-100-142	88-108-153
			Throw 22.5°	18-29-55	26-39-63	33-49-71	39-55-78	46-59-84	52-63-90	58-71-100	63-78-110	68-84-118
			(ft) 45°	11-17-32	15-23-37	19-28-41	23-32-45	27-34-49	30-37-52	34-41-58	37-45-64	40-49-69
28x28	**5.44**	**5.16**	cfm	1548	2064	2580	3096	3612	4128	5160	6192	7224
			NC	-	17	24	29	34	38	45	50	55
			0°	24-39-72	35-52-84	43-65-93	52-72-102	60-78-110	68-84-118	76-93-132	84-102-145	90-110-156
			Throw 22.5°	19-30-56	27-40-65	33-50-72	40-56-79	47-61-86	53-65-92	59-72-102	65-79-112	70-86-121
			(ft) 45°	11-17-33	16-23-38	19-29-42	23-33-46	27-35-50	31-38-53	34-42-59	38-46-65	41-50-70
42x20 30x28	**5.83**	**5.51**	cfm	1653	2204	2755	3306	3857	4408	5510	6612	7714
			NC	-	17	24	30	34	38	45	50	55
			0°	25-40-75	36-54-86	45-67-96	54-75-106	62-81-114	70-86-122	79-96-136	86-106-149	93-114-161
			Throw 22.5°	19-31-58	28-41-67	35-52-75	41-58-82	48-63-88	55-67-95	61-75-106	67-82-116	72-88-125
			(ft) 45°	11-18-34	16-24-39	20-30-43	24-34-48	28-36-51	32-39-55	35-43-61	39-48-67	42-51-73
48x18 36x24	**6.00**	**5.66**	cfm	1698	2264	2830	3396	3962	4528	5660	6792	7924
			NC	-	18	24	30	34	38	45	50	55
			0°	25-41-76	36-54-87	45-68-98	54-76-107	63-82-116	71-87-124	80-98-138	87-107-152	94-116-164
			Throw 22.5°	20-32-59	28-42-68	35-53-76	42-59-83	49-63-90	55-68-96	62-76-107	68-83-117	73-90-127
			(ft) 45°	11-18-34	16-24-39	20-31-44	24-34-48	28-37-52	32-39-56	36-44-62	39-48-68	43-52-74
30x30	**6.25**	**5.94**	cfm	1782	2376	2970	3564	4158	4752	5940	7128	8316
			NC	-	18	24	30	34	38	45	51	55
			0°	26-42-78	37-56-90	46-69-100	56-78-110	65-84-119	73-90-127	82-100-142	90-110-155	97-119-168
			Throw 22.5°	20-32-60	29-43-69	36-54-78	43-60-85	50-65-92	57-69-98	63-78-110	69-85-120	75-92-130
			(ft) 45°	12-19-35	17-25-40	21-31-45	25-35-49	29-38-53	33-40-57	37-45-64	40-49-70	44-53-75

Performance notes appear at end of table

Recommended Noise Criteria and Face Velocity Ranges are on page 19.

