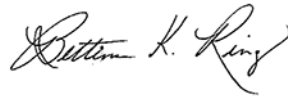


## Policy and Procedure 8-21

# Workplace Safety – Fire Extinguisher Operations and Maintenance

**Issued By:**

Bettina K. Ring, State Forester



**Effective Date:**

April 1, 2017

**Codes/Mandates:**

OSHA Standard CFR 1910.157, Portable Fire Extinguishers. This section applies to the placement, use, maintenance and testing of portable fire extinguishers provided for the use of employees.  
OSHA Standard CFR 1926.150, Fire Protection – Construction Sites. This section applies to the provision of firefighting equipment for construction and demolition work.  
NFPA 10 (2007), Standard for Portable Fire Extinguishers. The provisions of this standard apply to the selection, installation, inspection, maintenance and testing of portable extinguishing equipment.

**References:**

OSHA’s Evacuation Plans and Procedures eTool:  
<https://www.osha.gov/SLTC/etools/evacuation/portable.html>

**Forms:**

N/A

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## PURPOSE

As an agency immersed in major fire-related duties, it is vital that VDOF set an example of support and adherence to public policy regarding fire equipment safety and use. Specifically, it is important that VDOF adhere to applicable OSHA and NFPA standards as set forth through VOSH and the State Fire Marshal’s Office regarding the use and maintenance of portable fire extinguishers. It is the intent of this policy to ensure compliance with such standards.

## POLICY

This policy and procedure sets forth the agency standards for the selection, placement and care of portable fire extinguishers, as well as employee training requirements per state and federal standards. This policy ensures that VDOF facilities and vehicles are adequately supplied and their staff trained.

## DEFINITIONS

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**“Agency”** and **“VDOF”** means the Virginia Department of Forestry.

**“Commonwealth”** means the Commonwealth of Virginia.

**“Commercial vehicle”** is any self-propelled or towed motor vehicle used on a highway in interstate commerce to transport persons or property when the vehicle:

- ◆ Has a gross weight rating or gross combination weight rating, or a gross vehicle rate or gross combination weight of 10,001 pounds or more, whichever is greater
- ◆ Is designed to transport eight passengers (including the driver) for compensation
- ◆ Is designed or used to transport more than 15 passengers, including the driver and is not used to transport passengers for compensation
- ◆ Is used in transporting material found by the Secretary of Transportation to be hazardous

**“Date of service”** is the date an extinguisher is put into service. The date of service will be determined by looking at the date of manufacture. The manufacture date can be found in one of three places: on the label, stamped on the bottom outside edge of the cylinder or stamped to the underside of the extinguisher.

**“Extinguisher classification rating”** is the series of numbers and letters found in the fine print on an extinguisher’s label, for example, 3-A:40-B:C. The numbers, assigned by Underwriters Laboratories, tell the extinguisher's relative effectiveness against each type of fire. The higher the number, the greater the effectiveness.

- ◆ The number associated with the A rating is a water equivalency rating. Each A is equivalent to 1.25 gallons of water. For example, a 4-A rating equals 5 gallons of water. So, an extinguisher with a 4-A rating is more effective on ordinary combustibles than a 2-A one since it contains a water equivalency of 5 gallons compared to 2.5 gallons.
- ◆ The number associated with the B rating on fire extinguisher is the approximate number of square feet of a flammable liquid fire that a non-expert person can expect to extinguish. For example: 20 B=20 sq. ft. of coverage. Therefore, an 80-B rating is more effective than a 40-B rating since it can cover 80 square feet compared to 40 square feet.
- ◆ There is no number associated with C ratings; if there is a C on the UL label it means the extinguisher's chemicals will not conduct electricity.
- ◆ Class D relative effectiveness is not associated with a numerical value. The effectiveness is detailed on the extinguisher nameplate for the specific combustible metal fire for which it is recommended.

**“Extinguisher inspection”** is a quick check of a fire extinguisher to see if it is in its designated place, that it has not been actuated or tampered with and that there is no obvious physical damage or condition to prevent its operation.

**“Extinguisher maintenance”** is a thorough examination of an extinguisher for physical damage or condition, which would prevent its operation and includes any necessary repair or replacement of parts. It will also normally reveal if hydrostatic testing or internal maintenance is required.

