

## 18.0 - FIRE PROTECTION AND PREVENTION

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### GENERAL REQUIREMENTS

#### 29 CFR PART 1926.150

(a) *General requirements:* (1) The employer shall be responsible for the development of a fire protection program to be followed throughout all phases of the construction and demolition work, and he shall provide for the firefighting equipment as specified in this subpart. As fire hazards occur, there shall be no delay in providing the necessary equipment.

### FIRE PROTECTION AND PREVENTION

Fire protection and preventions are commonly overlooked in the construction industry due to lack of concern of the potential fire hazard and the common statement: "It couldn't happen to me."

But that is not the case. It could happen to anyone at any given time. Therefore, by law, every operator/employer *must have* a written firefighting program.

### LIST OF FIRE PROTECTION LAWS MOST FREQUENTLY VIOLATED AND CITED:

1. Approved containers or tanks for storing or handling flammable or combustible liquids.
2. Fire extinguisher for every 3000 square feet of protected building area or 100 feet of travel.
3. Provide for firefighting equipment and a fire protection program.
4. No smoking signs posted in service and refueling areas.
5. Specifications for fire extinguisher on each floor of multi-story structure.
6. Fire extinguisher in all service and refueling areas.

### 18.0 Fire Protection And Prevention, *continued*

The following information, pages 3 - 7, is based on OSHA Part 1925 Subpart F - Fire Protection and Prevention.

SOURCE: OSHA Part 1926, CONSTRUCTION SAFETY & HEALTH COMPLIANCE

**Engel Electric Co.**

1514 West Fourth Street Sterling, IL 61081

**Title: Fire Protection and Prevention Safety Procedures****PART I: General Fire Protection**

**(a) General requirements.** (1) Engel Electric shall be responsible for the following fire protection program to be carried out through all phases of the construction and demolition work, and shall provide for the firefighting equipment as specified in this subpart. As fire hazards occur, there shall be no delay in providing the necessary equipment.

(2) Access to all available firefighting equipment shall be maintained at all times.

(3) All firefighting equipment, provided by Engel Electric shall be conspicuously located.

(4) All firefighting equipment shall be periodically inspected and maintained in operating condition. Defective equipment shall be immediately replaced.

(5) If warranted by the project, The Company shall provide a trained and equipped firefighting organization (Fire Brigade) to assure adequate protection to life.

**(b) Water supply.** (1) A temporary or permanent water supply, of sufficient volume, duration, and pressure, required to properly operate the firefighting equipment shall be made available as soon as combustible materials accumulate.

1926.150(b)(2)

(2) Where underground water mains are to be provided, they shall be installed, completed, and made available for use as soon as practicable.

**(c) Portable firefighting equipment-** (1) Fire extinguishers and small hose lines. (i) A fire extinguisher, rated not less than 2A, shall be provided for each 3,000 square feet of the protected building area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet.

(ii) One 55-gallon open drum of water with two fire pails may be substituted for a fire extinguisher having a 2A rating.

(iii) A 1/2-inch diameter garden-type hose line, not to exceed 100 feet in length and equipped with a nozzle, may be substituted for a 2A-rated fire extinguisher, providing it is capable of discharging a minimum of 5 gallons per minute with a minimum hose stream range of 30 feet horizontally. The garden-type hose lines shall be mounted on conventional racks or reels. The number and location of hose racks or reels shall be such that at least one hose stream can be applied to all points in the area.

(iv) One or more fire extinguishers, rated not less than 2A, shall be provided on each floor. In multistory buildings, at least one fire extinguisher shall be located adjacent to stairway.

1926.150(c)(1)(v)

(v) Extinguishers and water drums, subject to freezing, shall be protected from freezing.

(vi) A fire extinguisher, rated not less than 10B, shall be provided within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used on the jobsite. This requirement does not apply to the integral fuel tanks of motor vehicles.

*(vii) Carbon tetrachloride and other toxic vaporizing liquid fire extinguishers are prohibited.*

(viii) Portable fire extinguishers shall be inspected periodically and maintained in accordance with Maintenance and Use of Portable Fire Extinguishers, NFPA No. 10A-1970.

