Fire Suppression

The Ford Fire Suppression System is designed to reduce the risk of injury in high-energy rear impacts by deploying chemicals designed to suppress the spread of fire or potentially extinguish a fire. By doing so, it provides more time for occupants to either escape from a crashed vehicle or be removed from the vehicle by outside persons.

Ford offers the Fire Suppression System as a factory option. **The FSS is an automotive industry first.**

Development testing showed that the best time for deploying the limited amount of fire suppression substance is near the point of-rest, which can be seconds after, and more than 200 feet beyond, the point of impact. It also showed that liquid fire suppressants, combined with surfactants, performed better than foams or powders due, in part, to the ability of these substances to stay with the fuel source and to spread, like gasoline, beyond the direct reach of the deployment nozzles and to cover the gasoline.

The Ford system uses advanced electronics and on-board sensors to measure post-impact vehicle movement to determine the optimal time for deployment of the fire suppression material. The system is integrated into the Police Interceptor's structure and electrical architecture.

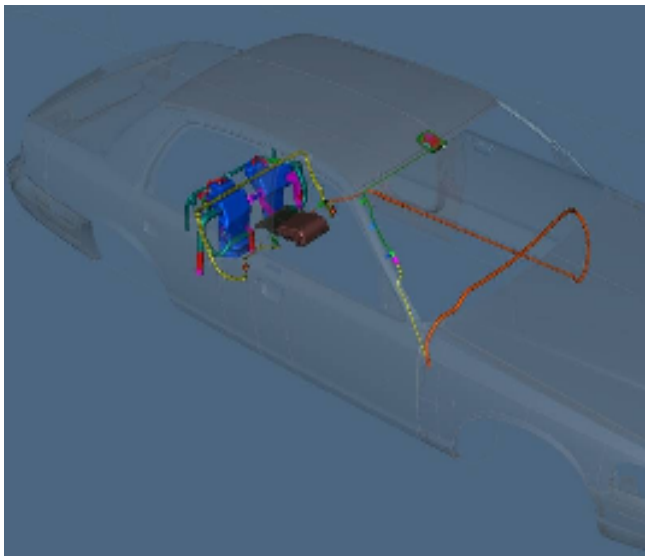
Robust Test Procedure

The Ford Fire Suppression system was tested in 75 mph rear impact collisions in which gasoline and ignition were artificially provided.

Test Protocol

A consistent, repeatable test protocol is required for testing in order to properly evaluate the system and any changes that are made during the development phase.

System Sketch – Total Vehicle



The system consists of:

- Two stainless steel containers that hold the fire suppressant material and gas generators used to pressurize and deploy the suppressant material.
- Two manifold assemblies, each with two deployable nozzles, which spray fire suppressant down onto the ground.
- An additional manifold, mounted high with two fixed nozzles, which sprays fire suppressant material up and into the body.

- The electronic control module (located under the rear seat). The module contains the rear crash sensor, the processing computer, and a large electrical capacitor for backup system power in case vehicle electrical power is lost.
- Two redundant wiring harnesses run between the control module and the gas generators. Each harness is armored to protect during a high-energy crash. The redundancy allows one to be damaged without impacting functionality of the system.
- The Manual Activation Switch is located on the headliner between the sun visors.

How the System Works
In the event of a very high speed, high-energy rear impact, a system of crash sensors and high speed electronic processors determines that the system needs to deploy. The system delays deployment until the ABS wheel sensors indicate the wheels have slowed and the vehicle is coming to rest.

If the vehicle speed sensors have been so damaged in the accident that they are unable to command deployment, a back-up timer will deploy the system six seconds after impact.

The fire suppression materials are stored in an unpressurized liquid state. When the deploy signal is given, two gas generators, similar to the gas generators used in airbags, generate high pressure gas. Suppressant and surfactant materials are then emitted through a system of manifolds and nozzles to suppress the fire.

Surfactant reduces the surface tension of the liquid fire suppressant enabling the liquid to spread more quickly and completely.

The system deploys:

- Automatically when a high-speed, high energy impact occurs at the rear of the vehicle
- Manually when other situations require fire suppression

None of the materials used in the Fire Suppression System are hazardous.

System Illustrations

Manual Activation Switch
There is a covered manual activation switch mounted in a console on the headliner between the visors that can be used by vehicle occupants to manually deploy the system.

Retrofits
The system cannot be retrofitted for two reasons:

- The system is integrated with the vehicle's computer and a high-speed vehicle data bus that is new for the 2005 model year. This precludes retrofits onto pre-2005 model year vehicles.
- Modifications to the vehicle frame were required to support the additional weight at the mounting locations. Only vehicles built at the factory will have the frame modifications required to support the additional weight.

Fire Suppression Test Video (broadband connection highly recommended due to large file size)
This video is of a Fire Suppression System test conducted in March 2004. The system was activated by a fixed time trigger, not cessation of vehicle motion. There was no leak of fuel from the vehicle and no punctures of the fuel tank. Fuel for the fire, as well as the ignition source, were deliberately introduced as

described in the Robust Test Procedure section.

- 75 mph
- 50% offset left
- 200 oz. fuel
- Fixed time trigger
- No punctures of the fuel tank
- Fuel and ignition source introduced by separate systems
- Fire suppressed automatically by onboard system

System Limitations

- The system has been designed and tested to withstand a 75 mph 50% offset rear impact by a Taurus-sized vehicle
    - In some crashes, including very high-energy crashes, the fire suppression system could be so damaged by the crash forces that it cannot deploy.
    - Like any vehicle component, the Fire Suppression System may not withstand some crashes.
- The Ford Fire Suppression System was tested and designed under controlled conditions involving the artificial deployment of 200 ounces of gasoline.
    - In some accidents, including those involving more fuel, the Ford Fire Suppression System may not be effective in controlling the fire.
- No vehicle can completely eliminate the risk of fires.
- You should not consider the vehicle “fire proof” because it is equipped with a Fire Suppression System.
- Like the Upgrade Kit, the Trunk Pack, and the Trunk Packing Considerations, Ford is offering the Fire Suppression System to reduce the risk of fires.