**“Extra (high) hazards” (NFPA 10-2007)** means occupancy areas is classified as locations where the quantity and combustibility of Class A combustible materials is high or where high amounts of Class B flammables are present and rapidly developing fires with high rates of heat release are expected. These areas consist of fire hazards involved with the storage, packaging, handling or manufacture of Class A combustibles and/or the total quantity of Class B flammables expected to be present in more than five gallons in any room or area.

**“Fire classifications”** includes five basic classes of fires. They are Class A, B, C, D and K. The different classes are associated with different fuel types. The classes are also distinguished on fire extinguisher labels by letters and pictographs to assist in choosing an extinguisher suitable for the situation in which it will be used.

- ◆ **Class A** – Fires in ordinary combustibles, such as wood, paper, cloth, rubber, plastics, etc.

- ◆ **Class B** – Fires involving flammable liquids, such as gasoline, oils, kerosene, paint, solvents, etc. They also include flammable gases, such as butane and propane.
- ◆ **Class C** – Fires in live electrical equipment such as motors, transformers, switches, panel boxes and appliances. The presence of the letter "C" indicates that the extinguishing agent is non-conductive.
- ◆ **Class D** – Fires involving combustible metals such as potassium, sodium, aluminum and magnesium. These materials burn at high temperatures and will react violently with water, air and/or other chemicals. Class D extinguishers are often specific for the type of metal in question. These extinguishers generally have no rating nor are they given a multi-purpose rating for use on other types of fires.
- ◆ **Class K** – Fires involving cooking equipment using grease and oil. These fires are a special hazard and are best fought with a dry chemical such as sodium bicarbonate or potassium bicarbonate.

**“Fire hazard...Light (low)” (NFPA 10-2007)** means these areas are classified as locations where the quantity and combustibility of Class A combustibles and Class B flammables is low and fires with relatively low rates of heat release are expected. These areas consist of fire hazards having normally expected quantities of Class A combustible furnishings and/or the total anticipated quantity of Class B flammables present is expected to be less than one gallon in any room or area.

**“Fire hazard...Ordinary (moderate)” (NFPA 10-2007)** means these areas are classified as locations where the quantity and combustibility of Class A combustible materials and Class B flammables is moderate and fires with moderate rates of heat release are expected. These areas consist of fire hazards that only occasionally contain Class A combustible materials beyond normal anticipated furnishings and/or the total quantity of Class B flammables typically expected to be present is from one gallon to five gallons in any room or area.

**“Fire hazard...Extra (high)” (NFPA 10-2007)** means these occupancy areas are classified as locations where the quantity and combustibility of Class A combustible materials is high or where high amounts of Class B flammables are present and rapidly developing fires with high rates of heat release are expected. These areas consist of fire hazards involved with the storage, packaging, handling, or manufacture of Class A combustibles and/or the total quantity of Class B flammables is expected to be present in more than five gallons in any room or area.

**“Non-rechargeable (non-refillable) fire extinguisher”** is a fire extinguisher not capable of (nor intended to be capable of) undergoing complete maintenance, hydrostatic testing and being restored to its full operating capability by the standard practices used by fire equipment dealers and distributors.

**“Portable fire extinguisher”** is a portable device, carried or on wheels and operated by hand, containing an extinguishing agent that can be expelled under pressure for the purpose of suppressing or extinguishing a fire.

**“Rechargeable (refillable) fire extinguisher”** is a fire extinguisher capable of undergoing complete maintenance, including internal inspection of the pressure vessel, replacement of all substandard parts and seals and hydrostatic testing.

**“Recharging”** means the replacement of the extinguishing agent.

**“Servicing”** means performing maintenance, recharging, or hydrostatic testing on a fire extinguisher. Servicing includes emptying the extinguisher, conducting a thorough internal and external examination, performing any needed repairs and recharging.

**“Stored-pressure fire extinguisher”** is a fire extinguisher in which both the extinguishing material and expellant gas are kept in a single container and includes a pressure indicator or gauge.

**“Travel distance”** is the actual walking distance from any point to the nearest fire extinguisher fulfilling hazard requirements.

**“Water-type fire extinguisher”** is a fire extinguisher containing water-based agents, such as water, AFFF, FFFP, antifreeze and loaded stream.

