

CHAPTER 9 FIRE PROTECTION SYSTEMS

Double strike through denotes model language deleted by Oregon
Blue text denotes Oregon Amendments

SECTION 902 DEFINITIONS

[B] SUBSTANTIAL ALTERATION.
[B] SUBSTANTIAL DAMAGE.

SECTION 903 AUTOMATIC SPRINKLER SYSTEMS

903.1.1 Alternative protection. Alternative automatic fire-extinguishing systems complying with Section 904 shall be permitted in lieu of automatic sprinkler protection where recognized by the applicable standard and *approved* by the ~~fire code~~ *building official*.

903.2.6 Group I. An *automatic sprinkler system* shall be provided throughout buildings with a Group I *fire area*.

Exceptions:

1. An *automatic sprinkler system* installed in accordance with Section 903.3.1.2 shall be allowed in Group I-1 **Condition 2** facilities.
- ~~2. An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be allowed in Group I-1 facilities when in compliance with all of the following:
2.1A Hydraulic design information sign is located on the system riser;
2.2 Exception 1 of Section 903.4 is not applied; and
2.3 Systems shall be maintained in accordance with the requirements of Section 903.3.1.2.~~
- 3. 2.** An *automatic sprinkler system* is not required where **Group I-4** daycare facilities are at the *level of exit discharge* and where every room where care is provided has at least one exterior *exit door*.
- ~~4. 3.~~ In buildings where Group I-4 daycare is provided on levels other than the *level of exit discharge*, an *automatic sprinkler system* in accordance with Section 903.3.1.1 shall be installed on the entire floor where care is provided and all floors between the level of care and the *level of exit discharge*, all floors below the *level of exit discharge*, other than areas classified as an open parking garage.

903.2.7 Group M. An *automatic sprinkler system* shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

1. A Group M *fire area* exceeds 12,000 square feet (1115 m²).
2. A Group M *fire area* is located more than three stories above grade plan.
3. The combined area of all Group M *fire areas* on all floors, including any mezzanines, exceeds 24,000 square feet (230 m²).
- ~~4. A Group M occupancy is used for the display and sale of upholstered furniture or mattresses exceeds 5,000 square feet (464 m²).~~

903.2.7.2 Display and sale of upholstered furniture or mattresses. An *automatic sprinkler system* shall be provided throughout the *fire area* of a Group M occupancy used for the display and sale of upholstered furniture or mattresses with an aggregate display area exceeding 5,000 square feet (464 m²).

903.2.8.1 Group R-3 or R-4 congregate residences. An *automatic sprinkler system* installed in accordance with Section 903...3.1.3 shall be permitted in Group R-3 or R-4 congregate living facilities with 16 or fewer residents.

903.2.8.2 Group R-4 Condition 1. An *automatic sprinkler system* installed in accordance with 903.3.1.3 shall be permitted in Group R-4 Condition 1.

903.2.8.3 Group R-4 Condition 2. An *automatic sprinkler system* installed in accordance with 903.3.1.2 shall be permitted in Group R-4 Condition 2. Attic shall be protected in accordance with Sections 903.2.8.3.1 or 903.2.8.3.2.

903.2.8.3.1 Attics used for living purposes, storage or fuel fired equipment. Attics used for living purposes, storage or fuel fired equipment shall be protected throughout with an *automatic sprinkler system* installed in accordance with 903.3.1.2.

903.2.8.3.2 Attics not used for living purposes, storage or fueled fired equipment. Attics not used for living purposes, storage or fuel fired equipment shall be protected in accordance with one of the following;

1. Attic protected throughout by a heat detector system arranged to activate the building fire alarm system in accordance with Section 907.2.10.
2. Attics constructed of noncombustible materials.
3. Attics constructed of fire-retardant-treated wood framing complying with Section 2303.2 of the *Oregon Structural Specialty Code*.
4. The automatic fire sprinkler system shall be extended to provide protection throughout the attic space.

