



# ENGINEERING DATA

## M-FR

Neck Velocity		300		400		500		600		700		800		900	
Total Pressure (PT)		0.042		0.075		0.117		0.168		0.229		0.299		0.379	
6x6	Total CFM	75		100		125		150		175		200		225	
	NC	5		13		19		23		27		31		34	
	Side	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1SQ	CFM/Side	75	0	100	0	125	0	150	0	175	0	200	0	225	0
	Throw (ft)	7-9-13		9-11-16		10-12-18		11-13-19		12-15-21		13-16-22		13-17-24	
2SQ	CFM/Side	38	38	50	50	63	63	75	75	88	88	100	100	113	113
	Throw (ft)	3-5-10	3-5-10	5-7-12	5-7-12	6-9-13	6-9-13	7-10-14	7-10-14	8-11-15	8-11-15	9-12-17	9-12-17	10-12-18	10-12-18
2CS	CFM/Side	38	38	50	50	63	63	75	75	88	88	100	100	113	113
	Throw (ft)	3-5-10	3-5-10	5-7-12	5-7-12	6-9-13	6-9-13	7-10-14	7-10-14	8-11-15	8-11-15	9-12-17	9-12-17	10-12-18	10-12-18
3SQ	CFM/Side	19	28	25	38	31	47	38	56	44	66	50	75	56	84
	Throw (ft)	3-4-8	3-5-9	4-6-9	4-7-10	5-7-10	6-8-11	6-8-11	7-9-13	7-8-12	8-9-14	7-9-13	8-10-15	8-9-13	9-11-16
4SQ	CFM/Side	19	19	25	25	31	31	38	38	44	44	50	50	56	56
	Throw (ft)	3-4-8	3-4-8	4-6-9	4-6-9	5-7-10	5-7-10	6-8-11	6-8-11	7-8-12	7-8-12	7-9-13	7-9-13	8-9-13	8-9-13

  

Neck Velocity		300		400		500		600		700		800		900	
Total Pressure (PT)		0.042		0.075		0.117		0.168		0.229		0.299		0.379	
9x9	Total CFM	169		225		281		338		394		450		506	
	NC	8		15		21		23		30		34		37	
	Side	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1SQ	CFM/Side	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	Throw (ft)	169	0	225	0	281	0	338	0	394	0	450	0	506	0
2SQ	CFM/Side	84	84	113	113	141	141	169	169	197	197	225	225	253	253
	Throw (ft)	11-14-20	11-14-20	13-17-24	13-17-24	15-19-27	15-19-27	17-20-29	17-20-29	18-22-31	18-22-31	19-24-34	19-24-34	20-25-36	20-25-36
2CS	CFM/Side	84	84	113	113	141	141	169	169	197	197	225	225	253	253
	Throw (ft)	5-8-15	5-8-15	7-11-18	7-11-18	9-14-20	9-14-20	11-15-22	11-15-22	13-16-23	13-16-23	14-18-25	14-18-25	15-19-27	15-19-27
3SQ	CFM/Side	42	63	56	84	70	105	84	127	98	148	113	169	127	190
	Throw (ft)	4-7-12	5-8-13	6-9-13	7-11-18	9-14-20	9-14-20	11-15-22	11-15-22	13-16-23	13-16-23	14-18-25	14-18-25	15-19-27	15-19-27
4SQ	CFM/Side	42	42	56	56	70	70	84	84	98	98	113	113	127	127
	Throw (ft)	4-7-12	5-8-13	6-9-13	7-11-16	5-11-15	9-12-17	9-12-17	11-13-19	11-13-20	12-14-21	11-13-19	13-16-22	14-14-20	13-16-24

  

Neck Velocity		300		400		500		600		700		800		900	
Total Pressure (PT)		0.042		0.075		0.117		0.168		0.229		0.299		0.379	
12x12	Total CFM	300		400		500		600		700		800		900	
	NC	10		17		23		28		32		35		38	
	Side	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1SQ	CFM/Side	300	0	400	0	500	0	600	0	700	0	800	0	900	0
	Throw (ft)	15-19-27	15-19-27	18-22-32	18-22-32	20-25-36	20-25-36	22-27-39	22-27-39	24-30-42	24-30-42	26-32-45	26-32-45	27-34-48	27-34-48
2SQ	CFM/Side	150	150	200	200	250	250	300	300	350	350	400	400	450	450
	Throw (ft)	7-11-20	7-11-20	10-15-24	10-15-24	12-19-27	12-19-27	15-20-29	15-20-29	17-22-31	17-22-31	19-24-34	19-24-34	20-25-36	20-25-36
2CS	CFM/Side	150	150	200	200	250	250	300	300	350	350	400	400	450	450
	Throw (ft)	7-11-20	7-11-20	10-15-24	10-15-24	12-19-27	12-19-27	15-20-29	15-20-29	17-22-31	17-22-31	19-24-34	19-24-34	20-25-36	20-25-36
3SQ	CFM/Side	75	113	100	100	125	188	150	225	3175	263	200	300	225	338
	Throw (ft)	6-9-16	7-11-18	8-13-18	8-13-18	11-14-20	12-16-21	13-16-22	14-18-26	14-17-24	16-19-28	15-18-26	17-21-30	16-19-27	18-22-32
4SQ	CFM/Side	75	75	100	100	125	125	150	150	175	175	200	200	225	225
	Throw (ft)	6-9-16	6-9-16	8-13-18	8-13-18	11-14-20	11-14-20	13-16-22	13-16-22	14-17-24	14-17-24	15-18-26	15-18-26	16-19-27	16-19-27

