Suppression Systems

January 2008

Requirements

- Fastest activation of discharge
- Release agent as fast as possible
- Distribute agent over largest possible volume as fast as possible
- Maximize pressure drop at distribution
- Lowest possible operating pressure

SAFE Suppression Performance

- Fast sealed valve operation in less than 5 milliseconds
- Discharge in less than 100 milliseconds
- Discharge and dispersion pattern of 360 degree horizontal and more than 60 degree vertical
- Provides for instantaneous formation of homogeneous extinguishing concentration throughout the protected area thus suppression in less than 150 milliseconds
- Rapid drop in pressure at a short distance from the specially designed dispersion assembly

Soldier Survivability & Safety Considerations

- Direct free flow of agent - *No interference , friction or pressure shock caused by other systems*
- SAFE deflector provides 360 degree free and fast flow dispersion – *when compared to other systems approx 30 degree angle distribution*
- SAFE Deflector provides efficient distribution and fast decay of pressure thus increasing safety

Sealed Valve Versus Solenoid

Sealed Valve

Hermetically Sealed

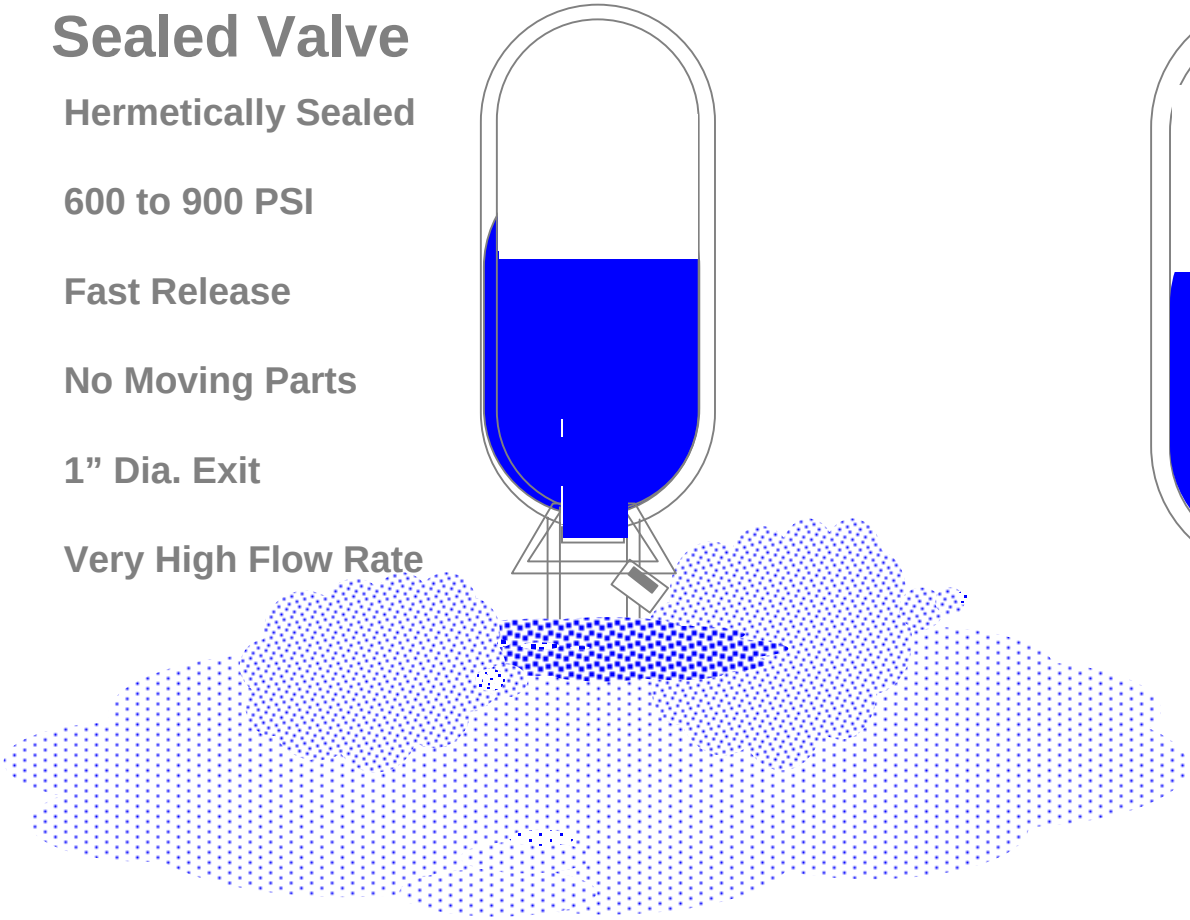
600 to 900 PSI

Fast Release

No Moving Parts

1” Dia. Exit

Very High Flow Rate



Agent Deployed in <80ms

Solenoid Valve

Non-Hermetically Sealed

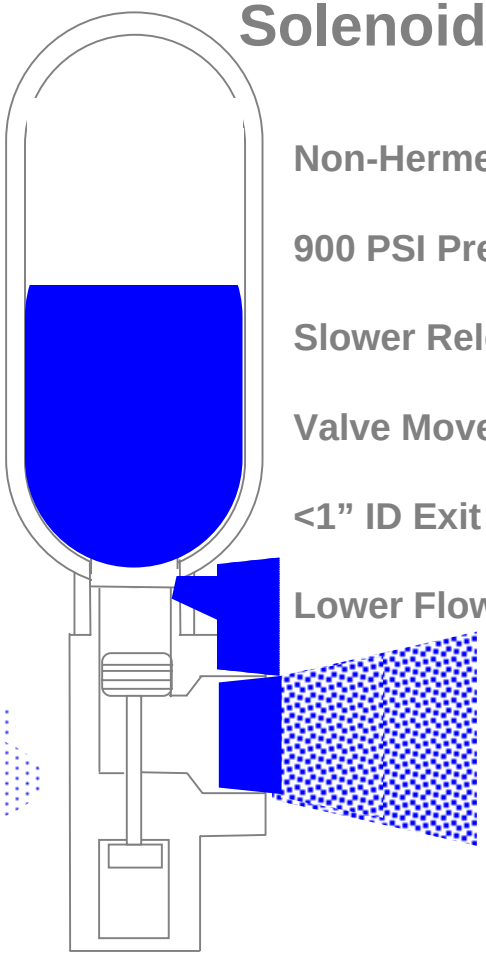
900 PSI Pressure

Slower Release

Valve Moves

<1” ID Exit port

Lower Flow Rate

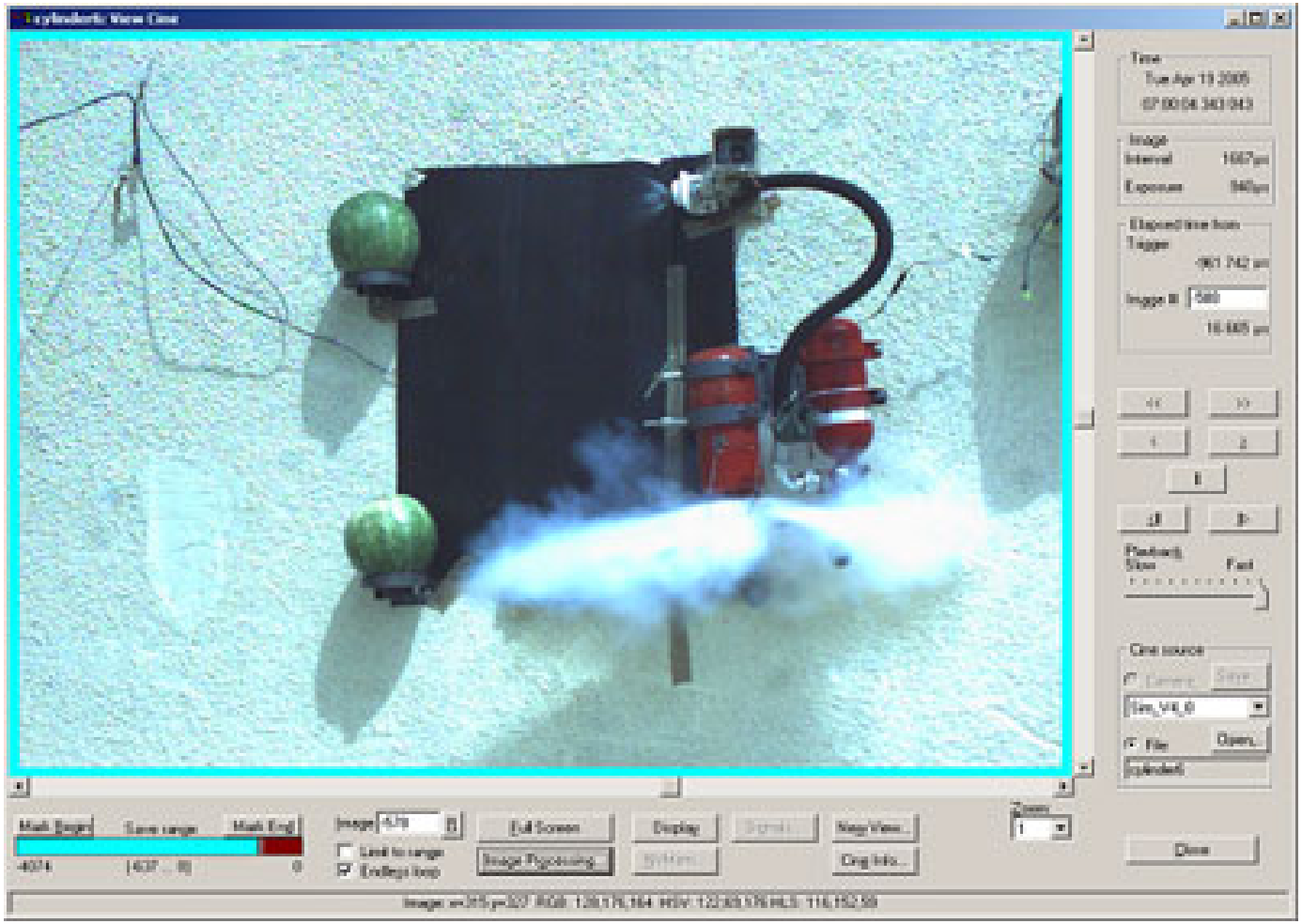


Agent Deployed in >150ms

Side by Side Test

- Test Set-up
  - Spectrex Extinguisher with Deflector
  - The “Stryker” Extinguisher with nozzle
  - Dispersion point located 2 ft from watermelon
  - Both used FM200 agent
  - Activation executed by same switch where the required power was provided at the exact same time to both

Discharge status at 17 milliseconds



Results at 17 milliseconds

The "Stryker" Suppression System

- "Stryker" suppression nozzle system, mounted on the right side with its nozzle at the top, is just beginning to deploy the extinguishing agent
- The "Stryker" system still does not discharge (approx 15 Milliseconds slower)

The SAFE Suppression System

At that point the SAFE System has released the extinguishing agent in a 360 degree pattern and the gas being discharged to all directions at a distance of more than 2 ft *(almost reaching the watermelon)*

The volume that is covered by the SAFE system extinguishing agent is meaningful in achieving superior performance.

Results at 25 milliseconds

Results at 25 milliseconds

The "Stryker" Suppression system

- The system beginning to effectively deploy the extinguishing agent which reaches 1 ft at 30 degree cone
- The Extinguishing agent covers a volume of approx 0.33 cubic feet

The SAFE Suppression System

- **SAFE System releases agent in a 360 degree at a radius of 3 ft to the right and left and toward the camera and the wall providing for substantial volume coverage**

At this early stage the SAFE system extinguishing agent volume coverage is approx 25.58 cubic feet, more than 75 times bigger volume coverage by the "Stryker" system.

