



# Coffee Break Training - Fire Protection Series

## Portable Extinguishers: Overview of “Class D” Agents

No. FP-2012-34 August 21, 2012

**Learning Objective:** The student shall be able to describe the use, application, and extinguishing methodology of “Class D” dry powders.

Today’s manufacturing materials and processes are vastly different from those used in the past. Special metals like titanium, magnesium, sodium, and lithium have become a part of our daily lives. These materials and manufacturing techniques present special challenges for today’s firefighters.

The burning characteristics of most combustible metals have both similarities and differences when compared to more common “Class A” materials like wood or paper. Like “Class A” materials, the energy required to ignite a metal depends on the configuration of the fuel; large solid blocks will require much more heat to ignite than will finely divided dust or chips from a lathe. However, unlike common combustibles, burning metals react violently when water is applied. Therefore, it is crucial that the fire protection expert understand the material being protected, its configuration, and its burning characteristics.

Because of the violent reaction to moisture, the use of any water-based fire protection is not permissible. Even the smallest amounts of moisture associated with carbon dioxide, halogenated agents, or other clean agents may cause an unacceptable reaction that will intensify the fire. Standard dry chemicals are not effective on these fuels either as the high heat generation will simply consume the agent.

Dry powders use a different extinguishing method than do standard dry chemicals. Instead of breaking the chain reaction to suppress a fire, dry powders smother a fire by forming a barrier between the fuel and the air.

Application of agent to a fire should result in a thick blanket, usually at least 1 inch (25 mm) thick over the entire surface of the fuel. The application of agent must be approximately 10 lb/ft<sup>2</sup> (4.5Kg/0.9m<sup>2</sup>) of area for most dry powders. The blanket of agent traps heat and may develop a crack that will allow air to pass through allowing the fuel to continue to burn. Anytime the agent blanket is disturbed, more agent must be applied to maintain at least a 1-inch (25 mm) blanket.

It is very important that overhaul of the hazard be delayed until the fuel has had sufficient time to cool below its ignition temperature. This may require 30 minutes or more to help assure that the metal has cooled enough to be removed without re-ignition.

The most common “Class D” dry powders are composed of a sodium chloride base or a special graphite base with additives that enable it to flow freely.

This Coffee Break Training tip courtesy of the Fire Equipment Manufacturer’s Equipment Association.



The bright flames from burning helicopters containing magnesium show the significant fire challenge posed by combustible metals. *Photo courtesy of the McMinnville Fire Department, Oregon.*



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