**Notes:**

1. Tests conducted in accordance with ANSI/ASHRAE 70-1991 at isothermal conditions.
2. Units: Neck Velocity = fpm; Total Pressure (P) = in. wc;
3. NC is based upon 10dB room absorption (Re: 10<sup>-12</sup> watts) evaluated at 125 through 4000 Hz octave bands.
4. Neck velocity: Airflow rate (CFM) divided by neck area (sq. ft.) equals the neck velocity.
5. Throw: Throw values shown are measured in feet and based on isothermal air. Throw values for terminal velocities of 150, 100 and 50 fpm.
6. Throw values shown are for diffuser mounted flush to the ceiling. If diffuser is mounted on exposed duct work, the throw will be reduced by 25%.



# ENGINEERING DATA

## M-FR

Neck Velocity		300		400		500		600		700		800		900	
Total Pressure (PT)		0.042		0.075		0.117		0.168		0.229		0.299		0.379	
15x15	Total CFM	469		625		781		938		1094		1250		1406	
	NC	11		19		25		29		33		37		40	
	Side	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1SQ	CFM/Side	469	0	625	0	781	0	938	0	1094	0	1250	0	1406	0
	Throw (ft)	19-24-34		23-28-40		26-31-45		28-34-49		30-37-53		34-40-57		34-42-60	
2SQ	CFM/Side	234	234	313	313	391	391	469	469	547	547	625	325	703	703
	Throw (ft)	9-14-26	9-14-26	12-19-30	12-19-30	15-23-33	15-23-33	19-26-36	19-26-36	22-28-39	22-28-39	24-30-42	23-40-42	26-32-45	26-32-45
2CS	CFM/Side	234	234	313	313	391	391	469	469	547	547	625	625	703	703
	Throw (ft)	9-14-26	9-14-26	12-19-30	12-19-30	15-23-33	15-23-33	19-26-36	19-26-36	22-28-39	22-28-39	24-30-42	24-30-42	26-32-45	26-32-45
3SQ	CFM/Side	117	176	156	234	195	293	234	352	273	410	313	496	352	527
	Throw (ft)	8-12-20	9-13-23	11-16-23	12-18-26	13-18-25	15-21-29	16-20-28	18-23-32	17-21-30	20-24-35	18-23-32	21-26-37	20-24-34	23-28-40
4SQ	CFM/Side	117	117	156	156	195	195	234	234	273	273	313	313	352	352
	Throw (ft)	8-12-20	8-12-20	11-16-23	11-16-23	13-18-25	13-18-25	16-20-28	16-20-28	17-21-30	17-21-30	18-23-32	18-23-32	20-24-34	20-24-34
Neck Velocity		300		400		500		600		700		800		900	
Total Pressure (PT)		0.042		0.075		0.117		0.168		0.229		0.299		0.379	
18x18	Total CFM	675		900		1125		1350		1575		1800		2025	
	NC	12		20		26		31		35		38		41	
	Side	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1SQ	CFM/Side	675	0	900	0	1125	0	1350	0	1575	0	1800	0	2025	0
	Throw (ft)	22-29-41		27-34-48		31-38-54		34-41-59		36-45-63		39-48-68		41-51-72	
2SQ	CFM/Side	338	338	450	450	563	563	675	675	788	788	900	900	1013	1013
	Throw (ft)	11-17-31	11-17-31	15-22-36	15-22-36	19-28-40	19-28-40	22-31-44	22-31-44	26-33-47	26-33-47	29-36-51	29-36-51	31-38-54	31-38-54
2CS	CFM/Side	338	338	450	450	563	563	675	675	788	788	900	900	1013	1013
	Throw (ft)	11-17-31	11-17-31	15-22-36	15-22-36	19-28-40	19-28-40	22-31-44	22-31-44	26-33-47	26-33-47	29-36-51	26-36-51	31-38-54	31-38-54
3SQ	CFM/Side	169	253	225	338	281	422	338	506	394	591	450	675	506	759
	Throw (ft)	9-14-24	11-16-27	13-19-27	14-22-32	16-22-31	18-25-35	19-24-34	22-27-39	21-26-36	24-29-42	22-27-39	26-32-45	24-29-41	27-33-48
4SQ	CFM/Side	169	169	225	225	281	281	338	338	394	394	450	450	506	506
	Throw (ft)	9-14-24	9-14-24	13-19-27	13-19-27	16-22-31	16-22-31	19-24-34	19-24-34	21-26-36	21-26-36	22-27-39	22-27-39	24-29-41	24-29-41
Neck Velocity		300		400		500		600		700		800		900	
Total Pressure (PT)		0.042		0.075		0.117		0.168		0.229		0.299		0.379	
21x21	Total CFM	919		1225		1531		1838		2144		2450		2756	
	NC	13		21		27		32		36		39		42	
	Side	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1SQ	CFM/Side	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	Throw (ft)	919	0	1225	0	1531	0	1838	0	2144	0	2450	0	2756	0
2SQ	CFM/Side	26-34-48		32-39-56		36-44-63		39-48-69		43-52-74		46-56-79		48-59-84	
	Throw (ft)	459	459	613	613	766	766	919	919	1072	1072	1225	1225	1378	1378
2CS	CFM/Side	13-19-36	13-19-36	17-26-42	17-26-42	22-33-47	22-33-47	26-36-51	26-36-51	31-39-55	31-39-55	34-42-59	34-42-59	36-44-63	36-44-63
	Throw (ft)	459	459	613	613	766	766	919	919	1072	1072	1225	1225	1378	1378
3SQ	CFM/Side	13-19-36	13-19-36	17-26-42	14-26-42	22-33-47	22-33-47	26-36-51	26-36-51	31-39-55	31-39-55	34-42-59	34-42-59	36-44-63	36-44-63
	Throw (ft)	230	345	306	459	383	574	459	689	536	804	613	919	689	1034
4SQ	CFM/Side	11-17-28	12-19-32	15-22-32	17-25-37	19-25-36	21-29-41	22-28-39	25-32-45	24-30-42	28-34-49	26-32-45	30-37-52	28-34-48	32-39-56
	Throw (ft)	230	230	306	306	383	383	459	459	536	536	613	613	689	689