## PROCEDURES

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### General Requirements

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- ◆ Each workplace building or structure, motor vehicle, commercial vehicle and bull dozer owned by VDOF will be equipped with an appropriate class and size portable fire extinguisher(s).
- ◆ Portable fire extinguishers will be made available for employees use only as a first line of defense to combat workplace fires of limited size. Fires can increase in size and intensity in seconds, blocking exit paths and creating a hazardous atmosphere. In addition, portable fire extinguishers contain a limited amount of extinguishing agent and can be discharged in a matter of seconds. Therefore, individuals should attempt to fight only very small or incipient stage fires.
- ◆ Employees will immediately evacuate a burning building or abandon a burning vehicle rather than use a fire extinguisher if:
  - The operator is not sure they have the proper type of extinguisher.
  - The operator is not sure how to use the extinguisher.
  - They cannot avoid smoke or are in imminent danger.
  - A fire exceeds the capacity expectations of the available extinguisher.
  - The charge has been unloaded on a fire and the fire has not been completely extinguished.
  - The fire exceeds the ability of the employee to combat it.
- ◆ Only UL-approved fire extinguishers are permitted to be used.

### Selection and Placement of Extinguishers

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- ◆ The type of fire extinguisher placed into use for a particular location will be based on the type of fire most likely to occur (see Fire Classifications). Extinguishers shall be specifically labeled for the type(s) of fire(s) they are intended to combat.
  - Motor vehicles, commercial vehicles, bull dozers and office buildings will be equipped with ABC type extinguishers since they contain many types of flammable materials, including flammable liquids, solid combustibles and electrical wiring.
  - Clean agent extinguishers should be provided in areas containing delicate electronic equipment.
  - In areas where there is potential for fires involving combustible cooking oils and fats Class K fire extinguishers will be used.
  - In work areas involving combustible metals fire extinguishers for Class D hazards or bulk dry chemicals for Class D hazards shall be used; the dry chemical will be selected based on the type of metal in use.
- ◆ The size (rating) and placement (number needed) of extinguishers used will be determined by the intensity of a potential fire (see definitions for low, moderate and high hazard areas), which would affect their use and by the travel distance to the extinguishers (see Table One).
- ◆ Fire extinguishers will be conspicuously located and readily accessible.
  - There will be no obstructions to hinder access to extinguishers.
  - They will not be obscured from view.
  - In areas where visual obstructions cannot be completely avoided observable signage will indicate their location.
- ◆ They will be located along normal paths of travel, including exits.
- ◆ Fire extinguishers that are subject to physical damage or dislodgement (e.g. from impact, vibration, the environment, etc.) will be installed in a manner that prevents such from happening and adequately protects

them (see NFPA 10 for more specific information on bracketing requirements). In particular, fire extinguishers are not allowed to lie loose within the passenger compartment of vehicles; they will be mounted so that they are secure.

<b>Table One. VDOF Minimum Standards for Fire Extinguisher Size and Placement</b>		
Based on NFPA 10, 2007		
<b>Fire Class/ Special Situation</b>	<b>Minimum Extinguisher Rating</b>	<b>Maximum Travel Distance to the Extinguisher</b>
<b>Class A</b>	For every 3000 square feet: <ul style="list-style-type: none"> <li>◆ one, 1-A extinguisher for light hazard areas</li> <li>◆ one, 2-A for moderate hazard areas</li> <li>◆ one, 3-A for heavy hazard areas</li> </ul> One 4A for 11,250/6,000/4,000 square feet for light/moderate/heavy hazard areas	75 ft. (22.9m) or less
<b>Class B</b>	5-B light hazard area 10-B light hazard area 10-B moderate hazard area 20-B moderate hazard area 40-B high hazard area 80-B high hazard area	30 ft. 50 ft. 30 ft. 50 ft. 30 ft. 50 ft.
<b>Class C</b>	Size based on anticipated Class A or B hazard	Based on the Class A or B hazard
<b>Class D</b>	Size based on recommendations of manufacturer for specific combustible metal	75 ft.
<b>Class K</b>	One 2-A rated water-type extinguisher or one 1.6 gallon wet chemical extinguisher per 5 cubic feet of solid cooking surface.	Must be located as close to a potential fire ignition point as possible, but no further than 30 ft.
<b>Passenger Vehicles</b>	One 2.5 pound 1A:10B:C rated	Must be located so that it is readily accessible for use; if located in passenger compartment it must be secured
<b>Commercial Vehicles</b>	Either one fire extinguisher with a rating of 5 B:C or more; or two fire extinguishers, each of with a rating of 4 B:C	Must be located so that it is readily accessible for use and securely mounted to prevent sliding, rolling, or vertical movement
<b>Bull Dozers</b>	One 5 pound 2A:10 B:C rated	Must be located so that it is readily accessible for use and securely mounted to prevent sliding, rolling, or vertical movement

## Inspection, Maintenance and Replacement of Extinguishers

- ◆ Portable fire extinguishers will be maintained in a fully charged and operable condition and kept in their designated places at all times except during use or maintenance.
- ◆ Extinguishers will be recharged or replaced immediately after use.
- ◆ Fire extinguishers will be inspected and serviced by competent persons.

