



City of Decatur Fire & Rescue Services Fire Marshal's Office

Parking Deck Ventilation Design Requirements

Parking Deck Openness Calculations

- I. Parking decks are classified as open, enclosed, or a combination of both.
 - a. Opening requirements are identical in NFPA 88A and NFPA 101
 - i. NFPA 88A: 5.5
 - ii. NFPA 101: 42.8.1.3
 - b. Designer must provide openness calculations per NFPA 88A: 5.5
 - i. Wall openings open to the atmosphere (5.5.1)
 - ii. Area of openings of not less than 1.4 ft² for each linear foot of the exterior perimeter (5.5.1)
 - iii. Openings must be distributed over 40 percent of the building perimeter or uniformly over two opposing sides (5.5.2)
 - iv. Interior wall lines and column lines must be at least 20 percent open, with the openings distributed to provide ventilation
 - c. Parking decks or portions of the parking deck that do not meet the openness requirements of NFPA 88A: 5.5 are classified as enclosed

Enclosed Parking Deck Ventilation Rate Requirements

- II. Enclosed parking decks are required to be ventilated by a mechanical system
 - a. Ventilation requirements between NFPA 88A and the IMC are different
 - i. NFPA 88A: 6.3.1 requires a ventilation rate of 1 ft³/min per ft² of floor area
 - ii. IMC 404.2 requires a minimum ventilation rate of 0.05 ft³/min per ft² of floor area and the system must be capable of producing a ventilation rate of 0.75 ft³/min per ft² of floor area
 - b. Apply a ventilation rate of 0.05 ft³/min per ft² of floor area when the garage is unoccupied
 - c. Apply a ventilation of 1 ft³/per ft² of floor area when the garage is occupied

Parking Deck Mechanical Ventilation System Design

- III. Mechanical ventilation systems must be designed to provide the minimum ventilation rates
 - a. NFPA 88A references NFPA 90A for the installation of the mechanical ventilation system
 - i. Per Table 102.13: Code Reference Guide in 120-3-3 the IMC is listed as the primary code for HVAC systems
 - b. Design of the mechanical ventilation system must comply with the provisions of the IMC
 - i. Mechanical ventilation system must run continuously (IMC 502.13)
 - ii. Mechanical ventilation system is permitted to run intermittently where Item 1, Item 2 or both are provided (IMC 404.1)
 1. Vehicle operation detection or the presence of occupants by an approved automatic detection device
 2. Carbon Monoxide detectors in conjunction with nitrogen dioxide detectors. Detectors are required to be installed per the manufacturer's recommendation

- c. A fire protection engineer must provide design documents for a mechanical ventilation system that will run intermittently. Design documents must include but are not limited to the following items:
 - i. Validate the openness calculations to verify the parking deck is enclosed
 - ii. State whether IMC 404.1 Item 1, Item 2 or both will be utilized
 - iii. Drawing showing the location of the vehicle or occupant detection system and/or the location of the carbon monoxide/nitrogen dioxide detectors
 - iv. Data sheets for all detectors
 - v. Method for the monitoring of the detectors
 - vi. Method for testing and commissioning of the detection system
 - vii. Maintenance schedule for the detection system
- d. Design of the intermittent ventilation system must be accepted by the FMO