90H / 90V / AL90H / AL90V Single-Deflection Supply

PERFORMANCE BASED ON NOMINAL SIZES SHOWN IN BOLD

Nom. Duct Size (in.)	Nom. Duct Area (ft²)	Core Area (ft²)			NC-20	NC-30			NC-40	NC-50		
			Core Vel.	300	400	500	600	700	800	1000	1200	1400
			Vel. Press.	0.006	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122
			0°	0.016	0.029	0.046	0.066	0.090	0.117	0.183	0.263	0.358
			Total 22.5°	0.018	0.033	0.051	0.074	0.100	0.131	0.204	0.294	0.401
			Press. 45°	0.028	0.049	0.077	0.111	0.152	0.198	0.309	0.445	0.606
42x24 36x28	**7.00**	**6.66**	cfm	1998	2664	3330	3996	4662	5328	6660	7992	9324
			NC	-	18	25	30	35	39	46	51	56
			0°	28-44-82	39-59-95	49-74-106	59-82-116	69-89-126	77-95-134	87-106-150	95-116-164	102-126-178
			Throw 22.5°	21-34-64	30-46-74	38-57-82	46-64-90	53-69-97	60-74-104	67-82-116	74-90-127	79-97-138
			(ft) 45°	12-20-37	18-26-43	22-33-48	26-37-52	31-40-56	35-43-60	39-48-68	43-52-74	46-56-80
46x22	**7.03**	**6.68**	cfm	2004	2672	3340	4008	4676	5344	6680	8016	9352
			NC	-	18	25	30	35	39	46	51	56
			0°	28-44-82	39-59-95	49-74-106	59-82-116	69-89-126	78-95-134	87-106-150	95-116-165	103-126-178
			Throw 22.5°	21-34-64	30-46-74	38-57-82	46-64-90	53-69-97	60-74-104	67-82-116	74-90-128	80-97-138
			(ft) 45°	12-20-37	18-27-43	22-33-48	27-37-52	31-40-57	35-43-60	39-48-68	43-52-74	46-57-80
32x32	**7.11**	**6.78**	cfm	2034	2712	3390	4068	4746	5424	6780	8136	9492
			NC	-	18	25	30	35	39	46	51	56
			0°	28-45-83	40-59-96	49-74-107	59-83-117	69-90-127	78-96-135	87-107-151	96-117-166	103-127-179
			Throw 22.5°	22-34-64	31-46-74	38-57-83	46-64-91	54-69-98	61-74-105	68-83-117	74-91-129	80-98-139
			(ft) 45°	12-20-37	18-27-43	22-33-48	27-37-53	31-40-57	35-43-61	39-48-68	43-53-75	47-57-81
36x30	**7.50**	**7.16**	cfm	2148	2864	3580	4296	5012	5728	7160	8592	10024
			NC	-	19	25	31	35	39	46	51	56
			0°	29-46-85	41-61-98	51-76-110	61-85-121	71-92-130	80-98-139	90-110-156	98-121-170	106-130-184
			Throw 22.5°	22-35-66	32-47-76	39-59-85	47-66-93	55-71-101	62-76-108	70-85-121	76-93-132	82-101-143
			(ft) 45°	13-21-38	18-27-44	23-34-50	27-38-54	32-41-59	36-44-63	40-50-70	44-54-77	48-59-83
48x24 36x32	**8.00**	**7.63**	cfm	2289	3052	3815	4578	5341	6104	7630	9156	10682
			NC	-	19	25	31	35	39	46	52	56
			0°	29-47-88	42-63-102	52-79-114	63-88-124	73-95-134	83-102-144	93-114-161	102-124-176	110-134-190
			Throw 22.5°	23-37-68	33-49-79	41-61-88	49-68-96	57-74-104	64-79-111	72-88-124	79-96-136	85-104-147
			(ft) 45°	13-21-40	19-28-46	24-35-51	28-40-56	33-43-60	37-46-65	42-51-72	46-56-79	49-60-86
34x34	**8.03**	**7.68**	cfm	2304	3072	3840	4608	5376	6144	7680	9216	10752
			NC	-	19	25	31	36	40	46	52	56
			0°	30-47-88	42-63-102	53-79-114	63-88-125	74-95-135	83-102-144	93-114-161	102-125-176	110-135-191
			Throw 22.5°	23-37-68	33-49-79	41-61-88	49-68-97	57-74-104	64-79-112	72-88-125	79-97-137	85-104-148
			(ft) 45°	13-21-40	19-28-46	24-36-51	28-40-56	33-43-61	37-46-65	42-51-73	46-56-79	50-61-86