(ix) Fire extinguishers which have been listed or approved by a nationally recognized testing laboratory, shall be used to meet the requirements of this subpart.

(x) The provided insert may be used as a guide for selecting the appropriate portable fire extinguishers.

**(SEE PROVIDED TABLE FOR  
FIRE EXTINGUISHER SELECTION)**

1926.150(c)(1)(xi)

(xi) **"Employment and training."** Where Engel Electric has provided portable fire extinguishers for employee use in the workplace, The Company shall also provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved with incipient stage fire fighting.

**(xii) Engel Electric shall provide the education required in paragraph (c)(1)(xi) of this section upon initial employment and at least annually thereafter.**

(xiii) Engel Electric shall assure that portable fire extinguishers are maintained in a fully charged and operable condition and kept in their designated places at all times except during use.

(xiv) Engel Electric shall assure that portable fire extinguishers are subjected to an annual maintenance check. Stored pressure extinguishers do not require an internal examination. The Company shall record the annual maintenance date and retain this record for one year after the last entry or the life of the shell, whichever is less. The record shall be available to the Assistant Secretary upon request.

(2) Fire hose and connections. (i) One hundred feet, or less, of 1 1/2-inch hose, with a nozzle capable of discharging water at 25 gallons or more per minute, may be substituted for a fire extinguisher rated not more than 2A in the designated area provided that the hose line can reach all points in the area.

1926.150(c)(2)(ii)

(ii) If fire hose connections are not compatible with local firefighting equipment, The Company shall provide adapters, or equivalent, to permit connections.

(iii) During demolition involving combustible materials, charged hose lines, supplied by hydrants, water tank trucks with pumps, or equivalent, shall be made available.

**(d) Fixed firefighting equipment-**(1) Sprinkler protection. (i) If the facility being constructed includes the installation of automatic sprinkler protection, the installation shall closely follow the construction and be placed in service as soon as applicable laws permit following completion of each story.

(ii) During demolition or alterations, existing automatic sprinkler installations shall be retained in service as long as reasonable. The operation of sprinkler control valves shall be permitted only by properly authorized persons. Modification of sprinkler systems to permit alterations or additional demolition should be expedited so that the automatic protection may be returned to service as quickly as possible. Sprinkler control valves shall be checked daily at close of work to ascertain that the protection is in service.

1926.150(d)(2)

(2) Standpipes. In all structures in which standpipes are required, or where standpipes exist in structures being altered, they shall be brought up as soon as applicable laws permit, and shall be maintained as construction progresses in such a manner that they are always ready for fire protection use. The standpipes shall be provided with Siamese fire department connections on the outside of the structure, at the street level, which shall be conspicuously marked. There shall be at least one standard hose outlet at each floor.

**(e) Fire alarm devices.** (1) An alarm system, e.g., telephone system, siren, etc., shall be established by Engel Electric whereby employees on the site and the local fire department can be alerted for an emergency.

(2) The alarm code and reporting instructions shall be conspicuously posted at phones and at employee entrances.

**(f) Fire cutoffs.** (1) Fire walls and exit stairways, required for the completed buildings, shall be given construction priority. Fire doors, with automatic closing devices, shall be hung on openings as soon as practicable.

(2) Fire cutoffs shall be retained in buildings undergoing alterations or demolition until operations necessitate their removal.

**PART II: Fire Awareness and Prevention.**

(a) When practical, objects to be welded, cut, or heated shall be moved to a designated safe location or, if the objects to be welded, cut, or heated cannot be readily moved, all movable fire hazards in the vicinity shall be taken to a safe place, or otherwise protected.

(b) If the object to be welded, cut, or heated cannot be moved and if all the fire hazards cannot be removed, positive means shall be taken to confine the heat, sparks, and slag, and to protect the immovable fire hazards from them.

(c) No welding, cutting, or heating shall be done where the application of flammable paints, or the presence of other flammable compounds, or heavy dust concentrations creates a hazard.

(d) Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use.

(e) When the welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel shall

be assigned to guard against fire while the actual welding, cutting, or heating operation is being performed, and for a sufficient period of time after completion of the work to ensure that no possibility of fire exists. Such personnel shall be instructed as to the specific anticipated fire hazards and how the firefighting equipment provided is to be used.

