

Fire Inspector Study Guide

- Initiating devices- activated Fire, smoke, flame and heat detectors
- Acceptance testing- performed after system has been installed
- Electronic heat detector- activates by smoke/heat (rate of rise)
- Wet chemical extinguisher- water/potassium
- Discharge is controlled by nozzle/lever (extinguisher)
- Control valves- used to isolate the flow of water (hydrants)
- Pyrophoric materials- can ignite within 5 minutes of being exposed to air
- Self-heating- has potential to self-heat when in contact with air
- Non bulk containers- used for liquids/gas
- Underground storage tanks- opening is at the top of tank above the liquid
- Means of egress must terminate in a public way or area of refuge
- Public way- street or alley open to the outside- min width 10 ft
- Exit discharge- portion of means of egress that is between exit and public way
- Stairwells- must be at least 44 inches wide (more than 50 people). 36 inches wide (less than 50 people)
- Occupant load- net floor area
- Concrete floors are fire resistive
- Sheathing- used outside of the studs to provide structural stability
- Stone-rocks that have been removed from a quarry and cut to size
- Type 1 construction- non combustible
- Type IV construction- heavy timber
- Ambulatory health care occupancies- 4 or more pt's is considered OUT PATIENT
- Storage occupancies- goods, merchandise, vehicles, animals
- Temperature- measure of average kinetic energy of the particles in a sample of matter
- Medium/channel- path a message takes
- Understanding- decoding message/assign meaning
- Photos- helpful when documenting violations
- Results review- inspector discusses results with owner/occupant/property manager
- Exit access-leads from occupied portion of building to exit
- Area of refuge- unable to use stairs and can remain temporarily
- Demolition sites- rapid fire spread due to large quantities of unprotected combustible materials on site
- Household lamp- less than 10 % of electricity
- Public water supply- rivers, streams, lakes, reservoirs, ground water
- Structural fire load- wall studs, floors, ceiling joists and roof supports

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- Fuel load- total quantity of combustible contents of the building. Interior finish and trim.
- Dead load-weight of the structure, structural members ,building components and any other features permanently attached to the building that are constant and immobile
- Lumber can be stacked 20 ft high
- Fire retardant wood- impregnation and surface coating
- Complaints that aren't serious can be assigned to inspection staff
- Fire alarm control unit-electronics that monitor the wiring of the system
- Proprietary system-large commercial, group of commonly owned facilities (tested annually/ extensive repair or modification)
- Evacuation phases: phase 1 – single room: phase 2 –entire zone: phase 3-entire floor, then floor above: phase 4 – entire building
- Engineered wood products- use panels, adhesives and metal fasteners
- Nursing home is classified as group B division 2
- Fire lane- 150 ft long with a clearance of 13 ft 6 inches
- Fire lane markings- curbs painted red with white lettering, street painted white with red lettering
- Fire lane width- min of 20 feet
- Field verification- reliable water supply, temporary fire suppression system
- Expert witness- sufficient skills, knowledge and experience in the field
- Review how to testify in court: page 23
- Review sending and receiving messages: page 690-691
- When finding a violation-initiate the process that leads to correction
- Always refer to complaint records before making an inspection
- Permit authorizes right of entry for fire inspector at any time
- Operational permits-allows person or group to conduct operation for specified time
- Construction permit- installation or alteration of system or equipment
- NFPA- publishes the majority consensus in fire protection, electrical systems and life safety systems
- Felony/bench trial- no jury only judge
- Misdemeanor- less serious
- Felony- most serious
- Awning windows- big glass that swings outwards
- Fire wall- fire resistive rated wall that protects openings
- Checking for stamp on large bottles- unsafe behavior
- Open burning- apply for permit before the burn date
- Flaming foods- usually considered open burning (hibachi)

