**CHAPTER 39**

**Title: Wildlife Netting Safety**

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**Instruction:** None

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1. **Purpose and Scope.**
2. This chapter specifies the minimum Occupational Safety and Health Program (Program) requirements for Department of the Interior (Department or DOI) and U.S. Geological Survey (Bureau or USGS) wildlife netting safety requirements.
3. This chapter applies to all situations involving the use of cannon and rocket net devices used to propel nets and entrap wildlife.
4. **Definitions.**
5. Cannon and Rocket Net Devices.  Devices used by agencies to propel nets through the air to quickly entrap various species of wildlife.
6. Explosives.  An explosive means any substance or article, including a device, which is designed to function by explosion (i.e., an extremely rapid release of gas and heat) or which, by chemical reaction within itself, is able to function in a similar manner even if not designed to function by explosion.
7. Department of Transportation Hazardous Materials (Class 1 - Explosives) Divisions.
8. Division 1.1.  Consists of explosives that have a mass explosion hazard.  A mass explosion is one which affects almost the entire load instantaneously.  High explosives possessing a detonating capability such as dynamite, nitroglycerin, picric acid, lead azide, fulminate of mercury, black powder, blasting caps, and primers also known as boosters.
9. Division 1.2.  Consists of explosives that have a projection hazard but not a mass explosion hazard.
10. Division 1.3.  Consists of explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.  Low explosives possessing a flammable capability such as propellant explosives, including some smokeless propellants and display fireworks.
11. Division 1.4.  Consists of explosives that present a minor explosion hazard.  The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected.  An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.  Includes certain types of manufactured articles containing Class 1.1 or 1.3 explosives, or both, but in restricted quantities such as consumer fireworks.
12. Division 1.5.  Consists of very insensitive explosives.  This division is comprised of substances that have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.  The probability of transition from burning to detonation is greater when large quantities are transported in a vessel.
13. *Division 1.6.*  Consists of extremely insensitive articles that do not have a mass explosive hazard.  This division is comprised of articles which contain only extremely insensitive detonating substances, and which demonstrate a negligible probability of accidental initiation or propagation.
14. Match.   Detonator for Division 1.3 explosives.
15. Squib.  Detonator for Division 1.1 explosives.
16. Cannon Net Devices.  Large bore cannons that fire a loosely fitting weighted shell with shock cords and line to the perimeter of the net.  Explosives used in these devices are largely Class 1.3 explosives (smokeless powder) and detonated with separately stored electric matches.
17. Rocket Net Devices.  Newer devices that propel the net directly with a propelled shell and functionally resemble a non-aerodynamic rocket.  They have a blunt nosecone, a hollow tube body, a stabilizing fin (usually a long steel rod counterweight), and exhaust ports in the base.  These devices have, on occasion, been referred to as recoilless cannons, but they are more correctly referred to as rockets because the entire chamber enclosing the explosion is lofted by the detonation of the charge contained within.  These internal combustion rockets are connected to the nets with shock cords and ropes and are propelled by electrically fired Class 1.3 explosives.
18. **Requirements**.  Those personnel involved in the use of cannon or rocket net devices shall follow the procedures in this chapter.  Although the procedures are written to apply to rocket net devices, similar precautions apply to the use of the older projected propulsion systems such as cannons.  Note: Any directions provided by the manufacturer for the loading of their equipment shall take precedence over the procedures provided herein.
19. Loading the Rocket.
20. Unscrew nozzle from rocket body.
21. Remove any debris from inside the rocket body; be certain rocket nozzles are clear of melted plastic and powder residues.
22. Insert rocket charge into rocket body.
23. Pass lead wire through one of the nozzle holes and take up slack lead wire.
24. Replace the nozzle on the rocket body and tighten securely (a minimum of three complete turns).  Threads should be periodically cleaned with a steel brush and greased during storage.
25. Inspect connection with net, keeping attachment chord clear of the rocket.
26. Hook-up to Power Supply and Firing.
27. Blasting machines are a preferred power source, but they may not be practical in some situations.
28. Connect charges in series with the firing lines after making sure firing lines are disconnected from power supply and shunted.
29. Check electrical circuit for continuity with a blasting galvanometer after hook-up is complete.
30. Recheck electrical continuity just prior to each trapping attempt.
31. Firing is accomplished by completing the circuit to the power source with the firing lines.
32. Safety Requirements.
33. Rockets and rocket charges must be matched to type.  Wildlife Material Incorporated (WMI) type rockets have exhaust ports of 6.35 millimeters (.250 inch) or larger and will be used only with WMI type charges.  Rockets or charges that cannot be identified as to type cannot be used.
34. Personnel should never stand or work in front of a rocket during arming or in front of an armed rocket net.  This applies to all testing of circuit continuity, net rearrangement work, etc.