Results at 50 milliseconds

Results at 50 milliseconds

The "Stryker" Suppression system

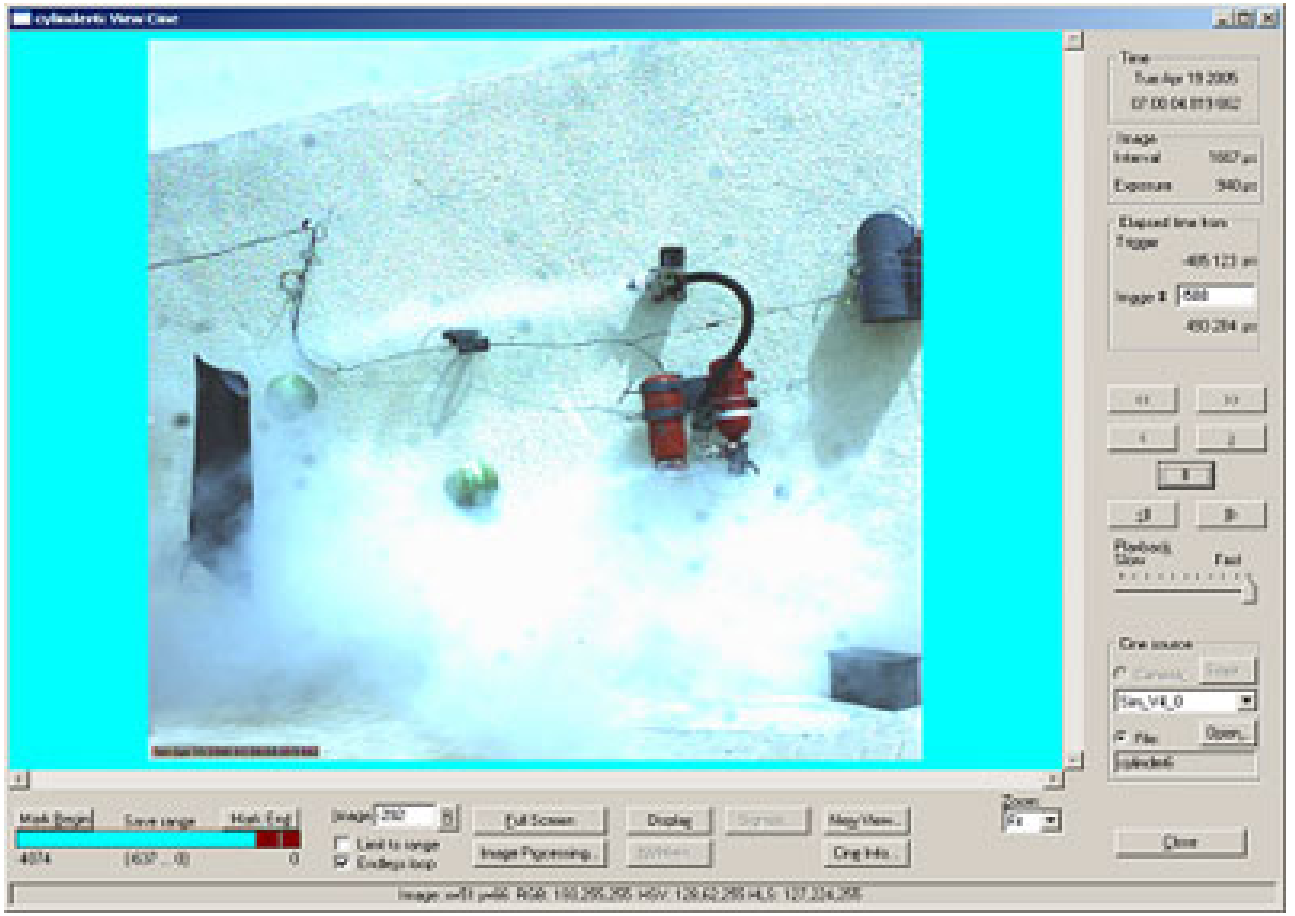
- The extinguishing agent from nozzle has finally reached and covers the upper melon
- Please note the narrow dispersion cone of the "Stryker" system and the limited volume coverage approx 5.92 cubic feet
- Due to the narrow cone, the agent does not disperse and hits directly (in full force) the watermelon

The SAFE Suppression system

- **SAFE system extinguishing agent has deployed over a significantly larger volume that covers approx 108.66 cubic feet, about 20 times better volume coverage**

In fact by this time effective suppression action can be performed by the SAFE system while the "Stryker" system is at its early stages of discharge and dispersion of the agent

Results at 493 milliseconds



Results at 493 milliseconds

The "Stryker" Suppression system

- The narrow cone discharge from the nozzle has blown the watermelon off the test fixture with a force that exceeds that of gravity and watermelon is moving at approximately 10 feet per second
- Force at end of stream from nozzle is still hundreds of pounds
- Nozzle still deploying extinguishing agent

The SAFE Suppression system

- **SAFE System has completed deploying agent and is now deploying residual nitrogen**
- **Pressure at SAFE system deflector less than 4 pounds per square inch**

Discharge Nozzle as installed in Stryker

- This is one of the nozzles that are installed in the Stryker crew compartment
- Pressure at the nozzle is 900 PSI and cone of discharge is 40 degrees
- This soldier seats next to the door on the standard seats. Please note the nozzle location above his head.
- In case of discharge he may lose his sunglasses and maybe something else!