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- SDS- safety data sheets –used world wide
- Used closed system- no release of vapors (piping system)
- Open system- moving to a different container
- Underground storage tanks are the safest way to store hazardous materials
- Dry barrel hydrant- used in freezing climates
- Pitot testing a hydrant- hold the gauge one half of the diameter of the opening
- Fusible link- melts and activates
- Pressure control device- manages pressure
- Halotron-no residue and doesn't conduct electricity
- O placard –minimal risk
- Best way to handle violations – follow up inspections
- Special locking doors- automatically open when there is loss of power
- Auto ignite- heated up and catches fire (no spark)
- Lodging/boarding- sleeping accommodations for rent
- Fully developed stage of fire- everything is burning
- Energy that is stored- potential energy
- Code- collection of rules and regulations
- Standard-principals, protocols, procedures
- Model code- enforceable when the AHJ adopts them
- New and existing structures- must be brought up to correct/stricter codes

Fire development in a compartment is in four stages

1. Incipient stage- starts with ignition. Which can be broken do to 2 types.
 - A. Piloted is caused by a spark or flame.
 - B. Non-piloted cause by self-ignite.
2. Growth Stage- a plume of hot gases and flames rises from the and mixes with the cooler air within the room (convection). The fire is influenced by the configuration of the compartment and the amount ventilation. Will exhibits a variety of traits that indicate change in the environment are thermal layer, isolated flames, rollover, and flashover.

Thermal Layering- is a gases is the tendency of gases to separate into layers according to temperature. Other terms that describe are heat stratification and thermal balance. Hot gases at the top cooler are lower.

Isolated Flames – as the fire moves through the growth stage pockets of flames mat be observed_moving_through the hot-gas layer above neutral plane called ghosting.

Rollover – unburn gas accumulates at the top of a compartment ignite and flames propagated through the hot gas layer or across the ceiling. Like ghosting, rollover is fire gas ignition.

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Flashover – is the rapid transition between the growth stage and the fully developed stage but is not a specific event like ignition.

Fully Developed Stage – occurs when all combustible materials in the compartment are burning.

Decay Stage – all fuel is consumed or as the oxygen concentration falls to the point where flaming combustion can no longer be supported.

Factors that affect Fire Development

The most fundamental fuel characteristics influencing fire development are mass and surface area.

Most fires beyond the incipient stage is or will quickly become ventilation-controlled, changing ventilation is one of the most significant factors in changing fire behavior.

Construction Type

Type 1 is only non-combustibles of limited combustibles materials and provides the highest level of safety. All structural members are composed reinforced concrete and precast concrete along with protected steel frame construction.

Type 2 composed of building materials that will not contribute to a fire development or spread.

Type 3 is commonly used when building churches, schools apartment dwelling and mercantile structures. Exterior walls be made out non-combustibles materials and interior elements be constructed of any material permitted by code.

Type 4 referred to a heavy timber construction , used large dimensions lumber greater than 4 inches for all structural elements.

Type 5 commonly known as wood frame, exterior walls are composed of entirely of wood and other combustible materials.

Occupancy Classifications

NFPA 101 and 5000 Building inspection and safety code describes and educational occupancy as a structure that is used by 6 or more persons through 12 grades that meets for 4 or more hours a day or more than 12 hours a week.

Heath Care, and Ambulatory, are both 4 or more patients who cannot evacuate themselves.

Residential

One two dwelling Units maximum of 2 units each containing cooking and bathroom facilities.

Lodging or Rooming house provides sleeping accommodation for a total of 16 or fewer people who are not related on a transient or permanent basis. Food service may or may not be provided.

Hotel under same management that provides sleeping accommodation for 16 or more persons.

Dormitory providing sleeping accommodation for 16 or more person in one room a series of closely associated rooms.

Apartment contains 3 or more living units with cooking and bathroom.

Board and care personal care provided to 4 or more residents who are unrelated to the owner or operator.

Means of Egress

If 50 or more people are in a room or occupancy the exit requirement for the building take on a higher level of significance and additional exiting system requirement must be met.