35. The crank for the firing source (hellbox) must be carried on the person arming the rocket.  If a blasting machine is used, keep it with you while loading.  This prevents accidental discharge of firing source energies during loading.
36. Check all firing-circuit continuity with a blasting galvanometer. Some commercial ohm meters can conceivably fire explosive devices.  Several large explosive companies make explosive circuit galvanometers.  For example, the Atlas Powder Company manufactures a Model No. 2 or equivalent.
37. All electrical connections must be of a firm and secure quality.  Never skimp on the quality of electrical connections or firing cables.
38. Firing lines will always remain shunted until the area is cleared of personnel. Maintain a shunt at the lead wires of the cartridge and the ends of the firing cable.  Immediately after firing, shunt the ends of the firing cable.  If open (unshunted) lead wires are brushed against synthetic fiber clothing, especially in cold air, residual static electricity could be of such intensity to fire unshunted cartridges.
39. Remote-controlled sites shall be at least .80 kilometers (one-half mile) minimum distance from live circuits.  Wattage outputs, climatic conditions, and energy requirements are so variable that it is impossible to establish a safe minimum area.  Consideration must be given to the danger of an accidental radio-frequency-caused firing.  Low-flying aircraft and high-voltage transmission lines under ideal conditions can also emit enough energy to trigger electrical explosive devices.
40. In the event of an undetermined misfire, a minimum of 30 minutes will be allowed before proceeding to disarm the rocket.
41. Never expose explosive device cartridges to unnecessary heat or abuse.
42. Do not handle charges or get in front of an armed trap during an electrical or dust storm.
43. Only the number of charges necessary to perform the planned work will be carried to the netting site.
44. All charges should be stored in the shunted position with lead wires.
45. All Division 1.3 low explosives, blasting agents, detonators, and charges shall be stored in a locked/secure Type 4 magazine/location as prescribed within 27 CFR §555.203.  Additional requirements with regard to physical location, magazine construction, and storage minimums shall be in compliance with §§555.206(a), (b), and (c), 555.210(b), 555.211(b) and 555.213. (See Appendix A.)
46. The location of the storage facility should meet the table of distances requirements of 27 CFR §555.219 (see Appendix B) for low explosives
47. All charges should be transported following the requirements of 49 CFR 172.
48. **Responsibilities**.
49. Bureau Safety Manager.
50. Develops appropriate policy, procedures, and plans and provides Bureau-wide program oversight and direction.
51. Conducts periodic evaluations of regional science programs to determine the effectiveness and degree of rocket-netting safety program administration and implementation and make recommendations for improvements, as appropriate.
52. Develops template products to assist the field in meeting rocket-netting chapter requirements, as appropriate.
53. Regional Safety Managers.
54. Assist Regional Safety Officers and Collateral Duty Safety Program Coordinators (CDSPCs) in identifying, developing, and approving rocket-netting safety training programs.
55. Conduct assessments of regional science programs during formal reviews/inspections.
56. Provide regional oversight and direction for the rocket-netting safety program.
57. Regional Safety Officers.
58. Assist regional science program CDSPCs in identifying, developing, and approving rocket-netting safety training programs.
59. Conduct assessments of regional field programs during formal reviews and inspections.
60. Collateral Duty Safety Program Coordinators.
61. Assist organizational field-level line supervisors in establishing and implementing rocket-netting safety training programs.
62. Conduct assessments of local programs during formal reviews and inspections.
63. Organizational Managers and Supervisors.
64. Establish a local rocket-netting program that complies with this chapter’s requirements and includes personnel training to provide persons with the knowledge, skills, and ability to perform rocket-netting operations.
65. Provide personnel instruction on the use and handling of explosives.
66. Provide immediate supervision and direction of an individual of proven ability and experience in rocket-netting operations for personnel who do not have sufficient training and experience to perform explosive work.
67. Verify that personnel performing rocket-netting operations are trained in CPR and first aid.
68. Verify that personnel required to operate a motor vehicle for transporting explosives are qualified and trained.  Should the vehicle be required to be placarded based on the quantity or hazardous nature of its contents, the operator of the vehicle shall have a valid State commercial driver’s license.
69. Personnel.
70. Adhere to all basic rocket-netting safety procedures as well as other additional safety procedures described in the explosives and rocket-netting chapter of this Handbook.
71. Complete required rocket-netting, blasting, or explosives safety training programs.
72. **Additional Resources.**
73. Dill, H. H., A Field Guide to Cannon Net Trapping, U.S. Department of the Interior: Bureau of Sport Fisheries and Wildlife, 1969, 18 pp.
74. Grieb, J. R., and M. G. Sheldon, “Radio-controlled firing device for the cannon-net trap,” J. Wildl. Manage, 1956, 20:203-205.
75. Peterle, T. J., “The cannon projected net trap for capturing sharp-tailed grouse,” Paper presented at 14th Midwest Wild. Conf., Des Moines, Iowa, 1952, 5 pp mimeo.
76. Sharp, D. E., and J. T. Lokemoen, “A remote-controlled firing device for cannon-net traps,” J. Wildl. Manage, 1980, 44(4):896-898.
77. CFR, Title 27, Part 555 and Title 49, Part 172.