36x34	**8.50**	**8.14**	cfm	2442	3256	4070	4884	5698	6512	8140	9768	11396
			NC	-	19	26	31	36	40	46	52	56
			0°	30-49-91	43-65-105	54-81-117	65-91-128	76-98-139	86-105-148	96-117-166	105-128-182	113-139-196
			Throw 22.5°	24-38-70	34-50-81	42-63-91	50-70-100	59-76-108	66-81-115	74-91-129	81-100-141	88-108-152
			(ft) 45°	14-22-41	20-29-47	24-37-53	29-41-58	34-44-62	39-47-67	43-53-75	47-58-82	51-62-88
42x30	**8.75**	**8.38**	cfm	2514	3352	4190	5028	5866	6704	8380	10056	11732
			NC	11	19	26	31	36	40	47	52	57
			0°	31-49-92	44-66-106	55-82-119	66-92-130	77-100-141	87-106-151	97-119-168	106-130-184	115-141-199
			Throw 22.5°	24-38-71	34-51-82	43-64-92	51-71-101	60-77-109	67-82-117	75-92-130	82-101-143	89-109-154
			(ft) 45°	14-22-41	20-30-48	25-37-54	30-41-59	35-45-63	39-48-68	44-54-76	48-59-83	52-63-90
36x36	**9.00**	**8.63**	cfm	2589	3452	4315	5178	6041	6904	8630	10356	12082
			NC	11	19	26	31	36	40	47	52	57
			0°	31-50-94	45-67-108	56-84-121	67-94-132	78-101-143	88-108-153	99-121-171	108-132-187	117-143-202
			Throw 22.5°	24-39-72	35-52-84	43-65-94	52-72-103	61-78-111	68-84-118	76-94-132	84-103-145	90-111-157
			(ft) 45°	14-23-42	20-30-49	25-38-54	30-42-60	35-45-64	40-49-69	44-54-77	49-60-84	53-64-91
42x34 **48x30**	**10.00**	**9.6**	cfm	2880	3840	4800	5760	6720	7680	9600	11520	13440
			NC	11	20	26	32	36	40	47	53	57
			0°	33-53-99	47-71-114	59-88-127	71-99-140	82-107-151	93-114-161	104-127-180	114-140-197	123-151-213
			Throw 22.5°	26-41-76	36-55-88	46-68-99	55-76-108	64-83-117	72-88-125	81-99-140	88-108-153	95-117-165
			(ft) 45°	15-24-44	21-32-51	26-40-57	32-44-63	37-48-68	42-51-73	47-57-81	51-63-89	55-68-96
38x38	**10.03**	**9.64**	cfm	2892	3856	4820	5784	6748	7712	9640	11568	13496
			NC	11	20	26	32	36	40	47	53	57
			0°	33-53-99	47-71-114	59-88-128	71-99-140	83-107-151	93-114-161	104-128-181	114-140-198	123-151-214
			Throw 22.5°	26-41-77	37-55-88	46-69-99	55-77-108	64-83-117	72-88-125	81-99-140	88-108-153	96-117-166
			(ft) 45°	15-24-44	21-32-51	27-40-57	32-44-63	37-48-68	42-51-73	47-57-81	51-63-89	55-68-96
42x36	**10.50**	**10.1**	cfm	3030	4040	5050	6060	7070	8080	10100	12120	14140
			NC	11	20	27	32	37	41	47	53	57
			0°	34-54-101	48-72-117	60-91-131	72-101-143	85-109-155	95-117-165	107-131-185	117-143-202	126-155-219
			Throw 22.5°	26-42-78	37-56-91	47-70-101	56-78-111	65-85-120	74-91-128	83-101-143	91-111-157	98-120-169
			(ft) 45°	15-24-46	22-33-53	27-41-59	33-46-64	38-49-70	43-53-74	48-59-83	53-64-91	57-70-98
46x34	**10.86**	**10.45**	cfm	3135	4180	5225	6270	7315	8360	10450	12540	14630
			NC	11	20	27	32	37	41	47	53	58
			0°	34-55-103	49-74-119	61-92-133	74-103-146	86-111-157	97-119-168	109-133-188	119-146-206	128-157-222
			Throw 22.5°	27-43-80	38-57-92	48-71-103	57-80-113	67-86-122	75-92-130	84-103-146	92-113-160	99-122-172
			(ft) 45°	16-25-46	22-33-53	28-41-60	33-46-66	39-50-71	44-53-76	49-60-85	53-66-93	58-71-100

