



Transporting and Disposing of Fusees: Best Management Practices

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Fusees used by wildland firefighters during prescribed fires and wildland fire suppression contain potassium perchlorate (perchlorate), a hazardous material that can contaminate ground and surface water.

Perchlorate disrupts the function of the thyroid gland and may lead to human developmental defects. Some State agencies have begun to set water quality standards for perchlorate, and the U.S. Environmental Protection Agency (EPA) has established a nonregulatory health advisory level of 15 parts per billion for perchlorate in drinking water.

Fusees require special consideration for safe transport because they are classified as a flammable solid and are regulated by the U.S. Department of Transportation (DOT). Backfiring fusees are available through the U.S. General Services Administration Wildland Fire Equipment Catalog. National Fire Equipment System (NFES 0105) fusees meet the requirements of U.S. Department of Agriculture, Forest Service Specification 5100-360. These fusees (figure 1) burn for 10 minutes.

Highlights...

- Wildland firefighters use fusees to light fires, often when burning fuel inside firelines.
- Fusees that aren't burned completely or that aren't disposed of properly can contaminate water with perchlorates.
- Fusees are considered a flammable solid by Federal hazardous materials regulations and have special requirements for transportation.
- This tech tip includes best management practices for use, transport, and disposal of fusees.



Figure 1—A fusee meeting Forest Service specifications used by wildland firefighters. Tape secures the protective striker cap. The ferrule is a cardboard tube that allows fusees to be connected.



Using and Disposing of Fusees

An unburned 20-minute fusee could contaminate up to 240,000 gallons of water with 4 parts per billion of potassium perchlorate (Veeger and others 2005). In California, the maximum contaminant level is 6 parts per billion. Unburned fusees can cause 2,000 times more contamination than completely burned fusees (Silva 2003).

Firefighters must take care during burning operations, using no more fusees than are needed and burning fusees completely. When a fusee burns down, firefighters should throw it back into the fire—not into or toward lakes, streams, or rivers.

Firefighters should inspect fusees before going into the field. Leave any fusees that are damaged, broken, or have the protective striker cap removed (figure 2) in a proper storage facility. If damaged fusees must be transported, separate the fusees from flammable materials and secure the fusees so

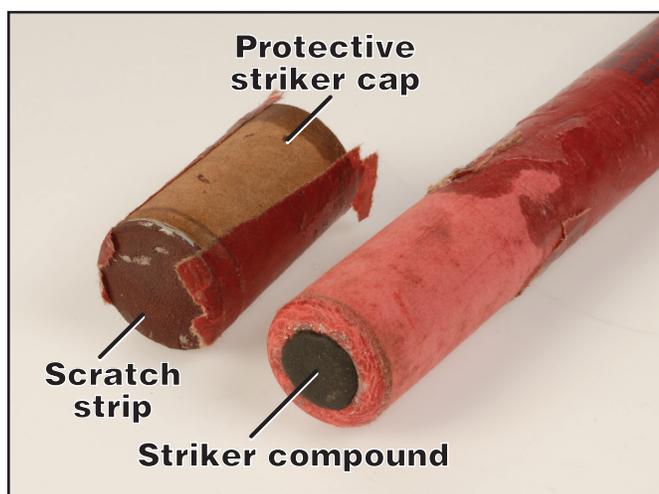


Figure 2—A fusee with the protective striker cap (left) removed. Make sure that protective caps are installed when transporting fusees.

they will not shift in transport.

Defective or broken fusees stored at a warehouse or fire station should be disposed of in a hazardous waste landfill. Fusees disposed in an unlined landfill could potentially contaminate the ground water and eventually contaminate drinking water.

Fusees used to burn fuels when fire threatens to overrun a firefighter should be discarded in any way that is safest for the firefighter. In this situation, firefighters should spend no extra time determining where to throw the fusee.

Transporting Fusees

Fusees are considered a flammable solid for shipping and transportation by Title 49 of the U.S. Code of Federal Regulations (49 CFR). Fusees must be handled and transported carefully to prevent unplanned ignition.

The “Interagency Transportation Guide for Gasoline, Mixed Gas, Drip-Torch Fuel, and Diesel,” National Wildfire Coordinating Group publication, Product Management System (PMS 442), requires that fusees be transported in a separate compartment from fuel in vehicles. Separating the fusee (a potential ignition source) from other flammable materials reduces the chance that fire might spread if a fusee ignites. When transporting fusees and fuel in the bed of a truck, separate the fusees from the fuel and secure them so they will not fall over or move. A material safety data sheet (MSDS) for fusees should be in the vehicle at all times.

The original shipping box (figure 3) or a vented metal storage box is recommended for transporting fusees. When you’re carrying fusees in your fireline pack, keep them away from fuel. Carry fusees in a pack pocket away from the fuel or carry the fuel outside the pack.



Figure 3—Use the original shipping box (shown) to transport fusees whenever possible.

When transporting packs with fusees in a vehicle or noncommercial aircraft, separate any fuel and place it in a different compartment. Review the “Interagency Aviation Transport of Hazardous Materials Guide” (NFES 1068) for specific requirements regarding the transportation of fusees in a noncommercial aircraft. Fusees cannot be transported on commercial aircraft.

Depending on the amount of hazardous materials being transported, both the container with the fusees and the vehicle that is carrying them may have to be marked.

A—If you are transporting 440 pounds or less (total weight) of all hazardous materials and each individual container weighs 66 pounds (including packaging) or less, only the proper shipping name (FUSEE) is required on each container holding fusees.

B—If you are transporting more than 440 pounds (total weight) of all hazardous materials or any container weighs more than 66 pounds (including packaging):

1. Fusees must be packaged in a DOT specification container (UN4G box, see figure 3).
2. A FLAMMABLE SOLID (hazard class 4.1) diamond-shaped label and identification number (NA1325) must mark each container holding fusees.
3. Shipping papers (carried in the vehicle) are required.
4. A FLAMMABLE SOLID label should be placed on the outside of the vehicle compartment holding the fusees.
5. DOT hazardous material training is required.
6. The material safety data sheet and a copy of the “Emergency Response Guidebook” must be carried in the vehicle.

C—If you are transporting 1,001 pounds or more (total weight) of all hazardous materials, in addition to B, you must have a commercial driver’s license and the vehicle must be placarded.

Conclusions

Fusees must be used, transported, and disposed of properly to reduce the possibility of accidental ignition or perchlorate contamination. The application of the best management practices in this tech tip will help the firefighters to protect water quality and maintain compliance with transportation requirements.

References

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Fusees are used by firefighters to light fires, often when burning fuel inside firelines or when igniting prescribed fires. The fusees contain perchlorates, which can contaminate water. This tech tip discusses how firefighters can use and dispose of fusees so they are less likely to contaminate water. The tech tip also discusses how to transport fusees, which are considered a flammable solid by Federal hazardous materials regulations (49 Code of Federal Regulations).

Keywords: ECAP, hazardous materials, ignition, perchlorates, transportation, waste disposal, wildland fire fighting, wildland firefighting



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