903.2.8.5 Requirements. Where substantial alterations are made or substantial damage occurs to an existing nonsprinklered Group R-2 apartment house, designed and constructed under the provisions of the *Oregon Structural Specialty Code*, an approved automatic sprinkler system complying with NFPA 13R shall be installed only in the substantially altered or damaged dwelling units. When more than 50 percent of the dwelling units within a building are substantially altered or damaged, the entire apartment house occupancy shall be provided with an NFPA 13R sprinkler system or equivalent.

For the purpose of this section when a NFPA 13R sprinkler system is installed, a fire department connection shall not be required.

903.3.1.1.1 Exempt locations. Automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an *approved* automatic fire detection system in accordance with Section 907.2 that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from any room merely because it is damp, of fire-resistance rated construction or contains electrical equipment.

1. Any room where the application of water, or flame and water, constitutes a serious life or fire hazard.
2. Any room or space where sprinklers are considered undesirable because of the nature of the contents, when approved by the ~~fire code~~ **building** official.
3. Generator and transformer rooms separated from the remainder of the building by walls and floor/ceiling or roof/ceiling assemblies having a *fire-resistance rating* of not less than 2 hours.
4. Rooms or areas that are of noncombustible construction with wholly noncombustible contents.
5. Fire service access elevator machine rooms and machinery spaces.
6. Machine rooms and machinery spaces associated with occupant evacuation elevators designed in accordance with Section 3008 of the International Building Code.

903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of *dwelling units* where the building is of Type V construction, ~~provided there is a roof or deck above.~~ Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are

within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.

903.3.1.3 NFPA 13D sprinkler systems. *Automatic sprinkler systems* installed in one and two-family *dwelling*s, Group R-3, ~~and R-4 *congregate living facilities*~~ **Condition 1** and *townhouses* shall be permitted to be installed throughout in accordance with NFPA 13D.

903.4.1 Monitoring. Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an *approved* supervising station or, when *approved* by the ~~fire~~ **building code** official, shall sound an audible signal at a constantly attended location.

Exceptions:

1. Underground key or hub valves in roadway boxes provided by the municipality or public utility are not required to be monitored.
2. Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.

**SECTION 904
ALTERNATIVE AUTOMATIC
FIRE-EXTINGUISHING SYSTEMS**

904.2 Where required. Automatic fire- extinguishing systems installed as an alternative to the required *automatic sprinkler systems* of Section 903 shall be *approved* by the ~~fire~~ **building code** official. Automatic fire-extinguishing systems shall not be considered alternatives for the purposes of exceptions or reductions allowed by other requirements of this code.

**SECTION 905
STANDPIPE SYSTEMS**

905.4 Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required *stairway*, a hose connection shall be provided for each floor level above or below grade. Hose connections shall be located at an intermediate floor level landing between floors, unless otherwise *approved* by the *fire code official*.
2. On each side of the wall adjacent to the *exit* opening of a horizontal *exit*.

Exception: Where floor areas adjacent to a horizontal *exit* are reachable from *exit stairway* hose connections by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal *exit*.

3. In every *exit* passageway, at the entrance from the exit passageway to other areas of a building.

Exception: Where floor areas adjacent to an exit passageway are reachable from *exit stairway* hose connections by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the exit passageway to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an *exit* passageway or *exit corridor* to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an exit passageway or exit corridor to the mall

5. Where the roof has a slope less than four units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of a *stairway* with stair access to the roof provided in accordance with Section 1009.16.
6. Where the most remote portion of a nonsprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story is more than 200 feet (60 960 mm) from a hose connection, the ~~fire building code~~ *official* is authorized to require that additional hose connections be provided in *approved* locations.

905.5.3 Class II system 1-inch hose. A minimum 1-inch (25 mm) hose shall be allowed to be used for hose stations in light-hazard occupancies where investigated and *listed* for this service and where *approved* by the ~~fire building code~~ *official*.