Performance notes appear at end of table

Recommended Noise Criteria and Face Velocity Ranges are on page 19.

90H / 90V / AL90H / AL90V Single-Deflection Supply

PERFORMANCE BASED ON NOMINAL SIZES SHOWN IN BOLD

Nom. Duct Size (in.)	Nom. Duct Area (ft²)	Core Area (ft²)		NC-20		NC-30		NC-40		NC-50		
			Core Vel.	300	400	500	600	700	800	1000	1200	1400
			Vel. Press.	0.006	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122
			0°	0.016	0.029	0.046	0.066	0.090	0.117	0.183	0.263	0.358
			Total 22.5°	0.018	0.033	0.051	0.074	0.100	0.131	0.204	0.294	0.401
			Press. 45°	0.028	0.049	0.077	0.111	0.152	0.198	0.309	0.445	0.606
42x38	11.08	10.67	cfm	3201	4268	5335	6402	7469	8536	10670	12804	14938
			NC	12	20	27	32	37	41	48	53	58
			0°	35-56-104	50-74-120	62-93-134	74-104-147	87-112-159	98-120-170	110-134-190	120-147-208	130-159-225
			Throw 22.5°	27-43-81	38-58-93	48-72-104	58-81-114	67-87-123	76-93-132	85-104-147	93-114-161	101-123-174
			(ft) 45°	16-25-47	22-34-54	28-42-60	34-47-66	39-51-71	44-54-76	49-60-85	54-66-94	58-71-101
40x40	11.11	10.7	cfm	3210	4280	5350	6420	7490	8560	10700	12840	14980
			NC	12	20	27	32	37	41	48	53	58
			0°	35-56-104	50-75-120	62-93-134	75-104-147	87-113-159	98-120-170	110-134-190	120-147-208	130-159-225
			Throw 22.5°	27-43-81	39-58-93	48-72-104	58-81-114	67-87-123	76-93-132	85-104-147	93-114-161	101-123-174
			(ft) 45°	16-25-47	22-34-54	28-42-61	34-47-66	39-51-72	44-54-77	49-61-86	54-66-94	58-72-101
48x36	12.00	11.57	cfm	3471	4628	5785	6942	8099	9256	11570	13884	16198
			NC	12	21	27	33	37	41	48	53	58
			0°	36-58-108	52-78-125	65-97-140	78-108-153	90-117-165	102-125-177	114-140-198	125-153-217	135-165-234
			Throw 22.5°	28-45-84	40-60-97	50-75-108	60-84-119	70-91-128	79-97-137	88-108-153	97-119-168	105-128-181
			(ft) 45°	16-26-49	23-35-56	29-44-63	35-49-69	41-53-74	46-56-80	51-63-89	56-69-97	61-74-105
42x42	12.25	11.82	cfm	3546	4728	5910	7092	8274	9456	11820	14184	16548
			NC	12	21	27	33	37	41	48	53	58
			0°	37-59-109	52-78-126	65-98-141	78-109-155	91-118-167	103-126-179	115-141-200	126-155-219	137-167-236
			Throw 22.5°	28-46-85	40-61-98	51-76-110	61-85-120	71-92-130	80-98-139	89-110-155	98-120-170	106-130-183
			(ft) 45°	16-26-49	24-35-57	29-44-64	35-49-70	41-53-75	46-57-80	52-64-90	57-70-99	61-75-106
44x44	13.44	12.99	cfm	3897	5196	6495	7794	9093	10392	12990	15588	18186
			NC	12	21	28	33	38	42	48	54	58
			0°	38-62-115	55-82-133	68-103-148	82-115-162	96-124-175	108-133-187	121-148-210	133-162-230	143-175-248
			Throw 22.5°	30-48-89	42-64-103	53-80-115	64-89-126	74-96-136	84-103-145	94-115-162	103-126-178	111-136-192
			(ft) 45°	17-28-52	25-37-60	31-46-67	37-52-73	43-56-79	49-60-84	54-67-94	60-73-103	64-79-112
48x42	14.00	13.54	cfm	4062	5416	6770	8124	9478	10832	13540	16248	18956
			NC	13	21	28	33	38	42	49	54	59
			0°	39-63-117	56-84-135	70-105-151	84-117-166	98-127-179	110-135-191	124-151-214	135-166-234	146-179-253
			Throw 22.5°	30-49-91	43-65-105	54-81-117	65-91-128	76-98-139	86-105-148	96-117-166	105-128-182	113-139-196
			(ft) 45°	18-28-53	25-38-61	31-47-68	38-53-75	44-57-81	50-61-86	56-68-96	61-75-105	66-81-114
46x46	14.69	14.22	cfm	4266	5688	7110	8532	9954	11376	14220	17064	19908
			NC	13	21	28	33	38	42	49	54	59
			0°	40-64-120	57-86-139	72-107-155	86-120-170	100-130-183	113-139-196	127-155-219	139-170-240	150-183-259
			Throw 22.5°	31-50-93	44-67-107	56-83-120	67-93-132	78-101-142	88-107-152	98-120-170	107-132-186	116-142-201
			(ft) 45°	18-29-54	26-39-62	32-48-70	39-54-76	45-58-83	51-62-88	57-70-99	62-76-108	67-83-117
48x46	15.33	14.85	cfm	4455	5940	7425	8910	10395	11880	14850	17820	20790
			NC	13	22	28	34	38	42	49	54	59
			0°	41-66-123	59-88-142	73-110-158	88-123-174	102-133-187	116-142-200	129-158-224	142-174-245	153-187-265
			Throw 22.5°	32-51-95	45-68-110	57-85-123	68-95-134	79-103-145	90-110-155	100-123-174	110-134-190	119-145-205
			(ft) 45°	18-30-55	26-40-64	33-49-71	40-55-78	46-60-84	52-64-90	58-71-101	64-78-110	69-84-119
48x48	16.00	15.50	cfm	4650	6200	7750	9300	10850	12400	15500	18600	21700
			NC	13	22	28	34	38	42	49	55	59
			0°	42-67-125	60-90-145	75-112-162	90-125-177	105-135-192	118-145-205	132-162-229	145-177-251	156-192-271
			Throw 22.5°	33-52-97	46-70-112	58-87-125	70-97-137	81-105-148	92-112-159	102-125-177	112-137-194	121-148-210
			(ft) 45°	19-30-56	27-40-65	34-50-73	40-56-80	47-61-86	53-65-92	59-73-103	65-80-113	70-86-122