- Monthly spot inspections do not require special licensing to conduct. Employees who are assigned extinguishers will perform monthly inspections on their extinguishers; managers will assign specific employees to conduct monthly inspections if not assigned to specific individuals.
- Annual maintenance inspections must be performed by a trained and certified person (VDOF-certified inspector or a service vendor) who has undergone the instructions necessary to reliably perform such checks.
- Six-year maintenance, twelve year hydrostatic testing, recharging, or any other servicing must be performed by a service vendor/contractor that is trained and certified to do so.

## Monthly Spot Inspections

- ◆ All fire extinguishers (rechargeable and non-rechargeable) will be inspected monthly (more frequently when circumstances indicate a need).
- ◆ Records of monthly inspections will be kept on a tag attached to the extinguisher. Records will be kept on file to demonstrate that at least the last 12 monthly inspections have been performed.
- ◆ The monthly inspection will ensure the following:
  - Extinguisher is in its designated place
  - No obstructions to access or visibility
  - Labeling is in place and operating instructions are legible
  - Tag is attached that indicates the month and year that inspection, maintenance and recharging was performed and identifies the person performing the service.
  - No obvious physical damage, corrosion, leakage
  - The pressure is at the recommended level. On extinguishers equipped with a gauge that means the needle should be in the green zone - not too high and not too low.
  - Tamper seal (plastic wire) and lockpin are in place and not broken
  - Unit appears to be full when hefted (lifted)
  - Nozzle is unobstructed
  - If on a wheeled assembly, condition of tires, wheels, hose, nozzle and carriage is good
  - On non-rechargeable fire extinguishers the pin on the push-to-test indicator indicates an appropriate charge
  - Extinguisher chemical is not caked (dry chemical only). The extinguisher will be turned upside down and tapped lightly.
  - If an inspection reveals a deficiency in any of the conditions above, corrective action must be taken, including maintenance or replacement.

## Annual Maintenance Inspections

- ◆ All fire extinguishers (rechargeable and non-rechargeable) will undergo maintenance inspections annually, after discharging and when problems related to monthly inspections indicate a need to do so.
- ◆ Inspections will be used to determine if maintenance and/or replacement of the extinguisher, is required. Stored pressure extinguishers do not require an internal examination or recharging during this check unless triggered by a substandard condition (i.e., corrosion, dents, light weight, etc.).
- ◆ Annual maintenance inspections will include the following:
  - A thorough examination of the exterior mechanical parts, extinguishing agent and expelling means as per the monthly inspection protocol.
  - Removal of the tamper seal on rechargeable extinguishers by operating the pull pin (tamper seals on non-rechargeable extinguishers are not to be removed); the pin should pull out easily; the pin and pin hole will be inspected for corrosion/damage; the pin will then be reinserted and a new tamper seal installed.

