

AIR MANAGEMENT REGULATION XII
PROCEDURES AND GUIDELINES RELATED TO THE
REVIEW AND APPROVAL OF AUTOMOTIVE FACILITIES

Philadelphia Department of Public Health
Air Management Services
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1. Plans and specifications shall be submitted to Air Management Services showing details of the ventilation system, air moving devices, points of air intake and exhaust, location and capacity of each supply and return vent, and the location and type of air monitoring and ventilation control devices. Other required information shall include the facility's maximum capacity, types of vehicles using the facility, and type and location of adjacent structures.
2. Mechanical ventilation exhaust discharge capacity is required based on the number of levels, total maximum capacity, and the type of vehicle using the facility. This value may be obtained from table 1.

Table 1

<u>No. of Levels</u>	<u>CFM per vehicle</u>
1	450
2	465
3	480
4	495
5	510
6	525
7	540
8	555

Air flow should be distributed based on the parking capacity and traffic activity of each level. In a four-level garage the entry\exit level would be

provided 495 CFM per vehicle of capacity and Level 4 would receive 450 CFM per vehicle.

Fleet truck and bus facilities shall have a ventilation capacity of at least 1,000 CFM per vehicle.

3. Mechanical ventilation supply discharge is required equivalent to the required exhaust capacity for any levels below grade. Levels above grade may have free openings equal in area of exhaust vents on these levels. Exceptions to the requirement include:

- (a) Allowing the use of areaways for induced supply.

- (b) For small parking garages and valet park facilities allowing supply air to be induced from areaways and the garage entry\exit.

The rationale for this is that for both types of facilities the number of cars that can be in operation at any time is very limited. Small parking garages tend to be either private or if open to the public-valet park.

- (c) Any facility may use the 2018 Building Officials and Code Administrators (BOCA) standard in lieu of the Philadelphia Guidelines:

Mechanical ventilation systems for enclosed parking garages shall operate continuously or shall be automatically operated by means of carbon monoxide detectors applied in conjunction with nitrogen dioxide detectors. Such detectors shall be listed in accordance with [UL 2075](#) and installed in accordance with their listing and the manufacturers' instructions. Automatic operation shall cycle the ventilation system between the following two modes of operation:

- (i) Full-on at an airflow rate of not less than 0.75 cfm per square foot [$0.0038 \text{ m}^3/(\text{s} \cdot \text{m}^2)$] of the floor area served.
 - (ii) Standby at an airflow rate of not less than 0.05 cfm per square foot [$0.00025 \text{ m}^3/(\text{s} \cdot \text{m}^2)$] of the floor area served.

4. Supply and exhaust air openings must be situated so that good air distribution occurs over the area ventilated and no “dead air” space exists. Supply air must come from an outside air source at least twenty feet from street traffic and parking spaces. Exhaust points must be at least twenty-five feet from supply air intakes and openings in habitable structures and ten feet from pedestrian areas.
5. The ventilation system must be designed and operated so that negative air pressure is maintained in the facility. This is to prevent leakage of contaminated air into adjoining occupied spaces.
6. The mechanical ventilation system must be controlled and monitored from a central location accessible to operating, maintenance or security personnel at all times that the facility is available for use. Where an automatic carbon monoxide detection system is required, it shall be installed with remote sensing or sampling points at each parking level. The detection system shall be controlled and monitored from the central location and be calibrated to initiate emergency procedures when a concentration of 200 ppm is exceeded in any part of the facility during any 15 minute period. Emergency procedures shall include at least an audible alarm to alert the responsible personnel who shall then take the following steps.
 - (a) Advise patrons to stop engines and leave the facility.
 - (b) Close entrances.
 - (c) Start emergency or reserve ventilation system (if available)

For facilities of more than two levels or 250 spaces, the detection system shall be automated to initiate and carry out step (a) via local alarms and illuminated signs. Alternately, a public address system may be employed to instruct patrons to leave. The parking facility may return to normal service when the carbon monoxide concentration returns to a safe level.

7. Air Management Services shall be notified immediately of any parking facility ventilation emergency; telephone (215) 685-7580 weekdays and (215) 686-4514 at other times.
8. Attendants, guards, ticket takers, booths, or any occupied spaces which normally have openings to the facility must be pressurized with temperature-controlled supply air so that there is an outflow air velocity

of at least 50 feet per minute through the openings. Air must be introduced into the booth so that there is no draft on the occupant and must come from a supply air source as described in paragraph 4 above.

9. The parking facility shall not be used for any automobile repairs that would require the operation of an engine for more than ten minutes.

10. Maintenance

- (a) All ventilation systems should be inspected on a monthly schedule with a service record kept in the facility's office. Minimum preventive maintenance for fans includes periodic cleaning of duct work, plenums, filters and screens, a check on the proper operation and adjustment of all dampers and louvers, fan belt adjustment and motor lubrication.
- (b) Each facility must be able to demonstrate the accurate functioning of the carbon monoxide detection system. As a minimum, calibration should be checked bi-weekly with service records kept in the facility's office.

References

1. City of Detroit, Department of Building & Safety Engineering, Bulletin No. E-16, September 30, 1969.
2. “Air Flow Requirements for Underground Parking Garages”, George M. Hana, et al., Amer. Industrial Hygiene Assoc. Journal, December, 1961.
3. “2018 International Mechanical Code (IMC), Section 404.
https://codes.iccsafe.org/content/IMC2018P4/chapter-4-ventilation#IMC2018P4_Ch04_Sec404