## 1926.352(f)

(f) When welding, cutting, or heating is performed on walls, floors, steel or other overhead material and ceilings, since direct penetration of sparks or heat transfer may introduce a fire hazard to an adjacent area, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed.

(g) For the elimination of possible fire in enclosed spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the enclosed space whenever the torch is not to be used or whenever the torch is left unattended for a substantial period of time, such as during the lunch period. Overnight and at the change of shifts, the torch and hose shall be removed from the confined space. Open end fuel gas and oxygen hoses shall be immediately removed from enclosed spaces when they are disconnected from the torch or other gas-consuming device.

(h) Except when the contents are being removed or transferred, drums, pails, and other containers which contain or have contained flammable liquids shall be kept closed. Empty containers shall be removed to a safe area apart from hot work operations or open flames.

(i) Drums containers, or hollow structures which have contained toxic or flammable substances shall, before welding, cutting, or heating is undertaken on them, either be filled with water or thoroughly cleaned of such substances and ventilated and tested. For welding, cutting and heating on steel pipelines containing natural gas, the pertinent portions of regulations issued by the Department of Transportation, Office of Pipeline Safety, 49 CFR Part 192, Minimum Federal Safety Standards for Gas Pipelines, shall apply.

## 1926.352(j)

(j) Before heat is applied to a drum, container, or hollow structure, a vent or opening shall be provided for the release of any built-up pressure during the application of heat.

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# How to Select the Proper Fire Extinguisher

† Figures in parentheses refer to wheeled units.

**D**ifferent types of extinguishers are used to put out different kinds of fires. For example, a Halon 1211 extinguisher is one of the types recommended for putting out an electrical fire (Halon does not conduct electricity). A water type extinguisher should never be used on such a fire (water does conduct electricity).

To help you select the proper extinguisher for the type of hazard you are most likely to encounter in the home, or workplace, the charts here classify both fires and extinguishers into types. Types of fires are classified as: A—ordinary combustible materials, such as wood, cloth, paper, and many plastics; B—flammable liquids, gases, and grease; and C—energized electrical equipment (such as computers). There is a class D—combustible metals, but this hazard is rare and found usually in industrial situations.

Unlike fires, extinguishers have more classifications, than simply A, B, C, or D. They are A, AB, BC, ABC, and D. This is because some extinguishers can put out more than just one type of fire. For example, a BC dry chemical fire extinguisher can put out a grease fire (Class B), as well as an electrical fire (Class C). You might wonder: If that is so, why doesn't everyone just use ABC extinguishers, which put out virtually all types of fires? The answer is, although an ABC extinguisher is capable of putting out Class A, B, and C fires, it is not always as effective as another extinguisher designed solely for putting out only certain kinds of fires. For example, there are multipurpose dry chemical extinguishers, classified as ABC, and simply dry chemical extinguishers classified as BC. An ABC multipurpose dry chemical extinguisher is prohibited for use on deep fat fryers and refrigerators. Only BC dry chemical extinguishers are effective on deep fat fryers. The BC dry chemical reacts with the grease to create a kind of soapy foam that suffocates the fire (this process is called saponification). The multipurpose dry chemical of ABC fire extinguishers breaks down this foam once it is formed and allows the fire to re-ignite.

For general home use, however, the ABC extinguishers are fine for all applications. We will, however, show you that other kinds of extinguishers may be used in different areas of the home, etc. or office.




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All extinguishers are labeled with picture symbols. \* These symbols depict the kinds of fires on which the extinguisher is effective. A slash through a picture means the extinguisher is not to be used on that class fire. If it is used, it may actually spread the fire rather than put it out.  
\* Picture symbols for Class D fires are not practical.

## Choosing the Best Size Extinguisher

We have learned that extinguishers are classified by the type of fire they put out. They are also rated with a number that tells you the size of fire they can put out.  
For example, a five pound multipurpose dry chemical extinguisher (ABC) has a rating of 2-A, 10-B, C. That means the extinguisher can put out approximately twice as much fire as a 1-A extinguisher. A 1-A rated extinguisher is required to put out a blazing wood crib consisting of 50 pieces of 20 inch long 2" x 2's and an 8' x 8' wood panel. It can put out five times the size of a Class B fire that consists of 3.25 gallons of liquid fuel burning in a 2.5 square foot pan.