### Notes:

1. Tests conducted in accordance with ANSI/ASHRAE 70-1991.
2. Units: Neck Velocity = fpm; Total Pressure = inches w.c.; nominal neck sizes in inches.
3. NC values based on a room absorption of 10dB, re 10<sup>-12</sup> watts, with one diffuser operating.
4. Neck Area: The cross-sectional area (square feet) of the duct at the point where the diffuser is attached. All dimensions are nominal.
5. Neck Velocity: Airflow rate (CFM) divided by neck area (sq. ft.) equals the neck velocity.
6. Throw: throw values shown are measured in feet and based on isothermal air.
7. Throw values are given for terminal velocities of 150, 100 and 50 fpm. Throw values are for diffuser mounted flush to the ceiling.



# ENGINEERING DATA

## MA-FR: Adjustable

### MA-FR Performance Notes

Vertical adjustments are most effective with the sizes listed in the table below using the deflection pattern 4SQ (4-way square).

Apply the throw factor to the 50 fpm terminal velocity throw only.  
For MA-FR series diffusers (adjustable pattern controllers) apply the corrections from the table below to the M-FR data for square neck, 4-way core styles, as follows:

NC: Take listed value and add to correction  
(Listed value) + (correction)

TP: Take listed value and multiply by correction  
(Listed value) x (correction)

Throw: Take listed value and multiply by correction  
(Listed value) x (correction)

### Corrections for MA-FR Series (adjustable pattern controllers)

Square Neck Size	NC (add)		Total Pressure (multiply)		Cooling 20 °F	Vertical Throw (multiply)		
	H	V	H	V		Heating ΔT		
					0 °F	20 °F	40 °F	
6x6	3	7	1.3	1.6	1.3	1.1	0.8	0.6
9x9	3	7	1.5	2.3	1.5	1.2	0.9	0.6
12x12	3	7	1.5	2.3	1.6	1.3	1.0	0.6
15x15	3	7	1.5	2.3	1.7	1.3	1.0	0.6
18x18	3	7	1.5	2.3	1.7	1.3	0.9	0.6