Water-Based fire suppression systems

4 basic types – wet-pipe sprinkler, dry-pipe, deluge, preactive.

Water-flow control valve must be indicting type valve that visually indicate whether they are open or closed.

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1. Outside stem and yoke (OS&Y) – has a yoke on the outside with a threaded stem or screw. The threads are out it is open.
2. Post indicated valve (PIV) – has a hollow metal post attached to the valve housing and a window with the words open or shut.
3. **Wall Post Indicator valve (WPIV)** – same as a PIV but it is horizontally out of a wall with the words open and shut.
4. Post indicator a valve assembly (PIVA) – similar to the PIV except that it uses a butterfly valve while the PIV uses a gate valve.

Dry Chemical – agent storage container (cylinders) that are less than 150 pounds must be hydrostatically tested every 12 years.

Smoke Detector

1. Photoelectric – referred to a visible products of combustion smoke detector. Two ways they detect project beam application or refractory. **Projected beam** uses a beam of light focused across the area being monitored onto a photoelectric receiving device such as photodiode. Refractory uses a beam of light from a light emitting diode (LED) that passes through a small chamber at a point distant from the light source.
2. Ionization – contains two electrically charged plates (positive and negative) charge and a radioactive source for ionizing the air between the plates.

Access

Interior – the very shell of a building acts as a barrier by preventing access at any point other than a door or window.

Nonbulk packaging used in transport or stored liquids in quantities 119 gallons or less use the term **container**. Bulk packaging is maximum capacity is greater than 119 gallons.

Inspection

1. Before an inspector proper preparation is most likely to gain community support. Over review records before inspection.
2. A phone call on the business day before inspection is also a good idea to confirm appointment and reinforces the importance of it and rescheduling if necessary.

Plans

The reasons for requiring construction permits and review of plans for **community safety**, property conservation, fighters emergency responder safety. All of the parties involved is a project must have a clear understanding of what is require long before a building is ready for occupancy.

Design analysis

Preliminary drawings are often referred to as a concept drawings. These preliminary meetings are often referred to as predesign conference. The work that needs to be down before plans are made.

Sprinkler heads

Concealed heads are installed above the ceiling and are hidden by a flush cover plate that can be factory painted to match the ceiling. The cover plate solders to the cup surrounding the head and has a lower activation temperature than the head so it can fall away well before discharge is necessary. Once the cover plate falls away, the heat goes directly to the heat-sensitive element, leading to head activation.

- Lowest amount of O₂ that sustains free burning, also applies to ignitable gas: **16%**.
- Sprinkler system that is used for enclosed buildings with no windows and a basement: **Automatic Sprinkler System (confirm this) ***.

