

HVAC OUTDOOR AIR VENTILATION STANDARD

ASHRAE Standard 62.1 - 2013

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“Landlord’s HVAC system design capacity shall equal or exceed outdoor air ventilation requirements specified in ASHRAE Standard 62.1 - 2013” (*prospect tenant lease draft clause*).

Is your building’s HVAC system design and operating parameters in compliance with the most current version of ASHRAE Standard 62.1? ASHRAE Standard 62.1 is the industry accepted standard of compliance, for HVAC ventilation criteria, in commercial, institutional and high-rise residential buildings.

ASHRAE 62.1 is considered “The Ventilation Standard for Acceptable Indoor Air Quality” and is the basis for ventilation codes including the International Mechanical Code (IMC). The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), includes 50,000 members that provide expertise and establish standards in Heating, Ventilation and Air-Conditioning (HVAC) building systems, energy efficiency, indoor air quality, refrigeration, and sustainability.

ASHRAE Standard 62.1 - 2013



Compliance with ASHRAE 62.1 is also a prerequisite for LEED-NC (New Construction) credits within the LEED EQ (Indoor Environmental Quality) category.

ASHRAE 62.1 - PURPOSE | SCOPE

Specify minimum ventilation rates, and other measures, intended to provide indoor air quality (IAQ) that is acceptable to human occupants and that minimizes adverse health effects	Intended for regulatory application to new buildings and existing building renovations and additions
Guide the improvement of indoor air quality (IAQ) in existing buildings	Defines the requirements for ventilation, air cleaning design, commissioning, installation, and operations and maintenance (O & M)

If a subject property was developed, prior to the establishment of certain ASHRAE 62.1 provisions, the building’s ventilation capacity may be considered non-compliant, within the expectations of a current, or prospect, owner, lender or tenant. By example, the HVAC system, in a building built in 1985, could provide a maximum of 7 cubic feet per minute (CFM) per person outdoor air, while the current ASHRAE 62.1-2013 Standard requires 17 CFM per person outdoor air. Although the building owner, may contend the HVAC system design is “grandfathered”, under previous, less stringent ASHRAE 62.1 conditions, a prospect tenant may require compliance, up to the current ASHRAE 62.1-2013 standard, as a precondition of their leasing criteria.

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ASHRAE 62.1 - 2013 Section 6 provides the minimum ventilation requirements for the dilution and reduction of indoor air contaminants.

ASHRAE 62.1-2013 OUTDOOR AIR VENTILATION REQUIREMENTS OFFICE CATEGORY		
Calculated Rate (combine both)		Default Values
People - Outdoor Air Rate	Area - Outdoor Air Rate	Combined - Outdoor Air Rate
5 cfm / person	.06 cfm / SF	17 cfm / person Default Occupant Density = 5 occupants per 1,000 SF (avg. 1 per 200 SF)

Outdoor Ventilation Rate - Default Value Method

The Default Value Method is straightforward and the building owner-operator should use this method if they are unsure of the occupant density, “distributed across” the premises, served by the HVAC air handling system. The **default occupant density**, utilized in determining office space ventilation rates, is 5 occupants per 1,000 SF (1 occupant per 200 SF). An owner-operator, estimating the outdoor air requirement for 20,000 SF, could assume 100 occupants in order to derive the required outdoor air CFM / person.

EXAMPLE: Outdoor Air Ventilation Rate - Default Value Method

Category	Value	Rate	Required Outdoor Ventilation
Office SF	20,000 SF	17 CFM per occupant	1,700 CFM

Outdoor air rate assumes 1 occupant per 200 SF. 20,000 SF / 200 SF per occupant = 100 occupants.
 100 occupants x 17 CFM outdoor air per occupant = 1,700 CFM outdoor air provided to the premises.

The illustration above determined the outdoor air requirement based upon the office premises occupancy (or size - SF). The table on the next page illustrates the technique of estimating outdoor air CFM conveyed by a representative HVAC Air Handling Unit (AHU).

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Representative Air Handling Unit (AHU) - Outdoor Air Ventilation Rate (CFM) Calculations

Air Handling Unit (AHU) Rated Capacity (CFM)	20,000	At 100% Speed. This figure will be reduced if the AHU is controlled by a Variable Speed Drive and operating at a reduced speed
Total Area (Premises SF) Served by the AHU	38,000	Entire SF area served by the AHU, in order to allocate CFM, as distributed, across the entire premises
Total Occupancy	190	Default Estimated Occupancy is 1 person per 200 SF 38,000 SF / 200 SF per occupant = 190 occupants
Total Ventilation Rate CFM per Person	105	This represents the total air CFM provided by the AHU (outdoor fresh air and return air). 20,000 CFM / 190 occupants

The estimated ventilation rate figures below are based on a typical HVAC system having exhaust air dampers. (the capacity to exhaust 100% of the supply air provided to the premises - "full economizer")

Outdoor Air Ventilation Rate CFM per person @ 100% outside air	105	100% Outdoor Air Operation Return (mixed-air) dampers in closed position
Outdoor Air Ventilation Rate CFM per person @ 75% outside air	79	75% Outdoor Air Operation $105 \times .75 = .79$ CFM Return (mixed-air) dampers 25% open position
Outdoor Air Ventilation Rate CFM per person @ 50% outside air	53	50% Outdoor Air Operation $105 \times .5 = 53$ CFM Return (mixed-air) dampers 50% open position
Outdoor Air Ventilation Rate CFM per person @ 25% outside air	26	25% Outdoor Air Operation $105 \times .25 = 26$ CFM Return (mixed-air) dampers 75% open position
ASHRAE 62.1 - 2013 Required Outdoor Air Ventilation Rate 17 CFM per person	17	Outdoor Air, as a percentage of Total Air, required in order to provide the minimum standard 17 CFM per person: $17 \text{ CFM} / 105 \text{ CFM} = 16\%$. Return (mixed air) dampers 84% open

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Air Change Calculation | Standard Measurement - Air Changes per Hour (ACH)

The rate at which air is exchanged (in the premises) represents another method of measuring ventilation capacity & effectiveness. Air exchange rate is typically expressed in **Air Changes per Hour - "ACH"**. Air changes per hour can be estimated by determining the total air supplied to, and removed from, the premises **"total air exchange"** or the outdoor (fresh) air supplied to, and removed from, the premises **"outdoor air exchange"**.



Air Change Calculation | Standard Measurement - Air Changes Per Hour (ACH)

Category	Premises Size ALL AREAS served by the Air Handling Unit (AHU)	Ceiling Height	Premises Cubic Feet = Premises SF x Ceiling Height	Air Handling Unit (AHU) Ventilation Rate (CFM)	Ventilation Rate (CFH) (cubic feet per hour) CFM x 60	Air Changes Per Hour 168,000 / 180,000
Office	20,000 SF	9'0"	180,000 Cu Ft	2,800 CFM	168,000	.93 Air Changes Per Hour (.93 "ACH")

$20,000 \times 9' = 180,000 \text{ Cu Ft}$. $2,800 \text{ CFM} \times 60 \text{ minutes} = 168,000 \text{ CFH}$. $168,000 \text{ CFH} / 180,000 \text{ Cu Ft} = .93 \text{ ACH}$