

# Part III—Building and Equipment Design Features

## CHAPTER 5

### FIRE SERVICE FEATURES

#### SECTION 501 GENERAL

**501.1 Scope.** Fire service features for buildings, structures and premises shall comply with this chapter. See also Oregon Revised Statutes (ORS) 92.044, 203, 221, 195.065, 368.039, 478.920 and Oregon Administrative Rule (OAR) 918-480-0100.

**ORS Chapter 92.044, 203, 221, 368.039, 195.065, 478.920 and OAR Chapter 918** are not a part of this code but are reproduced or paraphrased here for the reader's convenience.

**ORS 92.044** is the adoption of standards and procedures governing approval of plats and plans; delegation to planning commission; fees.

**ORS 203** is the county bodies; county home rule.

**ORS 221** is the organization and government of cities.

**ORS 368.039** allows road standards adopted by local government to supersede standards in the fire codes and requires consultation with local fire agency.

**ORS 195.065** requires local governments and special districts that provide urban service to enter into urban service agreements. For the purpose of this statute, "urban service" means: sanitary sewers, water, fire protection, parks, open space, recreation and streets, roads and mass transit.

**ORS 478.920** describes elements that may be included in the scope of a fire prevention code adopted by a rural fire protection district, including but not limited to: mobile fire apparatus means of approach to buildings and structures, and providing fire-fighting water supplies and fire detection and suppression apparatus adequate for the protection of buildings and structures.

**OAR 918-480-0100** describes the procedure for approving the installation of automatic fire sprinklers where fire apparatus access or fire-fighting water supply do not meet local standards.

**501.2 Permits.** A permit shall be required as set forth in Sections 105.6 and 105.7.

**501.3 Construction documents.** *Construction documents* for proposed fire apparatus access, location of *fire lanes*, security gates across fire apparatus access roads and *construction documents* and hydraulic calculations for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.

**501.4 Timing of installation.** When fire apparatus access roads or a water supply for fire protection is required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except when *approved* alternative methods of protection are provided.

Temporary street signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles in accordance with Section 505.2.

#### SECTION 502 DEFINITIONS

**502.1 Definitions.** The following terms are defined in Chapter 2:

**AGENCY.**

**FIRE APPARATUS ACCESS ROAD.**

**FIRE COMMAND CENTER.**

**FIRE DEPARTMENT MASTER KEY.**

**FIRE LANE.**

**KEY BOX.**

**TRAFFIC CALMING DEVICES.**

#### SECTION 503 FIRE APPARATUS ACCESS ROADS

**503.1 Where required.** Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through 503.1.3. See Appendix D.

**503.1.1 Buildings and facilities.** *Approved* fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall comply with the requirements of this section and shall extend to within 150 feet (45 720 mm) of all portions of the facility and all portions of the exterior walls of the first story of the building as measured by an *approved* route around the exterior of the building or facility.

**Exception:** The *fire code official* is authorized to modify Sections 503.1 and 503.2 where any of the following applies:

1. The building is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, nonnegotiable grades or other similar conditions, and an *approved* alternative means of fire protection is provided.
3. There are not more than two Group R-3 or Group U occupancies.

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**503.1.2 Additional access.** The *fire code official* is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

**503.1.3 High-piled storage.** Fire department vehicle access to buildings used for *high-piled combustible storage* shall comply with the applicable provisions of Chapter 32.

**503.2 Specifications.** Fire apparatus access roads shall be installed and arranged in accordance with Sections 503.2.1 through 503.2.8.

**503.2.1 Dimensions.** Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm), exclusive of shoulders, except for *approved* security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).

**503.2.2 Authority.** The *fire code official* shall have the authority to modify the dimensions specified in Section 503.2.1.

**503.2.3 Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather driving capabilities.

**503.2.4 Turning radius.** The required turning radius of a fire apparatus access road shall be determined by the *fire code official*.

**503.2.5 Dead ends.** Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) in length shall be provided with an *approved* area for turning around fire apparatus.

