





HOT STUFF

When it comes to fire suppression and racing, meeting the letter of the law may not be the best idea

BY JASON ISLEY PHOTOS PHILIP ROYLE

Ask any road racer – amateur or professional – what their biggest fear associated with a crash is and the answer will probably be a fire. A good quality driver's suit and underwear are the first line of defense for the driver, but there are additional tools you can use to protect yourself (and your car) in the event of a fire.

The GCR currently allows for a 2lb, handheld fire extinguisher to be used in a number of Club Racing classes, and we have been using this allowance in one of our project cars. While the small extinguisher meets the letter of the rules, and we are certain it could prove useful when tackling a small fire, we do not like the idea of getting close enough to a fire to actually use the extinguisher – we hope to be out of the car and far away from the flames, which essentially makes the extinguisher a cosmetic item. Consequently, a complete fire system was in order.

As items like a HANS and a radio system are added, egress time is slowed, reducing the amount of time the driver may have to use the handheld fire extinguisher. A fire system protects the car and driver better than a handheld extinguisher as the system does the work of fighting the fire even as the driver is in the process of escaping.

YOUR OPTIONS

When it comes to on-board fire systems you typically have two choices, Halon or Aqueous Film Forming Foam (AFFF). Halon is one of the most common types of extinguishers in automotive applications. Halon is stored under pressure in a liquid state and, once discharged, the combination of liquid and gas work to smother the flames. A nice feature of Halon systems is that almost no cleanup is required if you discharge the system; a drawback is that due to some of the ingredients being labeled as harmful to the ozone layer, production of Halon was banned in most countries in 1994.

If you have a Halon system, or are thinking about purchasing one, don't let the production ban deter you. There is still a large surplus of Halon available – over 30 years worth, according to some sources – as well as safe alternatives such as FE-36, which is in production. It is also noteworthy that many experts agree that chlorofluorocarbons do more harm to the ozone layer than Halon due to the volume used.

Unlike Halon, AFFF is stored as a liquid and discharges as foam. The AFFF concentrate is a water-based, synthetic animal protein, and the foam is biodegradable, non-toxic and cleans up with water. The most common AFFF applications are found as a pressurized tank, charged by nitrogen or oxygen.



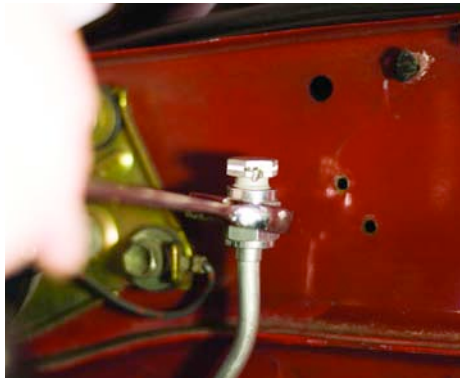
The reality is both Halon and AFFF are more than adequate to help protect you and your car, leaving a lot of the decision to personal preference. After researching the options, we opted for an AFFF system for its environmental advantages.

INSTALLING THE SYSTEM

Emergency Suppression Systems (ESS) offers an AFFF system that is non-pressurized and meets SCCA requirements. The ESS system uses an AFFF concentrate, which is combined in the storage cylinder with water. The activating agent comes from an externally mounted, liquid-filled CO2 cartridge. When the system's T handle activator is pulled, the CO2 cartridge is pierced allowing the CO2 to mix with the AFFF and water in the tank, creating foam that resembles shaving cream.

The ESS system is user rechargeable, so if you ever have to use it (or you accidentally pull the T handle) you can recharge it yourself, which is a great cost savings and convenience. The ESS system is also priced around \$50 less than a competitive Halon system. The shelf life of the ESS system is also nice – when mixed, ESS states that its solution is good for 10 years, but recommends replacing it after five to seven years.

The ESS 2.5-liter system was a perfect fit for our application. The 2.5 system is designed to give two areas of coverage – the driver and the engine compartment. The AFFF foam is delivered via three T-style nozzles, one on the driver and two covering the engine.