Classification of Fires	Picture Symbols	Recommended Extinguishers
<b>A</b> Ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.		WATER AFFF ABC Dry Chemical Halon 1211 LIQUIDS: AFFF Regular
<b>B</b> Flammable liquids, oils, grease, tars, oil base paints, lacquers and gases.		Dry Chemical ABC Dry Chemical Purple K Dry Chemical Halon 1211 CO <sub>2</sub> GASES: Regular & Purple K Dry Chemical
<b>C</b> Energized electrical equipment where the electrical non-conductivity of the extinguishing agent is essential. (When electrical equipment is de-energized, Class A or B fires may be used safely.)		Regular Dry Chemical ABC Dry Chemical Purple K Dry Chemical Halon 1211 CO <sub>2</sub>

**Recommendations**  
 \* Kitchen—2½-5 lb. dry chemical, UL rating of 5B-C, and/or halon type  
 \* Corridor—1.5 lb. Halon 1211 or multipurpose dry chemical, UL rating of 1A-10B-C  
 \* Personal computer—1.2½ lb. Halon 1211, UL rating of 2B-C



Fisher Actions †	A		AB		BC			ABC		Dry Purpose						
	Water Types (Includes antifreeze)	Pump Tank	Stored Pressure	Self Expelling	Dry Chemical Types Purple K Super K Monnex Urea based	Cartridge Operated	Halogenated Types 1211 1301 1211/1301	Multipurpose Dry Chemical	Cartridge Operated		Halogenated Types 1211 1211/1301					
Weight	2 ½ Gal.	2 ½-5 Gal.	2 ½ Gal. (33 Gal.)	5-20 lb. (50-100 lb.)	2 ½-30 lb. (50-350 lb.)	4-30 lb. (125-350 lb.)	1-5 lb.	2 ½-20 lb. (50-350 lb.)	5-30 lb. (125-350 lb.)	5 ½-22 lb. (50-150 lb.)	30 lb. (150-350)					
Height (in.)	30-40 ft.	30-40 ft.	10-25 ft. (30 ft.)	3-8 ft. (3-10 ft.)	10-15 ft. (15-45 ft.)	10-20 ft. (15-45 ft.)	10-16 ft.	10-15 ft. (15-45 ft.)	10-20 ft. (15-45 ft.)	9-16 ft. (20-35 ft.)	5 ft. (15 ft.)					
Response Time (Sec.)	1 Min.	1-3 Min.	50-65 Sec. (1 Min.)	8-15 Sec. (10-30 Sec.)	8-25 Sec. (25-60 Sec.)	8-25 Sec. (25-60 Sec.)		8-25 Sec. (20-60 Sec.)	8-25 Sec. (25-60 Sec.)	10-18 Sec. (30-45 Sec.)	20 Sec. (150 lb., 70-350 lb., 1 ½)					
Notes	Conductor of electricity. Needs protection from freezing. (ex-cent. antifreeze). Use on flammable liquids and grease will spread fire.		Conductor of electricity. Needs protection from freezing. Not effective on water-soluble flammable liquids such as alcohol, unless otherwise stated on nameplate. AFFF not effective on pressurized flammable liquid/gas fires.		Smooth-boring occurs in high concentrations. Avoid contact with discharge horn. Limited effectiveness under windy conditions. Severely reduced effectiveness at sub-zero (F) temperatures.			Extensive cleanup, particularly on delicate electronic equipment. Obscures visibility in confined spaces.		Avoid high concentrations and unnecessary use.		Extensive cleanup. Damages electronic equipment. Obscures visibility in confined spaces. Limited penetrating ability on deep-seated Class A fires.		Avoid high concentrations and unnecessary use.		Not listed

NOTE: Protection required below 10' F and above 120' F.

NOTE: Only dry chemical types are effective on pressurized flammable gases and liquids; for deep fat fryers, multipurpose ABC dry chemicals are not acceptable.