**503.2.6 Bridges and elevated surfaces.** Where a bridge or an elevated surface is part of a fire apparatus access road, the bridge shall be constructed and maintained in accordance with AASHTO HB-17. Bridges and elevated surfaces shall be designed for a live load sufficient to carry the imposed loads of fire apparatus. Vehicle load limits shall be posted at both entrances to bridges when required by the *fire code official*. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces which are not designed for such use, *approved* barriers, *approved* signs or both shall be installed and maintained when required by the *fire code official*.

**503.2.7 Grade.** The grade of the fire apparatus access road shall be within the limits established by the *fire code official* based on the fire department's apparatus.

**503.2.8 Angles of approach and departure.** The angles of approach and departure for fire apparatus access roads shall be within the limits established by the *fire code official* based on the fire department's apparatus.

**503.3 Marking.** Where required by the *fire code official*, *approved* signs or other *approved* notices or markings that include the words NO PARKING—FIRE LANE shall be provided for fire apparatus access roads to identify such roads or prohibit the obstruction thereof. The means by which *fire*

*lanes* are designated shall be maintained in a clean and legible condition at all times and be replaced or repaired when necessary to provide adequate visibility.

**503.4 Obstruction of fire apparatus access roads.** Fire apparatus access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established in Section 503.2.1 shall be maintained at all times.

**503.4.1. Traffic calming devices.** Traffic calming devices shall be prohibited unless *approved* by the *fire code official*.

**503.5 Required gates or barricades.** The *fire code official* is authorized to require the installation and maintenance of gates or other *approved* barricades across fire apparatus access roads, trails or other accessways, not including public streets, alleys or highways. Electric gate operators, where provided, shall be *listed* in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.

**503.5.1 Secured gates and barricades.** When required, gates and barricades shall be secured in an *approved* manner. Roads, trails and other accessways that have been closed and obstructed in the manner prescribed by Section 503.5 shall not be trespassed on or used unless authorized by the *owner* and the *fire code official*.

**Exception:** The restriction on use shall not apply to public officers acting within the scope of duty.

**503.6 Security gates.** The installation of security gates across a fire apparatus access road shall be *approved* by the fire chief. Where security gates are installed, they shall have an *approved* means of emergency operation. The security gates and the emergency operation shall be maintained operational at all times. Electric gate operators, where provided, shall be *listed* in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.

## SECTION 504

### ACCESS TO BUILDING OPENINGS AND ROOFS

**504.1 Required access.** Exterior doors and openings required by this code or the *International Building Code* shall be maintained readily accessible for emergency access by the fire department. An *approved* access walkway leading from fire apparatus access roads to exterior openings shall be provided when required by the *fire code official*.

**504.2 Maintenance of exterior doors and openings.** Exterior doors and their function shall not be eliminated without prior approval. Exterior doors that have been rendered non-functional and that retain a functional door exterior appearance shall have a sign affixed to the exterior side of the door with the words THIS DOOR BLOCKED. The sign shall consist of letters having a principal stroke of not less than  $\frac{3}{4}$  inch (19.1 mm) wide and at least 6 inches (152 mm) high on a contrasting background. Required fire department access doors shall not be obstructed or eliminated. *Exit* and *exit access*

doors shall comply with Chapter 10. Access doors for *high-piled combustible storage* shall comply with Section 3206.6.1.

**504.3 Stairway access to roof.** New buildings four or more stories above grade plane, except those with a roof slope greater than four units vertical in 12 units horizontal (33.3-percent slope), shall be provided with a *stairway* to the roof. *Stairway* access to the roof shall be in accordance with Section 1009.13. Such *stairway* shall be marked at street and floor levels with a sign indicating that the *stairway* continues to the roof. Where roofs are used for roof gardens or for other purposes, *stairways* shall be provided as required for such occupancy classification.

### SECTION 505 PREMISES IDENTIFICATION

**505.1 Address identification.** New and existing buildings shall have *approved* address numbers, building numbers or *approved* building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Where required by the *fire code official*, address numbers shall be provided in additional *approved* locations to facilitate emergency response. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall be a minimum of 4 inches (101.6 mm) high with a minimum stroke width of 0.5 inch (12.7 mm). Where access is by means of a private road and the building cannot be viewed from the *public way*, a monument, pole or other sign or means shall be used to identify the structure. Address numbers shall be maintained.