- 0°, 22.5° & 45° represent blade deflection angles
- Performance data is based on duct sizes in bold, the performance varies slightly for duct sizes not shown in bold
- See the section, Engineering Guidelines, for drop information when selecting larger supply grilles for cooling purposes
- See the "Performance Notes" portion in this section for notes and correction factors
- See the section, Engineering Guidelines, for catalog throw information
- Each NC value represents the noise criteria curve that will not be exceeded by the sound pressure in any of the octave bands, 2 through 7, with a room absorption of 10 dB, re 10^{-12} watts

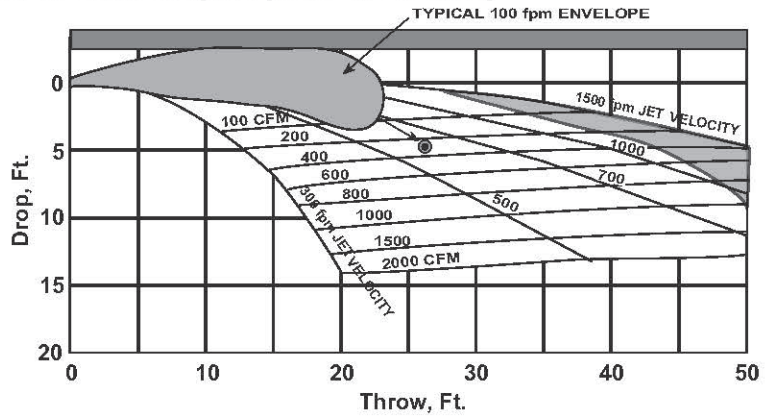
Recommended Noise Criteria and Face Velocity Ranges are on page 19.

