



# HVAC

# VENTILATION

(ASHRAE 62.1)

# FRESH AIR

# EXAMPLES



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## PART – 2



**ANSI/ASHRAE Standard 62.1-2016**  
(Supersedes ANSI/ASHRAE Standard 62.1-2013)  
Includes ANSI/ASHRAE addenda listed in Appendix K

## Ventilation for Acceptable Indoor Air Quality



## ASHRAE 62.1 VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY

### TABLE 6.2.2.1

### Minimum Ventilation Rates in Breathing Zone

TABLE 6.2.2.1 Minimum Ventilation Rates in Breathing Zone  
(Table 6.2.2.1 shall be used in conjunction with the accompanying notes.)

Occupancy Category	People Outdoor Air Rate $R_p$		Area Outdoor Air Rate $R_a$		Notes	Default Values				
	cfm/ person	L/s person	cfm/ft <sup>2</sup>	L/s·m <sup>2</sup>		Occupant Density (see Note 4) #/1000 ft <sup>2</sup> or #/100 m <sup>2</sup>	Combined Outdoor Air Rate (see Note 5)			Air Class
							cfm/ person	L/s person		



# ASHRAE 62.1

## VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY

Two (2) parameters are required to know the (fresh air) Ventilation Rate as per ASHRAE 62.1

**cfm/Person**  
(LPS/Person)

&

**cfm/ft<sup>2</sup>**  
(LPS/m<sup>2</sup>)

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	cfm/person	L/s-person	cfm/ft <sup>2</sup>	L/s-m <sup>2</sup>		Occupant Density (see Note 4)		Combined Outdoor Air Rate (see Note 5)		Air Class
						#/1000 ft <sup>2</sup> or #/100 m <sup>2</sup>		cfm/person	L/s-person	
<b>Correctional Facilities</b>										
Cell	5	2.5	0.12	0.6		25		10	4.9	2
Dayroom	5	2.5	0.06	0.3		30		7	3.5	1
Guard stations	5	2.5	0.06	0.3		15		9	4.5	1
Booking/waiting	7.5	3.8	0.06	0.3		50		9	4.4	2
<b>Educational Facilities</b>										
Daycare (through age 4)	10	5	0.18	0.9		25		17	8.6	2
Daycare sickroom	10	5	0.18	0.9		25		17	8.6	3
Classrooms (ages 5–8)	10	5	0.12	0.6		25		15	7.4	1
Classrooms (age 9 plus)	10	5	0.12	0.6		35		13	6.7	1
Lecture classroom	7.5	3.8	0.06	0.3	H	65		8	4.3	1
Lecture hall (fixed seats)	7.5	3.8	0.06	0.3	H	150		8	4.0	1
Art classroom	10	5	0.18	0.9		20		19	9.5	2
Science laboratories	10	5	0.18	0.9		25		17	8.6	2
University/college laboratories	10	5	0.18	0.9		25		17	8.6	2
Wood/metal shop	10	5	0.18	0.9		20		19	9.5	2
Computer lab	10	5	0.12	0.6		25		15	7.4	1
Media center	10	5	0.12	0.6	A	25		15	7.4	1
Music/theater/dance	10	5	0.06	0.3	H	35		12	5.9	1
Multiuse assembly	7.5	3.8	0.06	0.3	H	100		8	4.1	1
<b>Food and Beverage Service</b>										
Restaurant dining rooms	7.5	3.8	0.18	0.9		70		10	5.1	2
Cafeteria/fast-food dining	7.5	3.8	0.18	0.9		100		9	4.7	2
Bars, cocktail lounges	7.5	3.8	0.18	0.9		100		9	4.7	2
Kitchen (cooking)	7.5	3.8	0.12	0.6		20		14	7.0	2

**TABLE 6.2.2.1 Minimum Ventilation Rates in Breathing Zone**

**TABLE 6.2.2.1 Minimum Ventilation Rates in Breathing Zone (Continued)**  
(Table 6.2.2.1 shall be used in conjunction with the accompanying notes.)

Occupancy Category	People Outdoor Air Rate $R_p$		Area Outdoor Air Rate $R_a$		Notes	Default Values				
	cfm/person	L/s-person	cfm/ft <sup>2</sup>	L/s-m <sup>2</sup>		Occupant Density (see Note 4)	Combined Outdoor Air Rate (see Note 5)		Air Class	
						#/1000 ft <sup>2</sup> or #/100 m <sup>2</sup>	cfm/person	L/s-person		
<b>General</b>										
Break rooms	5	2.5	0.06	0.3	H	25	7	3.5	1	
Coffee stations	5	2.5	0.06	0.3	H	20	8	4	1	
Conference/meeting	5	2.5	0.06	0.3	H	50	6	3.1	1	
Corridors	—	—	0.06	0.3	H	—			1	
Occupiable storage rooms for liquids or gels	5	2.5	0.12	0.6	B	2	65	32.5	2	
<b>Hotels, Motels, Resorts, Dormitories</b>										
Bedroom/living room	5	2.5	0.06	0.3	H	10	11	5.5	1	
Barracks sleeping areas	5	2.5	0.06	0.3	H	20	8	4.0	1	
Laundry rooms, central	5	2.5	0.12	0.6		10	17	8.5	2	
Laundry rooms within dwelling units	5	2.5	0.12	0.6		10	17	8.5	1	
Lobbies/prefunction	7.5	3.8	0.06	0.3	H	30	10	4.8	1	
Multipurpose assembly	5	2.5	0.06	0.3	H	120	6	2.8	1	
<b>Office Buildings</b>										
Breakrooms	5	2.5	0.12	0.6		50	7	3.5	1	
Main entry lobbies	5	2.5	0.06	0.3	H	10	11	5.5	1	
Occupiable storage rooms for dry materials	5	2.5	0.06	0.3		2	35	17.5	1	
Office space	5	2.5	0.06	0.3	H	5	17	8.5	1	
Reception areas	5	2.5	0.06	0.3	H	30	7	3.5	1	
Telephone/data entry	5	2.5	0.06	0.3	H	60	6	3.0	1	