**505.2 Street or road signs.** Streets and roads shall be identified with *approved* signs. Temporary signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles. Signs shall be of an *approved* size, weather resistant and be maintained until replaced by permanent signs.

### SECTION 506 KEY BOXES

**506.1 Where required.** Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life-saving or fire-fighting purposes, the *fire code official* is authorized to require a key box to be installed in an *approved* location. The key box shall be of an *approved* type listed in accordance with UL 1037, and shall contain keys to gain necessary access as required by the *fire code official*.

**Exception:** Pharmacies in accordance with OAR 855-041-0035.

**506.1.1 Locks.** An *approved* lock shall be installed on gates or similar barriers when required by the *fire code official*.

**506.1.2 Key boxes for nonstandardized fire service elevator keys.** Key boxes provided for nonstandardized fire

service elevator keys shall comply with Section 506.1 and all of the following:

1. The key box shall be compatible with an existing rapid entry key box system in use in the jurisdiction and *approved* by the *fire code official*.
2. The front cover shall be permanently labeled with the words “Fire Department Use Only—Elevator Keys.”
3. The key box shall be mounted at each elevator bank at the lobby nearest to the lowest level of fire department access.
4. The key box shall be mounted 5 feet 6 inches (1676 mm) above the finished floor to the right side of the elevator bank.
5. Contents of the key box are limited to fire service elevator keys. Additional elevator access tools, keys and information pertinent to emergency planning or elevator access shall be permitted when authorized by the *fire code official*.
6. In buildings with two or more elevator banks, a single key box shall be permitted to be used when such elevator banks are separated by not more than 30 feet (9144 mm). Additional key boxes shall be provided for each individual elevator or elevator bank separated by more than 30 feet (9144 mm).

**Exception:** A single key box shall be permitted to be located adjacent to a *fire command center* or the non-standard fire service elevator key shall be permitted to be secured in a key box used for other purposes and located in accordance with Section 506.1.

**506.2 Key box maintenance.** The operator of the building shall immediately notify the *fire code official* and provide the new key when a lock is changed or rekeyed. The key to such lock shall be secured in the key box.

### SECTION 507 FIRE PROTECTION WATER SUPPLIES

**507.1 Required water supply.** An *approved* water supply capable of supplying the required fire flow for fire protection shall be provided to premises upon which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction.

**507.2 Type of water supply.** A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

**507.2.1 Private fire service mains.** Private fire service mains and appurtenances shall be installed in accordance with NFPA 24.

**507.2.2 Water tanks.** Water tanks for private fire protection shall be installed in accordance with NFPA 22.

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**507.3 Fire flow.** Fire flow requirements for buildings or portions of buildings and facilities shall be determined by an *approved* method. See Appendix B.

**507.4 Water supply test.** The *fire code official* shall be notified prior to the water supply test. Water supply tests shall be witnessed by the *fire code official* or *approved* documentation of the test shall be provided to the *fire code official* prior to final approval of the water supply system.

**507.5 Fire hydrant systems.** Fire hydrant systems shall comply with Sections 507.5.1 through 507.5.6. See Appendix C.

**507.5.1 Where required.** Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet (122 m) from a hydrant on a fire apparatus access road, as measured by an *approved* route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the *fire code official*.

### Exceptions:

1. For Group R-3 and Group U occupancies, the distance requirement shall be 600 feet (183 m).
2. For buildings equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the distance requirement shall be 600 feet (183 m).

**507.5.1.1 Hydrant for standpipe systems.** Buildings equipped with a standpipe system installed in accordance with Section 905 shall have a fire hydrant within 100 feet (30 m) of the fire department connections.

**Exception:** The distance shall be permitted to exceed 100 feet (30 m) where approved by the *fire code official*.

**507.5.2 Inspection, testing and maintenance.** Fire hydrant systems shall be subject to periodic tests as required by the *fire code official*. Fire hydrant systems shall be maintained in an operative condition at all times and shall be repaired where defective. Additions, repairs, *alterations* and servicing shall comply with *approved* standards.