CHAPTER 39, APPENDIX A

**Extractions from Title 27, Code of Federal Regulations, Part 55, Subpart K:**

**Storage Requirements**

**Sec. 55.203 Types of magazines.**

55.203 (d) Type 4 magazines. Magazines for the storage of low explosives, subject to the limitations prescribed by Secs. 55.206(b), 55.210(b), and 55.213. Blasting agents may be stored in type 4 magazines, subject to the limitations prescribed by Secs. 55.206(c), 55.211(b), and 55.213. Detonators that will not mass detonate may also be stored in type 4 magazines, subject to the limitations prescribed by Secs. 55.206(a), 55.210(b), and 55.213.

**Sec.** **55.206 Location of magazines**

**Sec. 55.206(a)** Outdoor magazines in which high explosives are stored must be located no closer to inhabited buildings, passenger railways, public highways, or other magazines in which high explosives are stored, than the minimum distances specified in the table of distances for storage of explosive materials in Sec. 55.218.

**Sec. 55.206(b)** Outdoor magazines in which low explosives are stored must be located no closer to inhibited buildings, passenger railways, public highways, or other magazines in which explosive materials are stored, than the minimum distances specified in the table of distances for storage of low explosives in Sec. 55.219, except that the table of distances in Sec. 55.224 shall apply to the storage of display fireworks. The distances shown in Sec. 55.219 may not be reduced by the presence of barricades.

**Sec. 55.206(c)** Outdoor magazines in which blasting agents in quantities of more than 50 pounds are stored must be located no closer to inhabited buildings, passenger railways, or public highways than the minimum distances specified in the table of distances for storage of explosive materials in Sec. 55.218.

**Sec 55.210: Construction of Type 4 Magazines**

**Sec. 55.210(b)** (b) Indoor magazine—

(1) General. Indoor magazines are to be fire-resistant and theft resistant. They need not be weather-resistant if the buildings in which they are stored provide protection from the weather. No indoor magazine is to be located in a residence or dwelling. The indoor storage of low explosives must not exceed a quantity of 50 pounds. More than one indoor magazine may be located in the same building if the total quantity of explosive materials stored does not exceed 50 pounds. Detonators that will not mass detonate must be stored in a separate magazine and the total number of electric detonators must not exceed 5,000.

(2) Construction. Indoor magazines are to be constructed of masonry, metal-covered wood, fabricated metal, or a combination of these materials. The walls and floors are to be constructed of, or covered with, a non-sparking material. The doors must be metal or solid wood covered with metal.

(3) Hinges and hasps. Hinges and hasps are to be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps must be installed so that they cannot be removed when the doors are closed and locked.

(4) Locks. Each door is to be equipped with (i) two mortise locks; (ii) two padlocks fastened in separate hasps and staples; (iii) a combination of a mortise lock and padlock; (iv) a mortise lock that requires two keys to open; or (v) a three-point lock. Padlocks must have at least five tumblers and a case-hardened shackle of at least \3/8\ inch diameter. Padlocks must be protected with not less than \1/4\ inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. Indoor magazines located in secure rooms that are locked as provided in this subparagraph may have each door locked with one steel padlock (which need not be protected by a steel hood) having at least five tumblers and a case-hardened shackle of at least \3/8\ inch diameter, if the door hinges and lock hasp are securely fastened to the magazine. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

**Sec. 55.213 Quantity and storage restrictions.**

(b) Detonators are not to be stored in the same magazine with other explosive materials, except under the following circumstances:

(1) In a type 4 magazine, detonators that will not mass detonate may be stored with electric squibs, safety fuse, igniters, and igniter cord.

(2) In a type 1 or type 2 magazine, detonators may be stored with delay devices and any of the items listed in paragraph (b)(1) of this section.

CHAPTER 39, APPENDIX B

## **Title 27, Code of Federal Regulations, Subpart K, Part 55.219**

## **(Table of Distances for Storage of Low Explosives)**

|  |  |  |  |
| --- | --- | --- | --- |
| Pounds | From inhabited building distance (feet) | From public railroad and highway distance (feet) | From above ground magazine (feet) |
| Over | Not Over |
| 0 | 1,000 | 75 | 75 | 50 |
| 1,000 | 5,000 | 115 | 115 | 75 |
| 5,000 | 10,000 | 150 | 150 | 100 |
| 10,000 | 20,000 | 190 | 190 | 125 |
| 20,000 | 30,000 | 215 | 215 | 145 |
| 30,000 | 40,000 | 235 | 235 | 155 |
| 40,000 | 50,000 | 250 | 250 | 165 |
| 50,000 | 60,000 | 260 | 260 | 175 |
| 60,000 | 70,000 | 270 | 270 | 185 |
| 70,000 | 80,000 | 280 | 280 | 190 |
| 80,000 | 90,000 | 295 | 295 | 195 |
| 90,000 | 100,000 | 300 | 300 | 200 |
| 100,000 | 200,000 | 375 | 375 | 250 |
| 200,000 | 300,000 | 450 | 450 | 300 |