tinguishers is divided into (*a*) water solution extinguishers, (*b*) dry-chemical, carbon dioxide, and liquefied-gas extinguishers, and (*c*) dry-powder extinguishers Some vaporizing liquid extinguishers, such as those containing carbon tetrachloride or chlorobromo-methane, are excluded as they are not recommended because of their toxic properties The proper method of operation and maintainance of these extinguishers are described in Figs 43–14 through 43–24, and their characteristics are summarized in Fig 43–13

Water solution extinguishers

Fire extinguishers that use water or water solutions include pump tank, cartridge actuated,* soda-acid,* stored pressure, loaded stream (often including a wetting agent), and foam** (see Figs 43–14 through 43–18) These extinguishers are effective against Class A fires because of the quenching and cooling effect of water The cooling effect of all but the foam extinguisher can be increased if the operator extends his forefinger over the edge of the nozzle to create a spray Foam primarily extinguishes Class B fires by smothering The loaded stream extinguisher can also be used against Class B fires because of the chemical action of the alkali-metal-salt, however, it has limited effectiveness These units cannot be used on fires in or near electrical equipment since they can produce a shock hazard to the operator

One important maintenance item on all water extinguishers is to inspect the nozzle frequently for foreign particles that may prevent discharge, such as dirt, match sticks, and paper The pressure relief hole in the cap of soda acid, gas cartridge, and foam units must also be free from obstruction as it is designed to release any residual pressure that may injure a worker when he is removing the cap before recharging

In locations exposed to freezing temperatures, extinguishers must be installed in heated cabinets (Fig 43–19), or charged with a nonfreezing solution However, antifreeze or salt solutions should not be used unless the equipment has been designed for such use For example, some chemicals cause rapid corrosion when used in stainless steel units

Water-base extinguishing equipment that cannot be protected from freezing temperatures can sometimes be kept usable by the addition of calcium chloride or patented chemicals Except for loaded stream extinguishers, which use a special alkali-metal-salt solution, the pump tank, cartridge operated, and stored-pressure water extinguishers can be protected against freezing by calcium chloride or by special antifreeze charges recommended by the manufacturer

Calcium chloride solutions are good conductors of electricity and therefore especially dangerous if applied to live electrical apparatus Solutions have high corrosivity and should include a corrosion inhibitor

When charging any extinguisher with an antifreeze solution, the chemical should be thoroughly dissolved in warm water in a separate container and then poured into the extinguisher through a fine strainer to remove any foreign particles that may clog the unit Greater care must be given in maintaining extinguishers containing antifreeze solutions, because they may corrode more easily than with plain water In recharging, all parts including the hose and nozzle should be thoroughly flushed with plain water Be sure that all the plain water is drained off to prevent freezing and clogging

Table 43-D shows the approximate temperatures above which varying strengths of 2½-gal calcium chloride solution will give protection against freezing At regular intervals, solutions should be tested with a hydrometer for conformity to the figures

Dry-chemical, carbon dioxide, and liquefied-gas extinguishers

Dry-chemical extinguishers The dry-chemical extinguisher is one of the most versatile units available It extinguishes by interrupting the chemical flame chain reaction (see explanation earlier in this chapter) It is not to be confused with dry powder extinguishers discussed in the next section

Four types of base agents are used sodium bicarbonate, potassium bicarbonate, potassium chloride and ammonium phosphate (multipurpose) When recharging, it is important to use only the dry chemical agent and

* No longer manufactured

** Only available as 18-oz disposable unit