



Coffee Break Training - Fire Protection Series

Portable Extinguishers: BC Fire Extinguishing Agents–Dry Chemical

No. FP-2011-43 October 25, 2011

Learning Objective: The student shall be able to explain Class BC dry-chemical agents' use, application, and extinguishing methods.

Dry-chemical extinguishing agents have been used since the early 1900s when sodium bicarbonate was found to have greater effectiveness on flammable liquid fires compared to other agents being used at the time. They are still in use today. In the 1950s and 60s, new dry-chemical agent types and manufacturing processes were introduced that provided even greater effectiveness on Class B fires and being electrically nonconductive (Class C).

The first of the dry-chemical agents developed for use on Class B and C fires was sodium bicarbonate dry chemical, also called “regular dry chemical.” Potassium bicarbonate or “Purple-K Powder” (PKP) was developed by the U.S. Naval Research Lab in 1959 and is considered twice as effective on Class B fires than regular dry chemical.

On a pound-for-pound basis, BC-rated dry-chemical agents offer fast deployment and superior “flame knockdown” on Class B fires compared to other agents. Although previously classified for use on cooking oils and greases (Class K fires), BC dry-chemical agents do not have the cooling effect of a wet-chemical agent and, therefore, are no longer considered effective for use on Class K fires.

The primary extinguishing mechanism for dry-chemical agents on a Class B fire is a “chain-breaking” action, preventing free radicals formed in the combustion process to sustain the reaction. Theoretically, the smaller the particle size, the more effective the chemical is as an extinguishing agent on Class B fires as it decomposes in the flame front. Consequently, there is no cooling effect on the flammable liquid or blanketing of the escaping vapors.

Though dry-chemical agents will knock down the flaming stages of a Class A fire, they have no effect on the ember or deep-seated stages of a Class A fire. However, they are rated for use on Class C fires (fires involving live electrical equipment) as they have been proven to prevent the passage of electrical current back to the operator.

Both PKP and regular BC agents are alkaline in nature and are less corrosive than the acidic ABC dry chemical such as monoammonium phosphate.

However, under no circumstances should any of these agents be allowed to mix in the same container or extinguisher. The mixing of different dry-chemical agents can cause performance variables and possibly create destructive internal hardware problems. Only qualified, competent service technicians should be responsible for the service, maintenance, and testing of extinguishers with these chemicals.

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



Potassium bicarbonate or “Purple-K Powder” (left) and sodium bicarbonate dry-chemical agents are displayed. Photo courtesy of the Fire Equipment Manufacturer's Equipment Association.



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