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ABSTRACT:

So many choices! What types and how many fire extinguishers do I really need? I don't have a copy of NFPA 10. Isn't there a rule of thumb I can use? Learn how to select the correct fire extinguisher rating and extinguishing media for the potential fire hazards in your design project.

FILING:

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KEYWORDS:

Fire Extinguisher, fire hazard, occupancy hazard, multipurpose, dry chemical, wet chemical, pressurized water, water mist, clean agent, AFFF, FFFP, carbon dioxide, Class A, Class B, Class C, Class D, Class K

REFERENCES:

International Code Council

International Building Code (2009)

National Fire Protection Association

NFPA 10 - Standard for Portable Fire Extinguishers (2010

Portable Fire Extinguisher Selection

By David Stutzman, AIA, CSI, CCS, SCIP, LEED AP

Background

Selecting the right type and size portable fire extinguisher for each application and indicating the right location within a building has been a challenge. The building code makes a broad reference to NFPA 10 for requirements affecting selection, installation and maintenance. Without the NFPA document at hand, it is nearly impossible to select and layout fire extinguishers to meet the code. Extinguisher selection and installation is governed by these factors:

- Building occupancy hazards
- Fire hazard classes
- Travel distances
- Building floor area

Fire Hazards

Fires are classified by NFPA 10 according to the type of materials supporting combustion.

- Class A - Ordinary combustible material (wood, cloth, paper, rubber, and many plastics) fires
- Class B - Flammable and combustible liquid (petroleum, grease, solvents, flammable gas) fires.
- Class C - Energized electrical equipment fires.
- Class D - Combustible metal (magnesium, titanium, sodium) fires
- Class K - Cooking appliance with combustible cooking media (oils and fats) fires

Identify each hazard that is present in the building. Be careful to identify specific hazards for storage rooms, laboratories, kitchens, and other Special occupancies. The building and its contents will always be a Class A hazard. Electrical switchgear rooms will be a Class C fire hazard while commercial kitchens will be a Class K hazard.

Selection

Extinguishers are rated and labeled according to the fire hazard. The ratings are expressed by the fire class letter. A number precedes the Class A and B designation to indicate the extinguisher's relative effectiveness for each fire type. Class A ratings typically range from 1 to 40 and Class B ratings from 1 to 120 depending on the extinguisher type and size. Larger extinguishers will have greater ratings. (See Table, next page)

Be sure to verify the extinguisher ratings from each manufacturer. All dry chemical extinguishers are not rated for Class D and Class K fires. And all clean agent extinguishers are not rated for Class A fires.

Multipurpose extinguishers are often selected because they are effective on Class A, B, and C fires. However there are some exceptions.

Only Class K rated extinguishers may be used to protect cooking equipment.

In oxidizer (chlorine and bromine pool chemicals) storage areas, only water type extinguishers are permitted.

For healthcare applications in MRI suites, use non-magnetic water mist extinguishers with dionized water in aluminum containers. Dionized water can be used on Type C fires. Without ions, water cannot conduct electricity.

Clean agent extinguishers may be used only in areas where other types of extinguishers may damage equipment or cause a hazard to occupants.

Foam type extinguishers can be used to coat flammable liquid spills to prevent ignition and to control an active Class B fires.

Location

Fire extinguisher required locations and capacities are determined by:

- Occupancy hazard
- Fire hazard class
- Travel distance to extinguisher
- Floor area per Unit of A
- Floor area

IBC Table 906.3(1) and Table 906.3(2) set the requirements for Class A and Class B fires that control locations.

Locate extinguishers along paths of egress. Use a 60 foot diameter circle to set the spacing for the maximum 75 foot travel distance and the maximum 11, 250 sf floor area for each extinguisher.

Check the actual floor area permitted for the extinguisher's Unit of A. Common multipurpose extinguishers are rated 2A (5 lb), 4A (10 lb), and 10A (20 lb). The floor area permitted for each Unit of A is determined by the occupancy hazard defined by NFPA 10 based on Class A furnishings and (not OR) Class B materials.

Consider using extinguishers rated 4A for light hazard and 10A for the other hazards to maximize the floor area covered by each required extinguisher.

For Class B materials, reduce the travel distance to 30 feet or 50 feet depending on the hazard classification and extinguisher rating. See IBC Table 906.3(2). Add extinguishers at Class B material locations rather than adjusting the Class A spacing.

Consult NFPA 10 for specific fire extinguisher requirements when Class B materials may accumulate to a depth of 1/4 inch or more and when Class D fire potential exists.

Occupancy Hazard	Class A Furnishings	Class B Mat. per room	SF/Unit of A
Light	Low	<1 gal.	3,000
Ordinary	Moderate	1 to 5 gal.	1,500
Extra	High	>5 gal.	1,000

Extinguisher Type	Fire Hazard Class				
	A	B	C	D	K
Multipurpose Dry Chemical	●	●	●		
Dry Chemical		●	●	●	●
Wet Chemical	●				●
Pressurized Water	●				
AFFF Foam	●	●			
FFFP Foam	●	●			
Water Mist	●		●		
Carbon Dioxide		●	●		
Clean Agent	●	●	●		

Conclusion

Identify fire extinguisher locations, types, and ratings on the code compliance (life safety) drawings. Show the floor area coverage and maximum travel distance for each extinguisher. Adding these bits of information will allow the code official to quickly assess code compliance. Remember to specify fire rated extinguisher cabinets when the cabinets are located in a fire rated partition.

Be sure to consult with the local fire marshal.

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