

## Fire Extinguishing Systems -- OSHA Standards 1910.160 - 1910.163 <sup>1</sup>

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### The Impact of Safety on Florida Agriculture

Florida agriculture, including forestry and seafood, made an annual economic impact of \$53 billion in 1998. More than 81,000 people work on the 40,000 farms in the state, and more than 50,000 are employed in other activities related to agriculture. The state's agricultural enterprises range from large citrus, vegetable and cattle operations to small family-operated farms.

From 1989 to 1998, there were approximately 240 deaths related to agriculture in Florida, according to data compiled by the Deep South Center for Agricultural Health and Safety. In addition, agriculture has one of the highest injury and death rates among U.S. industries.

Safety in Florida agriculture is challenging because:

- the state's agricultural enterprises are diverse,

- safety knowledge among workers varies,
- manual labor is used extensively,
- the climate creates year-round heat stress.

Therefore, it is vital to assist the public in learning about OSHA documents related to agriculture. More related information is available at the following Web sites:

Florida AgSafe:

<<http://agen.ufl.edu/~clehtola/agsaferef.htm>>

OSHA Regulations:

<<http://www.OSHA.gov/comp - links.html>>

### Overview

This document, a condensation of Sections 1910.160, 1910.161, 1910.162, and 1910.163 of the Occupational Safety and Health Act (29 CFR), is not intended to be totally inclusive but rather to highlight the information and requirements in the complete

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1. This document is ABE276, one of a series of the Agricultural and Biological Engineering Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date September 2000. Reviewed February 2008. Visit the EDIS Web Site at <http://edis.ifas.ufl.edu>.

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OSHA standard that owners and managers of agricultural businesses should understand. Refer to the OSHA Web site given above for the complete standard and for court interpretations of the standard.

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NOTE: Some sections of OSHA standards are labeled "Reserved." This label implies either that information has been deleted from the previous version of the standard or that additions to the standard are anticipated. Because standards often reference other standards, it is important that paragraph numbers remain consistent.

## **Fixed extinguishing systems, general -- OSHA Standard 1910.160**

### **Section 1910.160(a) -- Scope and Application**

**1910.160(a)(1)** -- This section applies to all fixed extinguishing systems installed to meet a particular OSHA standard except for automatic sprinkler systems which are covered by 1910.159.

**1910.160(a)(2)** -- This section also applies to fixed systems not installed to meet a particular OSHA standard, but which, by means of their operation, may expose employees to possible injury, death, or adverse health consequences caused by the extinguishing agent. Such systems are only subject to the requirements of paragraphs (b)(4) through (b)(7) and (c) of this section.

**1910.160(a)(3)** -- Systems otherwise covered in paragraph (a)(2) of this section which are installed in areas with no employee exposure are exempted from the requirements of this section.

### **Section 1910.160(b) -- General Requirements**

**1910.160(b)(1)** -- Fixed extinguishing system components and agents shall be designed and approved for use on the specific fire hazards they are expected to control or extinguish.

**1910.160(b)(2)** -- If for any reason a fixed extinguishing system becomes inoperable, the employer shall notify employees and take the necessary temporary precautions to assure their safety until the system is restored to operating order. Any defects or impairments shall be properly corrected by trained personnel.

**1910.160(b)(3)** -- The employer shall provide a distinctive alarm or signaling system which complies with 1910.165 and is capable of being perceived above ambient noise or light levels, on all extinguishing systems in those portions of the workplace covered by the extinguishing system to indicate when the extinguishing system is

discharging. Discharge alarms are not required on systems where discharge is immediately recognizable.

**1910.160(b)(4)** -- The employer shall provide effective safeguards to warn employees against entry into discharge areas where the atmosphere remains hazardous to employee safety or health.

**1910.160(b)(5)** -- The employer shall post hazard warning or caution signs at the entrance to, and inside of, areas protected by fixed extinguishing systems which use agents in concentrations known to be hazardous to employee safety and health.

**1910.160(b)(6)** -- The employer shall assure that fixed systems are inspected annually by a person knowledgeable in the design and function of the system to assure that the system is maintained in good operating condition.

**1910.160(b)(7)** -- The employer shall assure that the weight and pressure of refillable containers is checked at least semi-annually. If the container shows a loss in net content or weight of more than 5 percent, or a loss in pressure of more than 10 percent, it shall be subjected to maintenance.

**1910.160(b)(8)** -- The employer shall assure that factory charged nonrefillable containers which have no means of pressure indication are weighed at least semi-annually. If a container shows a loss in net weight or more than 5 percent it shall be replaced.

**1910.160(b)(9)** -- The employer shall assure that inspection and maintenance dates are recorded on the container, on a tag attached to the container, or in a central location. A record of the last semi-annual check shall be maintained until the container is checked again or for the life of the container, whichever is less.

**1910.160(b)(10)** -- The employer shall train employees designated to inspect, maintain, operate, or repair fixed extinguishing systems and annually review their training to keep them up-to-date in the functions they are to perform.

**1910.160(b)(11)** -- The employer shall not use chlorobromomethane or carbon tetrachloride as an extinguishing agent where employees may be exposed.

**1910.160(b)(12)** -- The employer shall assure that systems installed in the presence of corrosive atmospheres are constructed of non-corrosive material or otherwise protected against corrosion.

**1910.160(b)(13)** -- Automatic detection equipment shall be approved, installed and maintained in accordance with 1910.164.

**1910.160(b)(14)** -- The employer shall assure that all systems designed for and installed in areas with climatic extremes shall operate effectively at the expected extreme temperatures.

**1910.160(b)(15)** -- The employer shall assure that at least one manual station is provided for discharge activation of each fixed extinguishing system.

