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FEDERAL FIRE COUNCIL - Committee on Systems and Equipment

Washington, D.C. 20405

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HAND-PORTABLE FIRE EXTINGUISHER

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Enclosed is a listing of the types of hand-portable fire extinguishers now available, with a description of the advantages and disadvantages inherent in their use. The Systems and Equipment Committee of the Federal Fire Council has made recommendations to serve as guidelines in the purchase and use of extinguishers by Government agencies, in the hope that less desirable or duplicating models will be eliminated, and that the Federal Supply Service will be able to offer a family of extinguishers comprising the most effective models for a particular type hazard.

The material herein supplied is offered as a supplement to the instructions in the National Fire Protection Association Pamphlet No. 10, Standard for the Installation of Portable Fire Extinguishers, and Pamphlet No. 10A, Recommended Good Practice for the Maintenance and Use of Portable Fire Extinguishers. The ratings of the various types and sizes of extinguishers are available in the Underwriters' Laboratories, Inc. Fire Protection Equipment list.

Current recommendations are as follows:

1. Eliminate the use of soda-acid extinguishers, substituting stored-pressure or pump-tank water types. In many cases it may be advantageous to use multipurpose ABC (ammonium phosphate base) dry chemical extinguishers to add extinguishing capacity for flammable liquid and electrical fires.

2. Specify multipurpose ABC type dry chemical extinguisher, except where no Class A (ordinary material) extinguishing capacity will be needed, or if exceptionally high effectiveness on Class B (flammable liquid or grease) fires is required, potassium bicarbonate base dry chemical may be substituted.

3. Eliminate the use of extinguishers that are actuated by inverting. In addition to the soda-acid type (recommendation 1), this would bar the use of a few cartridge-pressurized extinguishers, and those of the foam type. The latter have their principal application on flammable liquid fires in a contained area (such as a small vat or tub), and if particularly required, may be available on special order.

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4. Dry chemical extinguishers should be substituted for those with carbon dioxide, except where the powder residue would be undesirable. Dry chemical devices have considerably greater extinguishing capacity and less weight of extinguisher per pound of extinguishing agent than do carbon dioxide types.

5. Substitute small dry chemical extinguishers for all using vaporizing liquid, especially carbon tetrachloride base agents.

6. Instructions for recharging should be followed explicitly and special care should be taken not to interchange different types of dry chemical.

7. Where it is stated in the description of the different types of extinguishers that partial discharge is possible, with the availability of further use listed as an advantage, this is not to be construed to mean that partially discharged extinguishers should not be fully recharged immediately after the emergency.

8. The need for an extinguisher in a particular situation should be made the subject of careful study so as to avoid unwarranted expenditure for extinguishers and their maintenance.

Any information you may have on experiences with different types of extinguishers will be greatly appreciated. Also, an expression of your opinion of these recommendations will be most welcome. Please address comments to the Federal Fire Council, Committee on Systems and Equipment, General Services Administration, Washington, D. C. 20405.



Harry Shoub
Chairman
Committee on Systems and Equipment

Advantages

Soda Acid:

Long known, widely recognized, can be recharged by anyone with readily available materials. (sodium bicarbonate in any food store -- sulfuric acid in some drugstores, 4 oz. in bottle)

Water and Cartridge:

Uses only water and a cartridge (no chemicals, unless antifreeze). Can be made antifreeze. Models operating upright available.

Stored Pressure Water:

Requires no chemicals or cartridge for recharging. Maintenance simply by visual observation of the pressure gage, and for evidence of tampering. May be made antifreeze. Extinguisher operates in upright position by squeeze-grip handle. Maximum pressure in extinguisher no greater than filling pressure. Clogged discharge will prevent operation but will not cause buildup of dangerous pressure conditions. Partial discharge possible, with residue available indefinitely for further use.

Disadvantages

Must be inverted to operate (not easy). Must be discharged and recharged at least once a year. Must be protected from freezing. Charge chemicals are messy, require some care (thoroughly dissolve sodium bicarbonate) and can be dangerous (acid). Danger of excessively high pressures if nozzle (or discharge) is clogged. Once initiated, discharges completely. Class A use only.