**507.5.3 Private fire service mains and water tanks.** Private fire service mains and water tanks shall be periodically inspected, tested and maintained in accordance with NFPA 25 at the following intervals:

1. Private fire hydrants (all types): Inspection annually and after each operation; flow test and maintenance annually.
2. Fire service main piping: Inspection of exposed, annually; flow test every 5 years.
3. Fire service main piping strainers: Inspection and maintenance after each use.

**507.5.4 Obstruction.** Unobstructed access to fire hydrants shall be maintained at all times. The fire department shall not be deterred or hindered from gaining immediate access to fire protection equipment or fire hydrants.

**507.5.5 Clear space around hydrants.** A 3-foot (914 mm) clear space shall be maintained around the circumference of fire hydrants, except as otherwise required or *approved*.

**ORS 811.550(16)** is not a part of this code but reproduced or paraphrased here for the reader's convenience.

**ORS 811.550(16)** prohibits parking within 10 feet (3048 mm) of a fire hydrant.

**OAR 860-024-0010** is not a part of this code but is reproduced or paraphrased here for the reader's convenience.

**OAR 860-024-0010** is an Oregon Public Utility Commission rule that adopts the National Electrical Safety Code (NESC). The NESC contains rules that limit the placement of a fire hydrant a minimum of 4 feet (1219 mm) from any supporting structure for electrical equipment, such as transformers and poles.

**507.5.6 Physical protection.** Where fire hydrants are subject to impact by a motor vehicle, guard posts or other *approved* means shall comply with Section 312.

## SECTION 508 FIRE COMMAND CENTER

**508.1 General.** Where required by other sections of this code and in all buildings classified as high-rise buildings by the *International Building Code*, a *fire command center* for fire department operations shall be provided and shall comply with Sections 508.1.1 through 508.1.5.

**508.1.1 Location and access.** The location and accessibility of the *fire command center* shall be *approved* by the fire chief.

**508.1.2 Separation.** The *fire command center* shall be separated from the remainder of the building by not less than a 1-hour *fire barrier* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assembly* constructed in accordance with Section 711 of the *International Building Code*, or both.

**508.1.3 Size.** The *fire command center* shall be a minimum of 200 square feet (19 m<sup>2</sup>) in area with a minimum dimension of 10 feet (3048 mm).

**508.1.4 Layout approval.** A layout of the *fire command center* and all features required by this section to be contained therein shall be submitted for approval prior to installation.

**508.1.5 Required features.** The *fire command center* shall comply with NFPA 72 and shall contain the following features:

1. The emergency voice/alarm communication system control unit.
2. The fire department communications system.
3. Fire detection and alarm system annunciator.
4. Annunciator unit visually indicating the location of the elevators and whether they are operational.

5. Status indicators and controls for air distribution systems.
6. The fire-fighter's control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking *stairway* doors simultaneously.
8. Sprinkler valve and water-flow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, *means of egress*, *fire protection systems*, fire-fighting equipment and fire department access, and the location of *fire walls*, *fire barriers*, *fire partitions*, *smoke barriers* and smoke partitions.
13. An *approved* Building Information Card that contains, but is not limited to, the following information:
  - 13.1. General building information that includes: property name, address, the number of floors in the building (above and below grade), use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor), estimated building population (i.e., day, night, weekend);
  - 13.2. Building emergency contact information that includes: a list of the building's emergency contacts (e.g., building manager, building engineer, etc.) and their respective work phone number, cell phone number, and e-mail address;
  - 13.3. Building construction information that includes: the type of building construction (e.g., floors, walls, columns, and roof assembly);
  - 13.4. Exit stair information that includes: number of *exit stairs* in the building, each *exit stair* designation and floors served, location where each *exit stair* discharges, *exit stairs* that are pressurized, *exit stairs* provided with emergency lighting, each *exit stair* that allows reentry, *exit stairs* providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve, location of elevator machine rooms, location of sky lobby, location of freight elevator banks;
  - 13.5. Building services and system information that includes: location of mechanical

rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator, location of natural gas service;

- 13.6. *Fire protection system* information that includes: locations of standpipes, location of fire pump room, location of fire department connections, floors protected by *automatic* sprinklers, location of different types of *automatic sprinkler systems* installed (e.g., dry, wet, pre-action, etc.); and
- 13.7. Hazardous material information that includes: location of hazardous material, quantity of hazardous material.
14. Work table.
15. Generator supervision devices, manual start and transfer features.
16. Public address system, where specifically required by other sections of this code.
17. Elevator fire recall switch in accordance with ASME A17.1.
18. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.

