

Fire Suppression in a Class E Cargo Compartment



Federal Aviation
Administration



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Objective

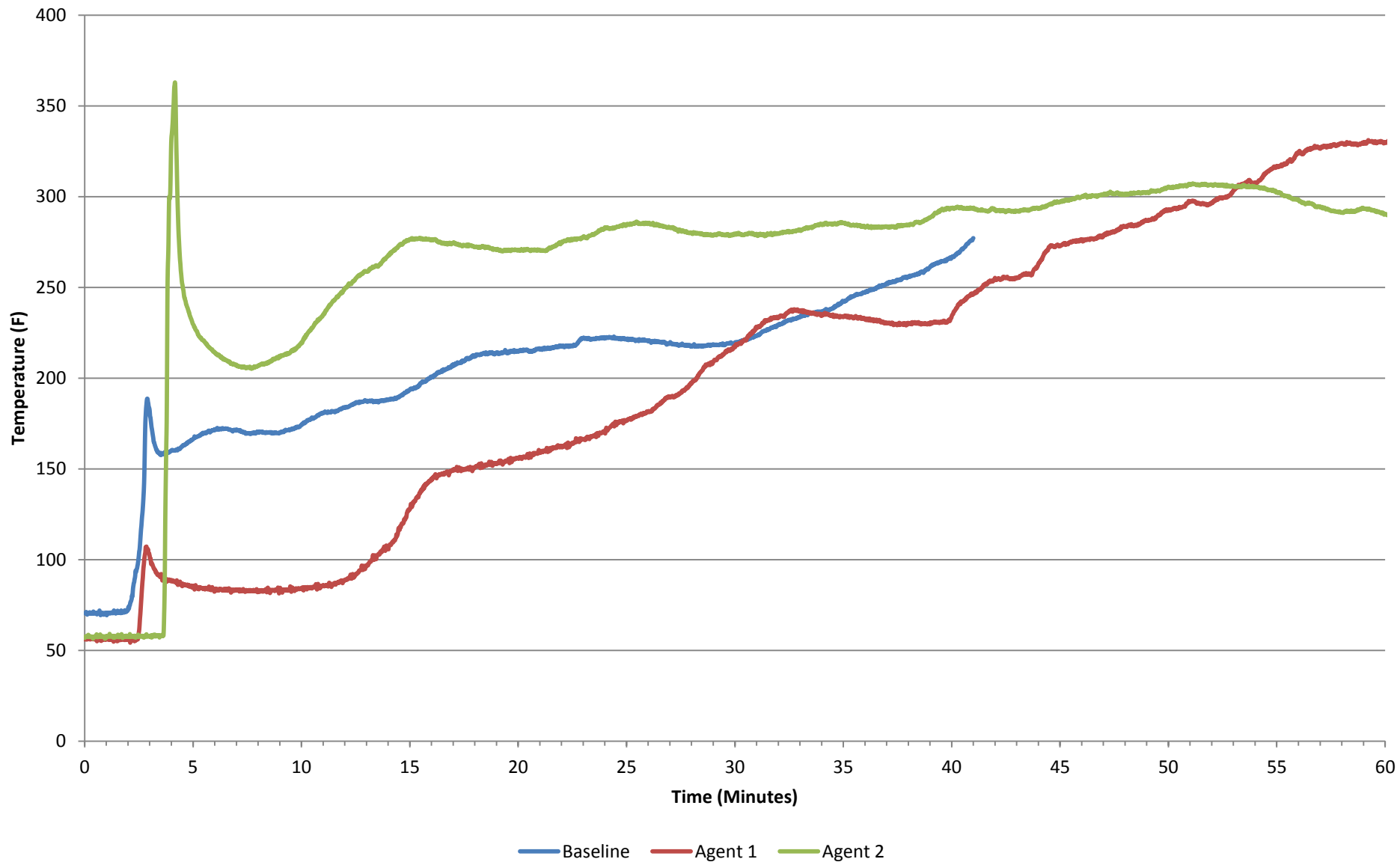
- **Test and Evaluate a Variety of Fire Suppression Options**
 - Aerosol based agents
 - Oxygen Starvation
 - Medium expansion Foams
 - Zone based water-mist systems