(ABOVE) Be sure the nozzles point in the manufacturer's suggested directions. (LEFT) The head of the fire bottle has two discharge lines; one offers coverage to the driver and the other passes through the firewall (BELOW) and into the engine compartment.

“ THE AFFF FOAM IS DELIVERED VIA THREE T-STYLE NOZZLES ”



Beyond basic hand tools, the only item we had to source for the installation was a flaring tool, to flare the end of the 1/4-inch aluminum tubing. If you have not used a flaring tool before, it is a good idea to pick up a scrap piece of tubing from your local hardware store to practice on.

The first step is to pick a location to mount the cylinder. The cylinder should be mounted horizontally in the car, with the head facing the front of the car to optimize the foam delivery. Besides that, the only mounting limitation is you must mount the tank within six feet of the actuating cable pull handle. However, it is a good idea to minimize any unusually sharp bends in either the actuating cable or the discharge lines. It is also a good idea to mount the cylinder with the CO2 cartridge on top, this way if you should have to remove the CO2 unit for a tech inspector, you will minimize any AFFF loss.

The T handle is the next item to install. This handle must be mounted within easy reach of a belted driver. We chose to fabricate a panel to fill the space once occupied by the factory radio and we placed a metal bar behind the panel to create a sturdy mounting point for the handle.

Back to the ESS cylinder, there are two outlets at the head of the cylinder. From these outlets we run aluminum tubing to both the driver and engine compartment.

Working with the aluminum tubing is simple as the tubing is soft enough to bend with your hands – just be sure to avoid sharp bends or pinching the tubes. The tubing should be secured with the supplied padded clamps, and steps should be taken to prevent the tubing from rubbing on anything that could wear a hole in it over time. The driver's discharge nozzle should be positioned to provide coverage of the lower torso, legs and feet. Typically, the side of the center console or transmission tunnel is a good place for this outlet; it should be about knee high.

Depending on your car, locating the bulkhead T can be a difficult task. Once you have found a suitable location to pass through the firewall you can select a location for the two nozzles. Typically against the firewall, one on the passenger's side and the other on the driver's will offer adequate coverage. These nozzles should be angled to face slightly toward each other to provide overlapping coverage of the engine compartment.



Once the hardware has been completely installed, you must remove the cylinder and fill it with the AFFF solution and water. Doing this step last makes the cylinder easier to work with not only because it weighs less, but also because there is no chance of accidentally discharging the system during the installation. This is the most dangerous part of the installation. When mixed with water, the AFFF solution is perfectly safe, but in its raw state it can be harmful to your eyes, so safety glasses are a must.

The process is simple: Fill the cylinder with the prescribed amount of water and add the AFFF solution. During this process, make sure to have the CO2 cartridge in place or fluid will escape from the cylinder. Once filled, reinstall the cylinder, hook up the T handle and nozzle lines, and you are done.

According to Thomas Turner, president of ESS, if you have followed the instructions your system will be ready to go with no testing needed. We did ask Turner if there was a way to verify the fittings and nozzles were aimed correctly and had no leaks without discharging the tank. Turner informed us we could run water



(ABOVE) We installed the actuator using a reinforced plastic cover where the radio once resided. (RIGHT) Be careful when handling the AFFF, as the chemical can be harmful to the eyes before it's mixed with water. (BELOW) Installed, the fire system doesn't take up much space. Be sure to remember to remove the safety pins before racing.



through the lines – this would also ensure you have not left any debris in the lines from the flaring process and that all your fittings are tight. He did reiterate, however, that testing is not necessary if you installed everything as shown in the instructions.

While installation of the ESS system is relatively easy, if you have any reservations about your ability to install the system (or any fire system), contact a professional for the installation. It is essential that the system works properly, and it is very likely you will not know if you did something wrong until the moment that everything has to work.

With the fire system installed, we are far more confident of our and the car's safety than when we were merely meeting the GCR's extinguisher requirements. As for testing our system, while we would like to see what it is like when it goes off, we have been unable to convince the boss to pull the trigger. ☹️

SOURCES

Emergency Suppression Systems Inc.
www.essfire.com

Environmental Protection Agency
www.epa.gov