SECTION 907 FIRE ALARM AND DETECTION SYSTEMS

907.1.1 Construction documents. *Construction documents* for fire alarm systems shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code, the *International Building Code*, and relevant laws, ordinances, rules and regulations, as determined by the ~~fire building code~~ *official*.

907.2.6.1 Group I-1. An automatic smoke detection system shall be installed in *corridors*, waiting areas open to *corridors* and *habitable spaces* other than *sleeping units* and kitchens. The system shall be activated in accordance with Section 907.6.

Exceptions:

1. ~~Smoke~~ **For Group I-1 Condition 1 smoke** detection in *habitable spaces* is not required where the facility is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.
2. Smoke detection is not required for exterior balconies.

907.2.11 Single- and multiple-station smoke alarms. *Listed* single- and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.4 and NFPA 72.

Note: Readers should also consult the Oregon smoke detection law located in ORS 479.250 through 479.300.

907.5.2.3.3 Groups I-1, and R-1 and R-4. Group I-1, ~~and R-1~~ **and R-4** *dwelling units* or *sleeping units* ~~in accordance with Table 907.5.2.3.3~~ shall be provided with a visible alarm notification appliance, activated by both the in-room smoke alarm and the building fire alarm system **in accordance with Table 907.5.2.3.3 and the accessibility requirements of ICC A117.1.**

907.5.2.3.4 Group R-2. In Group R-2 occupancies required by Section 907 to have a fire alarm system, ~~all dwelling units and sleeping units shall be provided with the capability to support visible alarm notification appliances in accordance with chapter 10 of ICC A117.1. Such capability shall be permitted to include the potential for future interconnection of the building fire alarm system with the unit smoke alarms, replacement of audible appliances with combination audible/visible appliances, or future extension of the existing wiring from the unit smoke alarm locations to required locations for visible appliances~~ **visual alarms shall be provided within common and public areas, but are not required within individual dwelling units.**

SECTION 908 EMERGENCY ALARM SYSTEMS

908.7 Carbon monoxide alarms. Approved carbon monoxide alarms in new buildings and structures shall be provided in the locations described in Sections 908.7.1 and 908.7.2.

908.7.1 Carbon monoxide alarms Group I. ~~Group I or R~~ occupancies located in a building containing a fuel-burning appliance or in a building which has an attached garage shall be equipped with single-station carbon monoxide alarms. The carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. An open parking garage, as defined in Chapter 2 of the *International Building Code*, or an enclosed parking garage ventilated in accordance with Section 404 of the *International Mechanical Code* shall not be considered an attached garage.

Exception: ~~Sleeping units or dwelling units~~ which do not themselves contain a fuel-burning appliance or have an attached garage, but which are located in a building with a fuel-burning appliance or an attached garage, need not be equipped with single-station carbon monoxide alarms provided that:

1. The ~~sleeping unit or dwelling unit~~ is located more than one story above or below any story which contains a fuel-burning appliance or an attached garage;
2. The ~~sleeping unit or dwelling unit~~ is not connected by duct work or ventilation shafts to any room containing a fuel-burning appliance or to an attached garage: and
3. The building is equipped with a common area carbon monoxide alarm system.

908.7.1.1 Carbon monoxide detection systems. Carbon monoxide detection systems, which include carbon monoxide detectors and audible notification appliances, installed and maintained in accordance with this section for carbon monoxide alarms and NFPA 720 shall be permitted. The carbon monoxide detectors shall be *listed* as complying with UL 2075.

908.7.2 Carbon monoxide alarms Group R. ~~For new construction, approved single-station~~ Carbon monoxide alarms or a household carbon monoxide detection system shall be installed in **Group R Occupancies**. ~~each of the following:~~

- ~~1. Group R Occupancies identified in Section 310 of the *International Building Code*, and~~
- ~~2. Groups SR 3 and SR 4 Occupancies identified in Appendix SR of the *International Building Code*.~~

908.7.2.1 Installation location. Carbon monoxide alarms shall be located in each bedroom or within 15 feet outside of each bedroom door. Bedrooms on separate floor levels in a structure consisting of two or more stories shall have separate carbon monoxide alarms serving each story.

