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## SECTION 27 VENTILATION INFO

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## VENTILATION FORMULAS

Average ceiling height= (Sidwall height x Peak height) / 2

Cross Sectional Area= Average height x width

Volume= CSA x length

Single air exchange rate (in seconds)= (volume/cfm) x 60

Velocity in FPM= CFM (fan capacity)/CSA

Required CFM= Velocity x CSA

Required CSA in square feet (inlet)= CFM/desired velocity

Note: This calculation must be modified for smaller inlets such as vent doors to account for the compression of air (vena contracta effect) as it passes through the door.

Typically a factor of 1.6 is applied.

Vent doors: CSA = (CFM/desired velocity x 1.6)

Vent doors: # of doors = (required CSA from above) / (vent door opening <"x w"> / 144)

Heat Transfer through a wall or other surface= (Surface area/R value) x temp. difference

Note: Temp. difference will be the difference between outside and inside a building.

Temperature rise= BTU (including heat transfer, bird heat and all other sources)/Total CFM

Electricity cost (for fans) = ((CFM x Hours used)/(CFM/watt x 1000)) x cost per KW hour



## WORKSHEET

CFM=CSA x Target Velocity  
 CSA=Avg. Ceiling Height x Building Width

### CSA - CROSS SECTIONAL AREA

Sidewall Height \_\_\_\_\_ + Peak Height \_\_\_\_\_  
 = \_\_\_\_\_ divided by 2 = \_\_\_\_\_ Average Ceiling Height  
 x Building Width \_\_\_\_\_ = CSA \_\_\_\_\_

### CFM - TOTAL FAN POWER REQUIRED

CFM = CSA x Target Velocity  
 CSA \_\_\_\_\_ x Target Velocity \_\_\_\_\_  
 = Total CFM \_\_\_\_\_

### NUMBER OF FANS REQUIRED

Total CFM \_\_\_\_\_ ÷ CFM/fan \_\_\_\_\_  
 = # of fans \_\_\_\_\_ Rounded up = \_\_\_\_\_  
 x CFM/Fan \_\_\_\_\_ = Actual CFM \_\_\_\_\_

CFM Total fan power required. **Make sure to use the correct static pressure rating when choosing fan specifications.**

CSA **Cross Sectional Area** of the building.  
 multiplied by the distance from the floor to the bottom of the baffle. Sidewall height is

### TUNNEL INLET SIZING

Total CFM \_\_\_\_\_ ÷ Target Velocity \_\_\_\_\_  
 = Square Feet of Inlet \_\_\_\_\_ ÷ Inlet Height \_\_\_\_\_  
 = Linear Linear ft. of inlet \_\_\_\_\_ ÷ 2 = Inlet per side \_\_\_\_\_

Target Velocity:     • Use 350-375fpm for 6" pad inlet



## MINIMUM CFM REQUIREMENTS FOR VELOCITY TARGETS

**NOTE**

*Fan performance ratings must reflect actual conditions.  
 Minimum of .10 ratings should be used in typical broiler house.*

BUILDING WIDTH (FT)	AVERAGE CEILING 7 FT.			AVERAGE CEILING 8 FT.			AVERAGE CEILING 9 FT.		
	TARGET VELOCITY			TARGET VELOCITY			TARGET VELOCITY		
	400	500	600	400	500	600	400	500	600
30	84000	105000	126000	96000	120000	144000	108000	135000	162000
31	86800	108500	130200	99200	124000	148800	111600	139500	167400
32	89600	112000	134400	102400	128000	153600	115200	144000	172800
33	92400	115500	138600	105600	132000	158400	118800	148500	178200
34	95200	119000	142800	108800	136000	163200	122400	153000	183600
35	98000	122500	147000	112000	140000	168000	126000	157500	189000
36	100800	126000	151200	115200	144000	172800	129600	162000	194400
37	103600	129500	155400	118400	148000	177600	133200	166500	199800
38	106400	133000	159600	121600	152000	182400	136800	171000	205200
39	109200	136500	163800	124800	156000	187200	140400	175500	210600
40	112000	140000	168000	128000	160000	192000	144000	180000	216000
41	114800	143500	172200	131200	164000	196800	147600	184500	221400
42	117600	147000	176400	134400	168000	201600	151200	189000	226800
43	120400	150500	180600	137600	172000	206400	154800	193500	232200
44	123200	154000	184800	140800	176000	211200	158400	198000	237600
45	126000	157500	189000	144000	180000	216000	162000	202500	243000
46	128800	161000	193200	147200	184000	220800	165600	207000	248400
47	131600	164500	197400	150400	188000	225600	169200	211500	253800
48	134400	168000	201600	153600	192000	230400	172800	216000	259200
49	137200	171500	205800	156800	196000	235200	176400	220500	264600
50	140000	175000	210000	160000	200000	240000	180000	225000	270000
51	142800	178500	214200	163200	204000	244800	183600	229500	275400
52	145600	182000	218400	166400	208000	249600	187200	234000	280800
53	148400	185500	222600	169600	212000	254400	190800	238500	286200
54	151200	189000	226800	172800	216000	259200	194400	243000	291600
55	154000	192500	231000	176000	220000	264000	198000	247500	297000
56	156800	196000	235200	179200	224000	268800	201600	252000	302400
57	159600	199500	239400	182400	228000	273600	205200	256500	307800
58	162400	203000	243600	185600	232000	278400	208800	261000	313200
59	165200	206500	247800	188800	236000	283200	212400	265500	318600
60	168000	210000	252000	192000	240000	288000	216000	270000	324000
61	170800	213500	256200	195200	244000	292800	219600	274500	329400
62	173600	217000	260400	198400	248000	297600	223200	279000	334800
63	176400	220500	264600	201600	252000	302400	226800	283500	340200
64	179200	224000	268800	204800	256000	307200	230400	288000	345600
65	182000	227500	273000	208000	260000	312000	234000	292500	351000
66	184800	231000	277200	211200	264000	316800	237600	297000	356400
67	187600	234500	281400	214400	268000	321600	241200	301500	361800
68	190400	238000	285600	217600	272000	326400	244800	306000	367200
69	193200	241500	289800	220800	276000	331200	248400	310500	372600
70	196000	245000	294000	224000	280000	336000	252000	315000	378000