- All removable boots, foot rings and attachments will be removed and underlying areas checked for corrosion or damage.
- Determination of fullness by weighing. A properly charged extinguisher will have a full load of extinguishing agent. If the extinguisher has an intact tamper seal (or unpunctured cartridge) it is likely to have a full load of extinguishing agent. However, to ensure that is the case, the extinguisher should be weighed:
  - Gross weight check for dry chemical fire extinguishers. These extinguishers will have in writing, on the label, the gross (total) weight of the fire extinguisher. For example, five-pound ABC extinguisher has on its label “. . . gross weight of 9lbs ± 4 ounces” To check the content and tell if the load is fully charged, place the extinguisher on a scale and read the actual weight you. In this example the weight should read between 8 pounds 12 ounces (9 pounds less 4 ounces) and 9 pounds 4 ounces (9 pounds plus 4 ounces). If the weight is outside these parameters it needs to be serviced.
  - Carbon dioxide extinguishers. These extinguishers do not have pressure gauges because [carbon dioxide](#) is a condensable gas. Thus, there is no pressure reading to help indicate how much agent remains in the cylinder. Instead, the extinguisher should have a tare (empty) weight stamped on it. To determine the amount of carbon dioxide remaining in the extinguisher, subtract the tare weight from the actual weight, as measured on a scale.
- ◆ If the extinguisher passes the maintenance inspection the inspection date will be recorded on an annual maintenance tag and affixed to the extinguisher or in a maintenance record kept on file. It will verify the month, day and year that the maintenance inspection was performed including the name of the person performing the inspection. This record will be retained for at least one year after the last entry.
- ◆ If a maintenance check reveals a condition that would hinder the extinguisher’s effectiveness it will be sent out for servicing by a certified technician or replaced, whichever is most cost effective.
  - Any extinguisher that undergoes servicing that includes an internal examination or recharging, as a result of a maintenance check, needs to have a “verification of service” collar affixed around the neck of the container. The collar consists of a single circular piece of uninterrupted material forming a hole of a size that does not permit the collar assembly to move over the neck of the container unless the valve is completely removed. The collar will include maintenance information that includes the month and year the service was performed (indicated by a perforation such as is done by a hand punch). New extinguishers requiring an initial charge are not required to have this collar.
  - When maintenance is performed on an extinguisher the next six-year servicing cycle (see below) begins from that date.

## Six-Year Servicing or Replacement of Extinguishers

Rechargeable stored pressure fire extinguishers (the typical A, B, C and dry chemical extinguishers used at VDOF) are required to be serviced every six years from their date of service (or when a deficiency is found during a monthly spot inspection or an annual maintenance inspection) by a trained service technician. VDOF will either outsource the servicing or replace the extinguisher at that point based on what is most cost effective.

- ◆ Fire extinguishers that are outsourced for the 6-year servicing must have a six-year service label affixed at the time of servicing. Any old label will be removed and replaced with a metallic label (or one of equally durable material) that is a minimum size of 2 in. × 3 1/2 in. (51 mm × 89 mm). The label will be the type that if removal is attempted it will self-destruct. The label will include the month and year the maintenance was performed, indicated by a perforation such as is done by a hand punch, the name or initials of the person performing the maintenance and the name of the company performing the maintenance.
- ◆ Non-rechargeable fire extinguishers are not designed to undergo servicing and are exempt from the six-year servicing requirement – any time they are deemed unfit to perform they are to be replaced.

Rechargeable stored pressure fire extinguishers (the typical A, B, C and dry chemical extinguishers used at VDOF) are required to be hydrostatically tested every twelve years from their date of service (or when a deficiency is found during a monthly spot inspection or an annual maintenance inspection) by a trained professional. VDOF will replace extinguishers that are deemed in need of hydrostatic testing. Non-rechargeable extinguishers will be taken out of service and replaced at twelve years from the date of manufacture since they are not designed to undergo hydrostatic testing.

## Additional Requirements for Construction Sites

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- ◆ Access to all available firefighting equipment shall be maintained at all times.
- ◆ All firefighting equipment shall be conspicuously located on the construction site.
- ◆ A fire extinguisher, rated not less than 2A, shall be provided for each 3,000 square feet of the building area or major fraction thereof. Travel distance from any point to a fire extinguisher shall not exceed 100 feet.
- ◆ One 55-gallon open drum of water with two fire pails may be substituted for a fire extinguisher having a 2A rating.
- ◆ A ½-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 five 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.
- ◆ One or more fire extinguishers, rated not less than 2A, shall be provided on each floor. In multi-story buildings, at least one fire extinguisher shall be located adjacent to a stairway.
- ◆ Extinguishers and water drums should be protected from freezing.
- ◆ 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 five pounds of flammable gas are being used on the jobsite. This requirement does not apply to the integral fuel tanks of motor vehicles.
- ◆ 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.
- ◆ During demolition or alterations, existing automatic sprinkler installations shall be retained in service as long as reasonable. 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 the close of work to ascertain that the protection is in service.

## Employee Training

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- ◆ All employees will complete an assigned e-course on fire extinguisher use within one month from initial hire and once every calendar year thereafter.
- ◆ All employees designated to conduct monthly inspections will complete assigned an e-course showing the procedure.
- ◆ Employees designated as fire extinguisher inspectors will complete DOC's Fire Extinguisher Inspector Course.

## AUTHORITY

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This policy and procedure is issued by the Virginia state forester.

## INTERPRETATION

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The director of human resources and agency safety officer are responsible for the interpretation of this policy and procedure.