2008 Title 24 Non-Residential Ventilation Requirements

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Overview of Proposal

- Remove outdoor air ventilation rate calculation requirements in Section 121
- Instead defer to model code (Uniform Mechanical Code) for ventilation requirements
  - 2006 UMC based on ASHRAE Standard 62.1-2004
- Note: Section 121 and the UMC are not compatible so either
  - Section 121 must be changed as proposed here; or
  - UMC Chapter 4 must not be adopted into UMC

Current Section 121 Outdoor Air Rate Calculation

- Outdoor air rate must be larger than the larger of:
  - 15 cfm per person
    - Occupancy assumed to be no less than 1/2 the UBC exiting requirement
  - the rate in Table 1-F times the floor area of the space
    - 0.15 cfm/ft^2 for most occupancy types

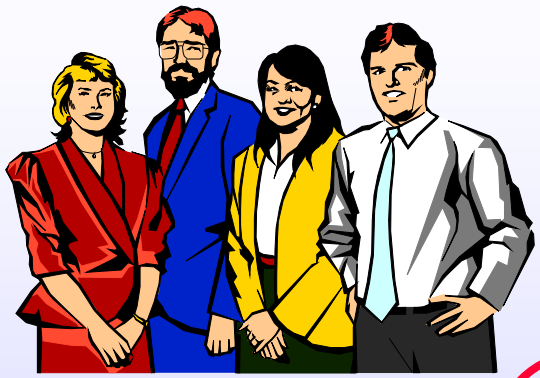
UMC/Standard 62.1
Outdoor Air Rate Calculation

1. Calculate breathing-zone outdoor airflow
2. Determine zone air distribution effectiveness
3. Calculate zone outdoor airflow at diffusers
4. Calculate minimum intake of outdoor air for the system

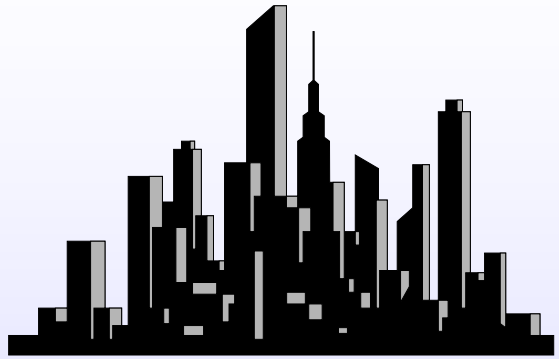
UMC/Standard 62.1
Breathing Zone Outdoor Air Rate

Breathing Zone Outdoor Air Ventilation Rate, CFM

People Component



Building Component



$$V_{bz} = R_p P_z + R_a A_z$$

- R_p: Minimum CFM/Person
- P_z: Number of People
- R_a: Minimum CFM/sqft
- A_z: Floor Area

Basis of Rates

- Research
  - Includes chamber studies, experimental research in labs and real buildings, epidemiology studies
  - Most completed after 1991 when T-24 rates were developed
- Experience & Judgment of
  - ASHRAE Committee Members
  - Engineers
  - Researchers
  - Commenters

Comparison

Sample Occupancies

Occupancy Type	% Difference in Ventilation Rate From Title 24 to ASHRAE/UMC		
	Minimum occupancy from		
	(1) Each Code	(2) Title 24	(3) ASHRAE
Auditoriums	-64%	-64%	-64%
Financial Institutions	-32%	-32%	-32%
Grocery Stores	-7%	-2%	3%
Hotels	-8%	-40%	-8%
Office Buildings	-29%	-29%	-29%
Restaurants	76%	7%	-16%
Retail/Wholesale Stores	-7%	-2%	-3%
Schools	57%	23%	12%
Bars	36%	-24%	-38%

Proposed changes
(assumes 2006 UMC is adopted into CMC)

SECTION 121 – REQUIREMENTS FOR VENTILATION

(a) **General Requirements.**

1. All enclosed spaces in a building that are normally used by humans shall be ventilated in accordance with the requirements of this section and the CBC.
2. The outdoor air-ventilation rate and air-distribution assumptions made in the design of the ventilating system shall be clearly identified on the plans required by Section 10-103 of Title 24, Part 1.

(b) **Design Requirements for Minimum Quantities of Outdoor Air**. Comply with Chapter 4 of the California Mechanical Code.

~~Every space in a building shall be designed to have outdoor air ventilation according to Item 1 or 2 below:~~

~~1. **Natural ventilation**.~~

~~A. Naturally ventilated spaces shall be permanently open to and within 20 feet of operable wall or roof openings to the outdoors, the openable area of which is not less than 5% of the conditioned floor area of the naturally ventilated space. Where openings are covered with louvers or otherwise obstructed, openable area shall be based on the free unobstructed area through the opening.~~

~~**EXCEPTION to Section 121 (b) 1. A:** Naturally ventilated spaces in high-rise residential dwelling units and hotel/motel guest rooms shall be open to and within 25 feet of operable wall or roof openings to the outdoors.~~

~~B. The means to open required operable openings shall be readily accessible to building occupants whenever the space is occupied.~~

~~2. **Mechanical ventilation**. Each space that is not naturally ventilated under Item 1 above shall be ventilated with a mechanical system capable of providing an outdoor air rate no less than the larger of:~~

~~A. The conditioned floor area of the space times the applicable ventilation rate from TABLE 121-A; or~~

~~B. 15 cfm per person times the expected number of occupants.~~

~~For meeting the requirement in Section 121 (b) 2 B for spaces without fixed seating, the expected number of occupants shall be either the expected number specified by the building designer or one half the maximum occupant load assumed for egress purposes in the CBC, whichever is greater. For spaces with fixed seating, the expected number of occupants shall be determined in accordance with the CBC.~~

~~**EXCEPTION to Section 121 (b) 2:** Transfer air. The rate of outdoor air required by Section 121 (b) 2 may be provided with air transferred from other ventilated spaces if:~~

~~A. None of the spaces from which air is transferred have any unusual sources of indoor air contaminants; and~~

~~B. Enough outdoor air is supplied to all spaces combined to meet the requirements of Section 121 (b) 2 for each space individually.~~

Summary

- Outdoor air rates are reduced for most occupancy types
  - Substantially reduced for densely but intermittently occupied spaces
  - Primary exception is schools where rates are higher
- Small energy savings due to overall reduced average rates
- California ventilation requirements will be consistent with Standard 62.1, UMC, and (pending) IMC