90H / 90V / AL90H / AL90V Single-Deflection Supply

PERFORMANCE NOTES

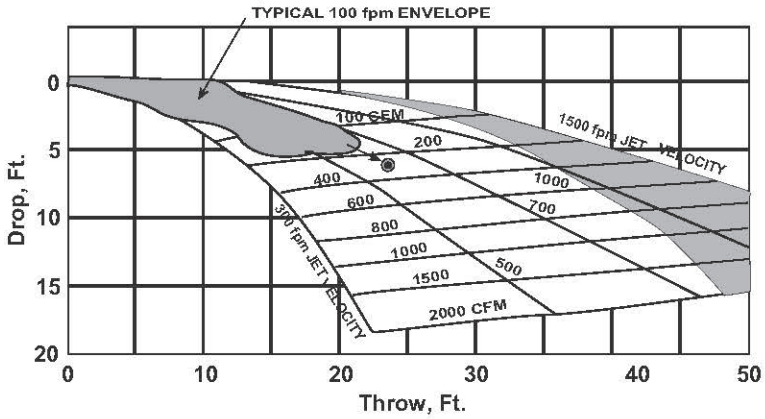
- Performance data includes damper
- Data obtained from tests conducted in accordance with ANSI/ASHRAE Standard 70-2006
- All pressures are in inches of water
- Core velocities are in feet per minute
- Throw values given are for isothermal terminal velocities of 150, 100 and 50 fpm
- Each NC value represents the noise criterion curve that will not be exceeded by the sound pressure in any of the octave bands, 2 through 7. Each NC value is based on a room absorption of 10 dB, re 10^{-12} watts. Each NC value is further based on grille operating at a 0° deflection. Settings of 22½° or 45°, increase the stated sound levels by 1 or 7 NC, respectively.
- Bold dividing lines on H12-H16 denote ranges of NC values
- The stated deflection settings refer to the horizontal setting of the blade's deflection angle. For a 20° upward deflection, use the throw rating for the 0° setting and the total pressure for the 22½° horizontal setting.
- Dash (—) in space indicates NC value less than 10
- For additional information concerning drop and throw, see the Engineering Guidelines section of this catalog

Drop Versus Throw Showing Ceiling Effect - 20°F ΔT Cooling



(Side view of air jet leaving wall mounted grille)

Drop Versus Throw without Ceiling Effect



(Side view of air jet leaving wall mounted grille)

VARIABLE AIR VOLUME APPLICATIONS

All supply grilles can be applied to variable air volume systems with excellent results. For detailed selection methods, consult your Titus representative or the Engineering Guidelines section of this catalog.

Correction Factors for Supply Grilles

Damper	A_k / A_c	Throw	Total Pressure	NC
With	0.77	1.00	1.00	0
Without	0.82	0.98	0.88	-2

Note: Throw and total pressure corrections are multipliers. The NC correction is an addition. A_k is the flow factor. A_c is the core area from the main table.

Recommended Noise Criteria and Face Velocity Ranges are on page 19.