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	cfm/person	L/s-person	cfm/ft <sup>2</sup>	L/s-m <sup>2</sup>		Occupant Density (see Note 4)		Combined Outdoor Air Rate (see Note 5)		Air Class
						#/1000 ft <sup>2</sup> or #/100 m <sup>2</sup>		cfm/person	L/s-person	
<b>Miscellaneous Spaces</b>										
Bank vaults/safe deposit	5	2.5	0.06	0.3	H	5		17	8.5	2
Banks or bank lobbies	7.5	3.8	0.06	0.3	H	15		12	6.0	1
Computer (not printing)	5	2.5	0.06	0.3	H	4		20	10.0	1
Freezer and refrigerated spaces (<50°F)	10	5	0	0	E	0		0	0	2
General manufacturing (excludes heavy industrial and processes using chemicals)	10	5.0	0.18	0.9		7		36	18	3
Pharmacy (prep. area)	5	2.5	0.18	0.9		10		23	11.5	2
Photo studios	5	2.5	0.12	0.6		10		17	8.5	1
Shipping/receiving	10	5	0.12	0.6	B	2		70	35	2
Sorting, packing, light assembly	7.5	3.8	0.12	0.6		7		25	12.5	2
Telephone closets	—	—	0.00	0.0		—				1
Transportation waiting	7.5	3.8	0.06	0.3	H	100		8	4.1	1
Warehouses	10	5	0.06	0.3	B	—				2
<b>Public Assembly Spaces</b>										
Auditorium seating area	5	2.5	0.06	0.3	H	150		5	2.7	1
Places of religious worship	5	2.5	0.06	0.3	H	120		6	2.8	1
Courtrooms	5	2.5	0.06	0.3	H	70		6	2.9	1
Legislative chambers	5	2.5	0.06	0.3	H	50		6	3.1	1
Libraries	5	2.5	0.12	0.6		10		17	8.5	1
Lobbies	5	2.5	0.06	0.3	H	150		5	2.7	1
Museums (children's)	7.5	3.8	0.12	0.6		40		11	5.3	1
Museums/galleries	7.5	3.8	0.06	0.3	H	40		9	4.6	1

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						#/1000 ft <sup>2</sup> or #/100 m <sup>2</sup>	cfm/person	L/s-person		
<b>Residential</b>										
Dwelling unit	5	2.5	0.06	0.3	F, G, H	F				1
Common corridors	—	—	0.06	0.3	H					1
<b>Retail</b>										
Sales (except as below)	7.5	3.8	0.12	0.6		15	16	7.8		2
Mall common areas	7.5	3.8	0.06	0.3	H	40	9	4.6		1
Barbershop	7.5	3.8	0.06	0.3	H	25	10	5.0		2
Beauty and nail salons	20	10	0.12	0.6		25	25	12.4		2
Pet shops (animal areas)	7.5	3.8	0.18	0.9		10	26	12.8		2
Supermarket	7.5	3.8	0.06	0.3	H	8	15	7.6		1
Coin-operated laundries	7.5	3.8	0.12	0.6		20	14	7.0		2
<b>Sports and Entertainment</b>										
Gym, sports arena (play area)	20	10	0.18	0.9	E	7	45	23		2
Spectator areas	7.5	3.8	0.06	0.3	H	150	8	4.0		1
Swimming (pool & deck)	—	—	0.48	2.4	C	—				2
Disco/dance floors	20	10	0.06	0.3	H	100	21	10.3		2
Health club/aerobics room	20	10	0.06	0.3		40	22	10.8		2
Health club/weight rooms	20	10	0.06	0.3		10	26	13.0		2
Bowling alley (seating)	10	5	0.12	0.6		40	13	6.5		1
Gambling casinos	7.5	3.8	0.18	0.9		120	9	4.6		1
Game arcades	7.5	3.8	0.18	0.9		20	17	8.3		1
Stages, studios	10	5	0.06	0.3	D, H	70	11	5.4		1

# ASHRAE 62.1

## VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY

- **cfm/Person** (LPS/Person) derives the ventilation rate from the number of people that will occupy the space at any given time.

**Office Building = 5 CFM/Person**

(ASHRAE 62.1)

NO. OF PERSON IN OFFICE = 10

5CFM/Person x 10 Person

5 x 10 = 50 CFM



# ASHRAE 62.1

## VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY

- $\text{cfm}/\text{ft}^2$  ( $\text{LPS}/\text{m}^2$ ) derives the ventilation rate from the area of the individual space/zone in a building.

Office Building = 0.12 CFM/ft<sup>2</sup>

(ASHRAE 62.1)

AREA OF OFFICE ROOM = 500ft<sup>2</sup>

$0.12\text{cfm}/\text{ft}^2 \times 500\text{ft}^2$

$0.12 \times 100 = 60 \text{ CFM}$



**HVAC SIMPLIFIED**



**ASHRAE 62.1**

**VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY**

**PART - 3**

**FRESH AIR CALCULATION**

**AS PER**

**ASHRAE 62.1**



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**PART - 3**



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*Thank  
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