908.7.2.1.2 Three or more dwelling units. In addition to the locations required by section 908.7.2.1, a carbon monoxide alarm shall be installed in any enclosed common areas within buildings containing three or more dwelling units.

908.7.2.2 Alarm requirements.

908.7.2.2.1 Single station alarm requirements. Single station carbon monoxide alarms shall be listed as complying with ANSI/UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.

908.7.2.2.2 Household carbon monoxide detection systems. Household carbon monoxide detection systems, that include carbon monoxide detectors and audible notification appliances, installed and maintained in accordance with this section for carbon monoxide alarms and NFPA720 shall be permitted. The carbon monoxide detectors shall be listed as complying with ANSI/UL 2075.

908.7.2.2.3 Combination smoke/carbon monoxide alarm/detector requirements. Combination smoke/carbon monoxide alarms shall be listed as complying with ANSI/UL 2034 and ANSI/UL 217. Combination smoke/carbon

monoxide detectors shall be listed as complying with ANSI/UL 2075 and ANSI/UL 268. See section 907.2.11 of this code for additional requirements specific to the installation of smoke alarms.

908.7.2.3 Power Source.

908.7.2.3.1 Carbon monoxide alarms. Single station carbon monoxide alarms shall be battery operated, or may receive their primary power from the building wiring system. Plug in devices securely fastened to the structure and installed in accordance with the manufacturer's installation instructions are deemed to satisfy this requirement. Hard wired and plug in carbon monoxide alarms shall be equipped with battery back up.

908.7.2.3.2 Household carbon monoxide detection systems. Required power supply sources for household carbon monoxide detection systems shall be in accordance with NFPA 720.

908.7.2.3.3 Combination smoke/carbon monoxide alarms/detectors. Combination smoke/carbon monoxide alarms/detectors shall receive their power source in accordance with section 907.2.11.4 and NFPA 72. Smoke alarm features of combination smoke/carbon monoxide alarms shall be interconnected.

Exception: Interconnection and hard-wiring of combination smoke/carbon monoxide alarms/detectors in existing areas shall not be required where the alterations or repairs do not result in the removal of interior wall or ceiling finishes exposing the structure.

908.7.2.4 Where required in existing affected occupancies. Where a new carbon monoxide source is introduced or work requiring a structural permit occurs in existing **Group R** occupancies, ~~as identified in section 908.1,~~ carbon monoxide alarms shall be provided in accordance with section 908.7.2.1 through 908.7.2.3 of this code.

Exception: Work involving the exterior surfaces of affected occupancies, such as the replacement of roofing or siding, or the *addition* or replacement of windows or doors, or the *addition* of a porch or deck, are exempt from the requirements of this section.

908.7.5 Testing and maintenance. Carbon monoxide alarms and systems shall be maintained and tested in accordance with NFPA 720 and the manufacturer's instructions.

SECTION 909 SMOKE CONTROL SYSTEMS

909.5.1 Leakage area. Total leakage area of the barrier is the product of the *smoke barrier* gross area multiplied by the allowable leakage area ratio, plus the area of other openings such as gaps and operable windows. Compliance shall be determined by achieving the minimum air pressure difference across the barrier with the system in the smoke control mode for mechanical smoke control systems. Passive smoke control systems tested using other *approved* means, such as door fan testing, shall be as *approved* by the ~~fire building code~~ official.

909.7 Airflow design method. When *approved* by the ~~fire building code~~ official, smoke migration through openings fixed in a permanently open position, which are located between smoke-control zones by the use of the airflow method, shall be permitted. The design airflow shall be in accordance with this section. Airflow shall be directed to limit smoke migration from the fire zone. The geometry of openings shall be considered to prevent flow reversal from turbulent effects.