**SECTION 509  
FIRE PROTECTION AND UTILITY  
EQUIPMENT IDENTIFICATION AND ACCESS**

**509.1 Identification.** Fire protection equipment shall be identified in an *approved* manner. Rooms containing controls for air-conditioning systems, sprinkler risers and valves, or other fire detection, suppression or control elements shall be identified for the use of the fire department. *Approved* signs required to identify fire protection equipment and equipment location shall be constructed of durable materials, permanently installed and readily visible.

**509.1.1 Utility identification.** Where required by the *fire code official*, gas shutoff valves, electric meters, service switches and other utility equipment shall be clearly and legibly marked to identify the unit or space that it serves. Identification shall be made in an *approved* manner, readily visible and shall be maintained.

**509.2 Equipment access.** *Approved* access shall be provided and maintained for all fire protection equipment to permit immediate safe operation and maintenance of such equipment. Storage, trash and other materials or objects shall not be placed or kept in such a manner that would prevent such equipment from being readily accessible.

**SECTION 510  
EMERGENCY RESPONDER RADIO COVERAGE**

**510.1 Emergency responder radio coverage in new buildings.** All new buildings, as described in Section 510.1.1, shall have *approved* radio coverage for emergency responders

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within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.

### Exceptions:

1. Where *approved* by the building official and the *fire code official*, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained in lieu of an *approved* radio coverage system.
2. Where it is determined by the *fire code official* that the radio coverage system is not needed.
3. In facilities where emergency responder radio coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the *fire code official* shall have the authority to accept an automatically activated emergency responder radio coverage system.

**510.1.1 Scope.** Emergency responder radio coverage must be provided in the following buildings and locations:

1. Any building with one or more basement or below-grade building levels.
2. Any underground building.
3. Any building more than five stories in height.
4. Any building 50,000 square feet (4645 m<sup>2</sup>) in size or larger.
5. Any building that, through performance testing, does not meet the requirement of Section 510.

**510.2 Emergency responder radio coverage in existing buildings.** Existing buildings shall be provided with *approved* radio coverage for emergency responders as required in Chapter 11.

**510.3 Permit required.** A construction permit for the installation of or modification to emergency responder radio coverage systems and related equipment is required as specified in Section 105.7.5. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

**510.4 Technical requirements.** Systems, components, and equipment required to provide emergency responder radio coverage system shall comply with Sections 510.4.1 through 510.4.2.5.

**510.4.1 Radio signal strength.** The building shall be considered to have acceptable emergency responder radio coverage when signal strength measurements in 95 percent of all areas on each floor of the building meet the signal strength requirements in Sections 510.4.1.1 and 510.4.1.2.

**510.4.1.1 Minimum signal strength into the building.** A minimum signal strength of -100 dBm at the agency's antenna port shall be received by the agency's radio system when transmitted from within the building.

**510.4.1.2 Minimum signal strength out of the building.** A minimum signal strength of -95 dBm shall be received by the agency's radio system when transmitted from within the building.

**510.4.2 System design.** The emergency responder radio coverage system shall be designed in accordance with Sections 510.4.2.1 through 510.4.2.5.

**510.4.2.1 Amplification systems allowed.** Buildings and structures which cannot support the required level of radio coverage shall be equipped with a radiating cable system, a distributed antenna system with Federal Communications Commission (FCC)-certified signal boosters, or other system approved by the *fire code official* in order to achieve the required adequate radio coverage.