**1910.160(b)(16)** -- The employer shall assure that manual operating devices are identified as to the hazard against which they will provide protection.

**1910.160(b)(17)** -- The employer shall provide and assure the use of the personal protective equipment needed for immediate rescue of employees trapped in hazardous atmospheres created by an agent discharge.

### **Section 1910.160(c) -- Total Flooding Systems with Potential Health and Safety Hazards to Employees**

**1910.160(c)(1)** -- The employer shall provide an emergency action plan in accordance with 1910.38 for each area within a workplace that is protected by a total flooding system which provides agent concentrations exceeding the maximum safe levels set forth in paragraphs (b)(5) and (b)(6) of 1910.162.

**1910.160(c)(2)** -- Systems installed in areas where employees cannot enter during or after the system's operation are exempt from the requirements of paragraph (c) of this section.

**1910.160(c)(3)** -- On all total flooding systems the employer shall provide a pre-discharge employee alarm which complies with 1910.165, and is capable of being perceived above ambient light or noise levels before the system discharges, which will give

employees time to safely exit from the discharge area prior to system discharge.

**1910.160(c)(4)** -- The employer shall provide automatic actuation of total flooding systems by means of an approved fire detection device installed and interconnected with a pre-discharge employee alarm system to give employees time to safely exit from the discharge area prior to system discharge.

## **Fixed Extinguishing Systems, Dry Chemical -- OSHA Standard 1910.161**

### **Section 1910.161(a) -- Scope and Application**

This section applies to all fixed extinguishing systems, using dry chemical as the extinguishing agent, installed to meet a particular OSHA standard. These systems shall also comply with 1910.160.

### **Section 1910.161(b) -- Specific Requirements**

**1910.160(b)(1)** -- The employer shall assure that dry chemical agents are compatible with any foams or wetting agents with which they are used.

**1910.160(b)(2)** -- The employer may not mix together dry chemical extinguishing agents of different compositions. The employer shall assure that dry chemical systems are refilled with the chemical stated on the approval nameplate or an equivalent compatible material.

**1910.160(b)(3)** -- When dry chemical discharge may obscure vision, the employer shall provide a pre-discharge employee alarm which complies with 1910.165 and which will give employees time to safely exit from the discharge area prior to system discharge.

**1910.160(b)(4)** -- The employer shall sample the dry chemical supply of all but stored pressure systems at least annually to assure that the dry chemical supply is free of moisture which may cause the supply to cake or form lumps.

**1910.160(b)(5)** -- The employer shall assure that the rate of application of dry chemicals is such that the designed concentration of the system will be reached within 30 seconds of initial discharge.

## **Fixed Extinguishing Systems, Gaseous Agent -- OSHA Standard 1910.162**

### **Section 1910.162(a) -- Scope and Application**

#### **1910.160(a)(1) -- Scope**

This section applies to all fixed extinguishing systems, using a gas as the extinguishing agent, installed to meet a particular OSHA standard. These systems shall also comply with 1910.160. In some cases, the gas may be in a liquid state during storage.

#### **1910.160(a)(2) -- Application**

The requirements of paragraphs (b)(2) and (b)(4) through (b)(6) shall apply only to total flooding systems.

### **Section 1910.162(b) -- Specific Requirements**

**1910.160(b)(1)** -- Agents used for initial supply and replenishment shall be of the type approved for the system's application. Carbon dioxide obtained by dry ice conversion to liquid is not acceptable unless it is processed to remove excess water and oil.

**1910.160(b)(2)** -- Except during overhaul, the employer shall assure that the designed concentration of gaseous agents is maintained until the fire has been extinguished or is under control.

**1910.160(b)(3)** -- The employer shall assure that employees are not exposed to toxic levels of gaseous agent or its decomposition products.

**1910.160(b)(4)** -- The employer shall assure that the designed extinguishing concentration is reached within 30 seconds of initial discharge except for

Halon systems which must achieve design concentration within 10 seconds.

**1910.160(b)(5)** -- The employer shall provide a distinctive pre-discharge employee alarm capable of being perceived above ambient light or noise levels when agent design concentrations exceed the maximum safe level for employee exposure. A pre-discharge employee alarm for alerting employees before system discharge shall be provided on Halon 1211 and carbon dioxide systems with a design concentration of 4 percent or greater and for Halon 1301 systems with a design concentration of 10 percent or greater. The pre-discharge employee alarm shall provide employees time to safely exit the discharge area prior to system discharge.

**1910.160(b)(6)(i)** -- Where egress from an area cannot be accomplished within one minute, the employer shall not use Halon 1301 in concentrations greater than 7 percent.

**1910.160(b)(6)(ii)** -- Where egress takes greater than 30 seconds but less than one minute, the employer shall not use Halon 1301 in a concentration greater than 10 percent.

**1910.160(b)(6)(iii)** -- Halon 1301 concentrations greater than 10 percent are only permitted in areas not normally occupied by employees provided that any employee in the area can escape within 30 seconds. The employer shall assure that no unprotected employees enter the area during agent discharge.

## **Fixed Extinguishing Systems, Water Spray and Foam -- OSHA Standard 1910.163**

### **Section 1910.163(a) -- Scope and Application**

This section applies to all fixed extinguishing systems, using water or foam solution as the extinguishing agent, installed to meet a particular OSHA standard. These systems shall also comply with 1910.160. This section does not apply to automatic sprinkler systems which are covered under 1910.159.

### **Section 1910.163(b) -- Specific Requirements**

**1910.160(b)(1)** -- The employer shall assure that foam and water spray systems are designed to be effective in at least controlling fire in the protected area or on protected equipment.

**1910.160(b)(2)** -- The employer shall assure that drainage of water spray systems is directed away from areas where employees are working and that no emergency egress is permitted through the drainage path.