90H / 90V / AL90H / AL90V Single-Deflection Supply

HORIZONTAL DEFLECTION (SPREAD)

SUPPLY GRILLES

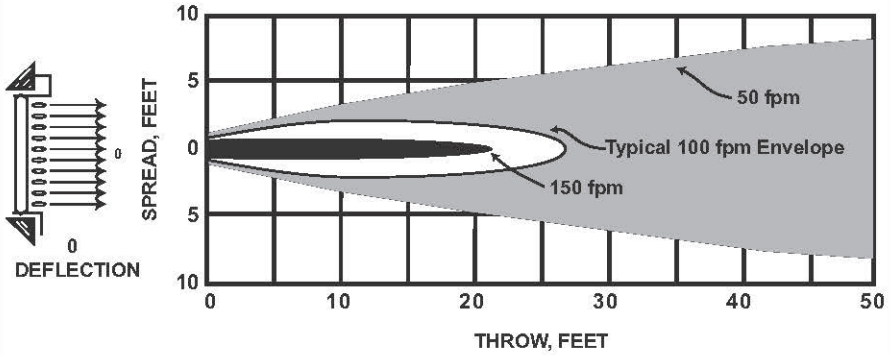
The figures depicting deflection, throw and drop are based on actual tests conducted by Titus. They show the relationship of spread to throw for a typical high side-wall supply outlet selection.

Notice the outer shaded area represents the 50 fpm isovel, the white area, the 100 fpm isovel, and the inner area, the 150 fpm isovel.

The spread angle also affects the airstream drop amount. Always consider for any given temperature, volume and core velocity; the wider spread results in a smaller drop. See section, Engineering Guidelines, for more drop, throw and spread relationship information.

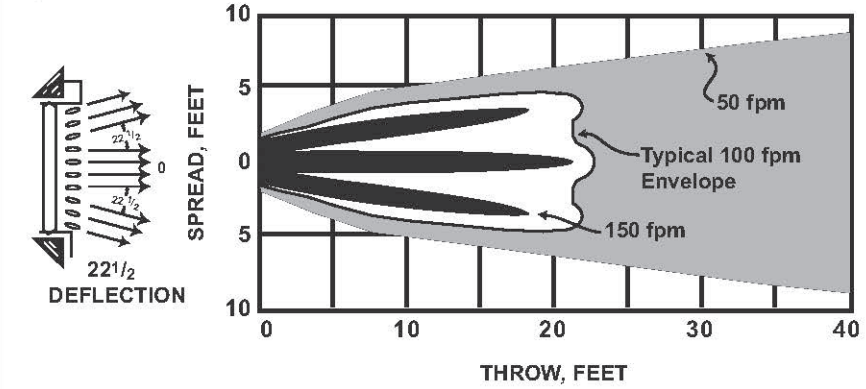
Grilles can be selected with a single set of blades for adjusting either horizontal or vertical deflection, or with two sets of blades for adjusting both horizontal and vertical deflections.

0° Horizontal Deflection



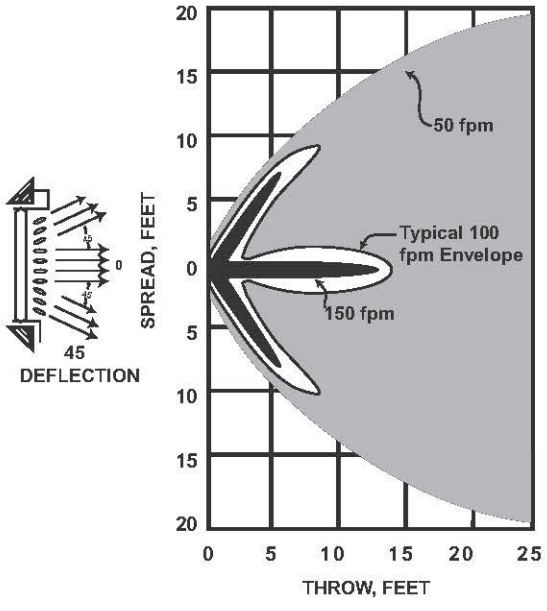
Spread versus throw at 0° horizontal deflection angle (Plan view of air jet leaving wall mounted grille).

22½° Horizontal Deflection



Spread versus throw at 22½° horizontal deflection angle (Plan view of air jet leaving wall mounted grille).

45° Horizontal Deflection



Spread versus throw at 45° horizontal deflection angle (Plan view of air jet leaving wall mounted grille).

Recommended Noise Criteria and Face Velocity Ranges are on page 19.