Which Fire Extinguisher Does Your Boat Need?

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Federal law and common sense both mandate adequate fire extinguishers in good order aboard all vessels. If you are unsure about the legal minimums for your class of vessel, consult the Coast Guard's *Federal Requirements for Commercial Fishing Industry Vessels*.

The extinguisher designations include a letter that indicates the type of fire it is designed to fight (for example, "B" for fuels and oils) and a Roman numeral for the weight of the extinguishing agent.

Clearly, a small canister of foam or dry chemical isn't adequate to extinguish a major fire, particularly in the engine room. Many operators have equipped their vessels with large halon systems because halon is relatively clean, electrically nonconductive, compact, and effective. However, halon is rapidly disappearing from the scene, and mariners need to find satisfactory replacements. Although halon 1211 and 1301 are probably the best fire-extinguishing agents ever made, they are no longer being manufactured. Why? Halon is of a family of chlorofluorocarbons known to destroy ozone, the atmospheric gas which protects Earth's living creatures from the sun's most damaging radiation.

The EPA didn't ban the possession of halon, only its manufacture; and since production ceased in 1994, halon has been scarce and in high demand. Industries like petroleum and aviation are buying up and hoarding supplies of halon because of its superior fire-fighting properties. If you have a halon extinguisher in good condition that you don't need, you can sell it to one of the companies that recycle halon.

Conventional fire extinguishers work by breaking one of the three legs of the "fire triangle" —fuel, oxygen, and heat or spark. Dry chemical, for example, suffocates a fire, and CO_2 also suffocates by displacing the air. Water cools a fire, depriving it of adequate heat to burn.

Halon and its successors work differently. They actually interrupt the chemical reaction of the fire, and they do it without displacing oxygen. This has both advantages and disadvantages. It means that halon is less dangerous to us in enclosed spaces than, say, CO_2, which can snuff out a person as quickly as a fire in an enclosed space.

The downside is that, although it will put out a fire, it won't kill a diesel engine. If an engine room fire triggers an automatic halon-type system, unless the engine is manually stopped it will suck the halon through the air intake and draw fresh air into the engine room, potentially reigniting the fire. The result is known as halon run-on.

Mariners need the capabilities of halon, but in most cases can no longer buy it. So they are turning to halon replacements. The big fire extinguisher and chemical companies have developed gases or rapidly gasing liquids, with names like FM-200 and FE-241, which work nearly as well as halon but with less damage to the atmosphere. However, recent legislation calls for the eventual phase-out of agents such as FE-241, which contain ozone-depleting hydrochlorofluorocarbons (HCFCs). Because FE-241 can irritate the respiratory system, it is recommended for non-occupied spaces such as engine rooms, while FM-200 (which does not contain HCFCs) can be used in cabins and other occupied areas.

Halon substitutes are less efficient than halon itself, so the containers are considerably larger than halon units for the same capacity. It takes, for example, about one and a half times as much FM-200 to extinguish a fire as halon 1301. The tradeoff for helping save the Earth is that you need a much bulkier fire extinguisher to save your boat.

It is important to follow carefully the manufacturers' instructions for installing and deploying these units. Since their characteristics may be different from those of other fire extinguishers, if not properly secured, they can become a missile ricocheting around the inside of your boat. Some of the agents are actually liquids that rapidly gasify when released from the container, so the route of the discharge from nozzle to the locus of the fire must be unobstructed to be most effective.

Curiously, the law sets standards for the extinguishers, but doesn't spell out standards for inspection and servicing. Essentially, it is up to the operator to determine whether they are properly maintained. Like all fire extinguishers, those containing halon substitutes should be checked and maintained regularly. The only way to ensure that an extinguisher is up to snuff, so to speak, is to weigh it at least twice a year. If the weight has decreased by 10% from the original, it needs to be recharged. Tanks and nozzles should be checked for corrosion and physical damage.

Regarding shutdowns: Installed units normally have a heat-sensitive trigger device which will cause the extinguisher to discharge if the temperature in the space reaches a predetermined level, such as 175°F. The vessel operator may be unaware that a fire had started, and that the unit had discharged; and if the engine continues to run even a few seconds after the extinguisher goes off, the effect can be neutralized by incoming fresh air.

The solution is an automatic engine shutdown–an electronic device wired between the extinguisher and the solenoid on the engine. (Most will not work on push-pull cable shutoffs.) The units are made with plug-ins for several connections, so a single setup is capable of shutting down twin mains, two gensets, and some engine room fans at the same time. They include a panel at the helm that indicates the status of the

unit, including a red light and audible alarm to announce discharge as well as a switch to disarm it. They are not cheap; expect to pay $200 to $400 for the unit plus installation.

A compelling argument for the automatic shutdowns and for automatic discharge extinguishers in the engine space is that, with the popularity of electronic solenoid stop switches, you may not be able to stop your engine if a fire destroys wiring between the engine and your instrument panel. Besides, a common source of engine room fire is leaking from a pressurized oil line, such as to the turbocharger; so quickly shutting down the engine is essential. Some operators install an auxiliary engine kill cable, or even an automatic engine air shutoff, so that they can kill the main and prevent halon run-on in the case of an engine room fire. ✥