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- What ICC group classification do people in hospitals that need medical attention require: **Group I (confirm this) ***.
- **Standard Council of Canada**: act as a coordinating and accrediting body for safety standards used in fire protection, construction, and other related fields.
- **ANSI**: Testing process of safety products. oversees the development and use of voluntary consensus standards for a wide range of products, services, and systems in the United States.
- For cone roof shaped tanks what physical hazards are they limited to: **Store Flammable & Combustible liquids and are limited to explosion hazards.**
- **Malfesance**: unlawful act committed by a public official knowingly.
- Alarm systems:
 - **Public Emergency Alarm Reporting System**: System that connects the protected property with the fire department alarm via a dedicated telephone line or municipal master fire alarm communications center.
 - **Proprietary Alarm System**: Fire alarm system owned and operated by property owner.
 - **Supervisory Signal**: Signal given by fire detection and alarm system when a monitored condition in the system is off normal.
 - **Alarm Signal**: Signal given by a fire detection and alarm system when there is a fire condition detected.
 - **Central Station System**: Alarm System that transmits a signal to a constantly attended location operated by an alarm company. This are retransmitted b y trained personal to the fire department alarm communications center.
 - **Trouble Signal**: signal given by a fire detection and alarm system when a power failure or other system malfunctions.
 - **(Direct alarm goes straight to fire department, confirm this) ***.
- When minerals, mud, and dead organisms are blocking the end of a pipe, what is it called: **Sedimentation.**
- How long should emergency lighting last for: **90 minutes (confirm this) *.**
- How many feet of separation should there be in an educational occupancy of less than 50 people in between each chair or table? **24 inches.**
- Different standpipes:
 - **Semi-Automatic**: Water flow is started by opening a valve manually, but the system itself is somewhat automatic in its operation. Typically involves pre-connected hoses for easier use by building occupants or trained staff. Usually found in Class II systems, which are designed for building occupants.
 - **Semi-Manual**: Requires a combination of manual activation (such as opening a valve) but may involve both firefighter-operated connections and pre-connected hoses. Generally, it refers to Class III systems, offering more flexibility and greater capability for both occupants and emergency personnel.
 - **Automatic-Wet**: In a wet standpipe system, water is constantly supplied and maintained in the pipes. This means that when a valve is opened (by firefighters or building occupants), water is immediately available to fight a fire.
 - **Automatic-Dry**: In a dry standpipe system, water is not stored within the pipes under normal conditions. The pipes are pressurized with air or inert gas, and the system remains dry until activated by the need for water. When a valve is opened, a deluge valve releases water into the system. Use air or nitrogen to keep the system pressurized. When the standpipe valve is opened, the air or gas is released, and water flows into the system, allowing firefighting efforts to commence.
- Violation: **usually considered the lowest level of offense.**

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- What type of witness per fire inspector 1 is allowed to state opinions in court: **Expert Witness: someone who is qualified by knowledge, skill, experience, or education to offer opinions and analysis about specific matters (confirm this) ***.
- **Attending:** the action of being present or observing a particular situation, event, or process related to fire safety or fire protection systems.
- **Design Input:** Review the architectural and engineering plans to ensure that fire safety features are integrated into the building's design from the outset.
- **Construction Standard:** Inspect the ongoing construction and installation of fire protection systems to ensure that they are implemented correctly according to the approved plans and specifications.
- **Foiled back gypsum:** used to replace vapor barrier in outside walls.
- **Core board:** used for shaft walls and partitions.
- **Back-layered core board:** refers to a construction technique where two layers of fire-resistant boards (such as core board) are used. In this case, one layer of the fire-resistant board is applied to the front of the structure, and the other layer, the back layer, is applied to the reverse side of the same assembly.
- **Fire Barriers:** are required to terminate at the floor or roof deck
- **Enclosure walls:** walls designed to prevent the spread of fire between different sections of a building. Protects means of egress in stairways.
- **Fire partitions:** are walls designed to limit the spread of fire between areas of a building. These walls are typically required to have a certain fire-resistance rating, such as 1-hour or 2-hour, depending on the building's use, size, and the local code requirements.
- Who performs the monthly visual inspection of the exterior of a tank: **Tank Owner.**
- API 653 performs external examinations every **5 years.**
- Tanks must be removed from service and internally inspected every **20 years.**
- Pressure vessels are engineered containers designed to store liquids, cryogenic, or gases at pressures of **15 PSIG or greater.**
- **Pitot tube and gauge:** used to measure the velocity pressure of the water flowing from a fire hydrant nozzle, which is then used to calculate the flow rate. TO determine fire flow from the hydrant.
- **Waterflow meter:** This device measures the actual volume of water flowing through the hydrant or pipe.
- **Non bulk packaging** containers used in transport or stored liquids must be in **quantities of 119 gallons or less.**
- When a building is demolished when should the record be purged: **purged once the demolition is complete ***
- **Pressure Control Device:** manages pressure. **Pressure-reducing valves** are used to regulate water pressure within a system. For fire hydrants or sprinklers, it ensures that the water entering the system doesn't exceed a certain pressure, which could be harmful to the components