**510.4.2.2 Technical criteria.** The *fire code official* shall maintain a document providing the specific technical information and requirements for the emergency responder radio coverage system. This document shall contain, but not be limited to, the various frequencies required, the location of radio sites, effective radiated power of radio sites, and other supporting technical information.

**510.4.2.3 Secondary power.** Emergency responder radio coverage systems shall be provided with an *approved* secondary source of power. The secondary power supply shall be capable of operating the emergency responder radio coverage system for a period of at least 24 hours. When primary power is lost, the power supply to the emergency responder radio coverage system shall automatically transfer to the secondary power supply.

**510.4.2.4 Signal booster requirements.** If used, signal boosters shall meet the following requirements:

1. All signal booster components shall be contained in a National Electrical Manufacturer's Association (NEMA) 4-type waterproof cabinet.
2. Battery systems used for the emergency power source shall be contained in a NEMA 4-type waterproof cabinet.
3. The signal booster system and battery system shall be electrically supervised and monitored by a supervisory service, or when *approved* by the *fire code official*, shall sound an audible signal at a constantly attended location.
4. Equipment shall have FCC certification prior to installation.

**510.4.2.5 Additional frequencies and change of frequencies.** The emergency responder radio coverage system shall be capable of modification or expansion in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC.

**510.5 Installation requirements.** The installation of the public safety radio coverage system shall be in accordance with Sections 510.5.1 through 510.5.4.

**510.5.1 Approval prior to installation.** Amplification systems capable of operating on frequencies licensed to any public safety agency by the FCC shall not be installed without prior coordination and approval of the *fire code official*.

**510.5.2 Minimum qualifications of personnel.** The minimum qualifications of the system designer and lead installation personnel shall include:

1. A valid FCC-issued general radio operators license; and
2. Certification of in-building system training issued by a nationally recognized organization, school or a certificate issued by the manufacturer of the equipment being installed.

These qualifications shall not be required where demonstration of adequate skills and experience satisfactory to the *fire code official* is provided.

**510.5.3 Acceptance test procedure.** When an emergency responder radio coverage system is required, and upon completion of installation, the building *owner* shall have the radio system tested to ensure that two-way coverage on each floor of the building is a minimum of 90 percent. The test procedure shall be conducted as follows:

1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas.
2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency's radio communications system.
3. Failure of a maximum of two nonadjacent test areas shall not result in failure of the test.
4. In the event that three of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of a maximum of four nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 90 percent coverage requirement.
5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered failure of that test area. Additional test locations shall not be permitted.
6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building *owner* so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building *owner* shall be required to rerun the acceptance test to reestablish the gain values.

7. As part of the installation a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at time of installation and subsequent annual inspections.

**510.5.4 FCC compliance.** The emergency responder radio coverage system installation and components shall also comply with all applicable federal regulations including, but not limited to, FCC 47 CFR Part 90.219.

**510.6 Maintenance.** The emergency responder radio coverage system shall be maintained operational at all times in accordance with Sections 510.6.1 through 510.6.3.

**510.6.1 Testing and proof of compliance.** The emergency responder radio coverage system shall be inspected and tested annually or whenever structural changes occur including additions or remodels that could materially change the original field performance tests. Testing shall consist of the following:

1. In-building coverage test as described in Section 510.5.3.
2. Signal boosters shall be tested to ensure that the gain is the same as it was upon initial installation and acceptance.
3. Backup batteries and power supplies shall be tested under load of a period of one hour to verify that they will properly operate during an actual power outage. If within the 1-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional 1-hour periods until the integrity of the battery can be determined.
4. All other active components shall be checked to verify operation within the manufacturer's specifications.
5. At the conclusion of the testing, a report, which shall verify compliance with Section 510.5.3, shall be submitted to the *fire code official*.

**510.6.2 Additional frequencies.** The building *owner* shall modify or expand the emergency responder radio coverage system at their expense in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC. Prior approval of a public safety radio coverage system on previous frequencies does not exempt this section.

**510.6.3 Field testing.** Agency personnel shall have the right to enter onto the property at any reasonable time to conduct field testing to verify the required level of radio coverage.