Requires a suitable cartridge for recharging. Maintenance requires that cartridge be carefully weighed, preferably at 6-month intervals (sensitive scale required). Danger of excessively high pressure if discharge is clogged. Once initiated, discharges completely. Class A use only (except loaded stream charge).

Must have compressed air supply for recharging (can use tire pump in a filling station.) Class A effectiveness only.

Advantages

Pump Tank:

Recharging and maintenance simple (add water). May be recharged at any time (even when discharging). May be made antifreeze.

Foam:

Suitable for Class A and B fires. Especially good on fires in oils or greases confined in a vat or tank where it will leave a cooling and smothering blanket that prevents reignition. Easily recharged with kit (inexpensive).

Carbon Dioxide:

Operates upright by squeeze-grip valve. Clean discharge, almost inert, no residue. Suitable on Class B and C fires (nonconductor of electricity). Does not require protection from freezing, and will operate at low temperatures. Special charging available for below 0°F. Partial discharge possible

Vaporizing Liquid, Carbon Tetrachloride

None.

Disadvantages

May be difficult for a few people to operate (but these could not carry the extinguisher to the fire, anyway). Tanks usually not sealed at filling opening -- may be tampered with or contaminated by foreign matter. Pump mechanism may fail (rare). Class A use only.

Must be inverted to operate. Must be discharged and recharged yearly. Must be protected from freezing, and from excessively high temperature storage. Excessively high pressures if actuated with clogged discharge. Once initiated, discharges completely. Not suitable for running or spill fires.

Extinguishers heavy (high weight per unit of extinguishing capacity). Maintenance is by weighing (fairly sensitive scale required, especially for small sizes). Recharging only by fire extinguisher service concerns or suppliers of compressed gases.

Ineffective agent; toxic, corrosive; difficult to aim and apply; rapid deterioration of extinguisher.

Advantages

Vaporizing Liquid, Stored Pressure, Chlorobromomethane:

Fairly effective extinguishing agent; easily directed; has long range. For Class B and C fires. Maintenance by inspection of gage. Squeeze-grip operation.

Dry Chemical-Sodium Bicarbonate Base:

Highly effective on Class B and C fires; useful on flash-type Class A fires (such as in scattered lint). Agent is non-toxic and practically non-corrosive. Available in sizes 1 to 30 lb. Stored pressure type can be partially discharged, and residue reserved for further use. Operates in upright position, usually by squeeze-grip handle. Powder cloud provides operator with some protection from radiant heat of fire.

Dry Chemical - Potassium Bicarbonate Base (Purple K):

Same as sodium bicarbonate base, but with greater effectiveness on Class B and C fires. May be made compatible with air foam.

Disadvantages

Agent toxic and corrosive. Requires a dry air or nitrogen source for recharging. Has little effectiveness on Class A fires.

Cartridge type requires suitable cartridge for recharge; must be discharged completely when initiated; cartridge must be checked periodically on a sensitive scale. Stored pressure type may be difficult to recharge properly (possibility of slow leakage of gas); requires dry air or nitrogen for recharging. Sodium bicarbonate base dry chemical is not compatible with mechanical (air) foam. Powder may present a cleaning problem after discharge.

Same as sodium bicarbonate base. Foam-compatible type may require greater care in handling to prevent moisture absorption.

Advantages

Dry Chemical - Multipurpose (ABC) Type:

Same as sodium bicarbonate base. High effectiveness on most Class A as well as Class B and C materials; high Class A rating for weight of agent - 10-lb capacity extinguishers available with 2A rating (same as 2-1/2-gal. water type). Coating effect on Class A materials tends to prevent reignition.

Disadvantages

Same as sodium bicarbonate base. Smaller size extinguishers, below 5-1/2 lb, do not have a Class A rating, although they may be effective on small fires in ordinary materials.