909.8 Exhaust method. When *approved* by the ~~fire building code~~ official, mechanical smoke control for large enclosed volumes, such as in atriums or malls, shall be permitted to utilize the exhaust method. Smoke control systems using the exhaust method shall be designed in accordance with NFPA 92B.

909.9 Design fire. The design fire shall be based on a rational analysis performed by the registered design professional and *approved* by the ~~fire building code~~ official. The design fire shall be based on the analysis in accordance with Section 909.4 and this section.

909.10 Equipment. Equipment including, but not limited to, fans, ducts, automatic dampers and balance dampers shall be suitable for their intended use, suitable for the probable exposure temperatures that the rational analysis indicates, and as *approved* by the ~~fire~~ **building code** official.

909.15 Control diagrams. Identical control diagrams showing all devices in the system and identifying their location and function shall be maintained current and kept on file with the ~~fire~~ **building code** official, the fire department and in the *fire command center* in a format and manner *approved* by the ~~fire~~ **code official** ~~fire chief~~.

909.18.8.3.1 Report filing. A copy of the final report shall be filed with the ~~fire~~ **and building code** official and an identical copy shall be maintained in an *approved* location at the building.

909.19 System acceptance. Buildings, or portions thereof, required by this code to comply with this section shall not be issued a certificate of occupancy until such time that the ~~fire~~ **building code** official determines that the provisions of this section have been fully complied with and that the fire department has received satisfactory instruction on the operation, both automatic and manual, of the system and a written maintenance program complying with the requirements of Section 909.20.1 has been submitted and *approved* by the ~~fire~~ **code official**.

Exception: In buildings of phased construction, a temporary certificate of occupancy, as *approved* by the ~~fire~~ **building code** official, shall be allowed, provided that those portions of the building to be occupied meet the requirements of this section and that the remainder does not pose a significant hazard to the safety of the proposed occupants or adjacent buildings.

SECTION 910 SMOKE AND HEAT VENTS

910.2.3 Group I-3 Emergency ventilation. Group I-3, resident housing areas shall be equipped with smoke and heat venting by one of the following:

1. A manually operated mechanical system capable of at least six air changes per hour of exhaust with mechanical or natural makeup air.
2. Roof vents capable of being manually operated, installed in accordance with their listing and Section 910.3.2. The maximum center-to-center spacing between vents shall be 100 feet (45 720 mm) and the venting ration of effective area of vent openings to floor area shall be 1:150.

910.4 Mechanical smoke exhaust. Where *approved* by the ~~fire~~ **building code** official, engineered mechanical smoke exhaust shall be an acceptable alternative to smoke and heat vents.

SECTION 914 FIRE PROTECTION BASED ON SPECIAL DETAILED REQUIREMENTS OF USE AND OCCUPANCY

914.8.2 Fire suppression. Aircraft hangars shall be provided with a fire suppression system designed in accordance with NFPA 409, based upon the classification for the hangar given in Table 914.8.2.

Exception:

1. When a fixed base operator has separate repair facilities on site, Group II hangars operated by a fixed base operator used for storage of transient aircraft only shall have a fire suppression system, but the system shall be exempt from foam requirements.
2. **Aircraft hangers that have an aircraft access door height less than 28 feet (8534 mm), and do not have provisions for housing aircraft with a tail height over 28 feet (8534 mm), are exempt from foam requirements provided the building complies with all the following criteria:**
 - 2.1 **The building is surrounded and adjoined by public ways or yards not less than 60 feet (18,288 mm) in width.**

- 2.2 The building is provided with an *automatic sprinkler system* throughout with a design density of 0.25 gal/min. (0.016 L/s).
- 2.3 The total fuel capacity of all aircraft located within a single *fire area* does not exceed 5,000 gallons (18,927 L).
- 2.4 No single *fire area* exceeds 65,000 square feet (2716 m²).
- 2.5 The gross building area does not exceed 75,000 square feet (4288 m²).