Old Test Article



Average Ceiling Temperature - Test Series 1



Observations

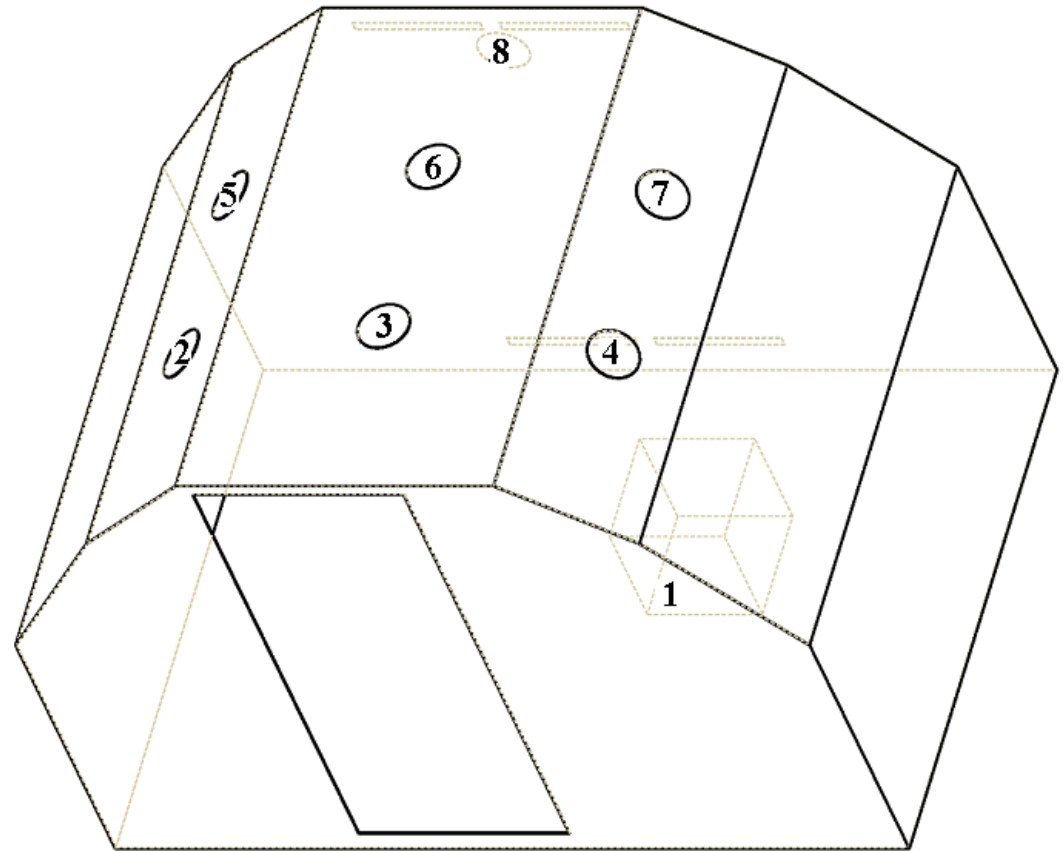
- **Effective initial knockdown.**
- **Container leaked most of the agent out from seams.**
- **Potential to obtain better results by sealing the container.**

New Test Article



Test Configuration

- Baseline
 - Upper vents open
 - Lower vents closed
- Aerosol Agent / Oxygen Starvation
 - Upper vents closed
 - Lower vents open



Location 1: Ignition Box - Inbox, Outbox, TC3

Location 8: TC10, Oxygen Concentration Sample Measurement

Location #: TC Inside Ceiling, TC Outside Roof

Location 2: TC4, TC11

Location 3: TC6, TC 13

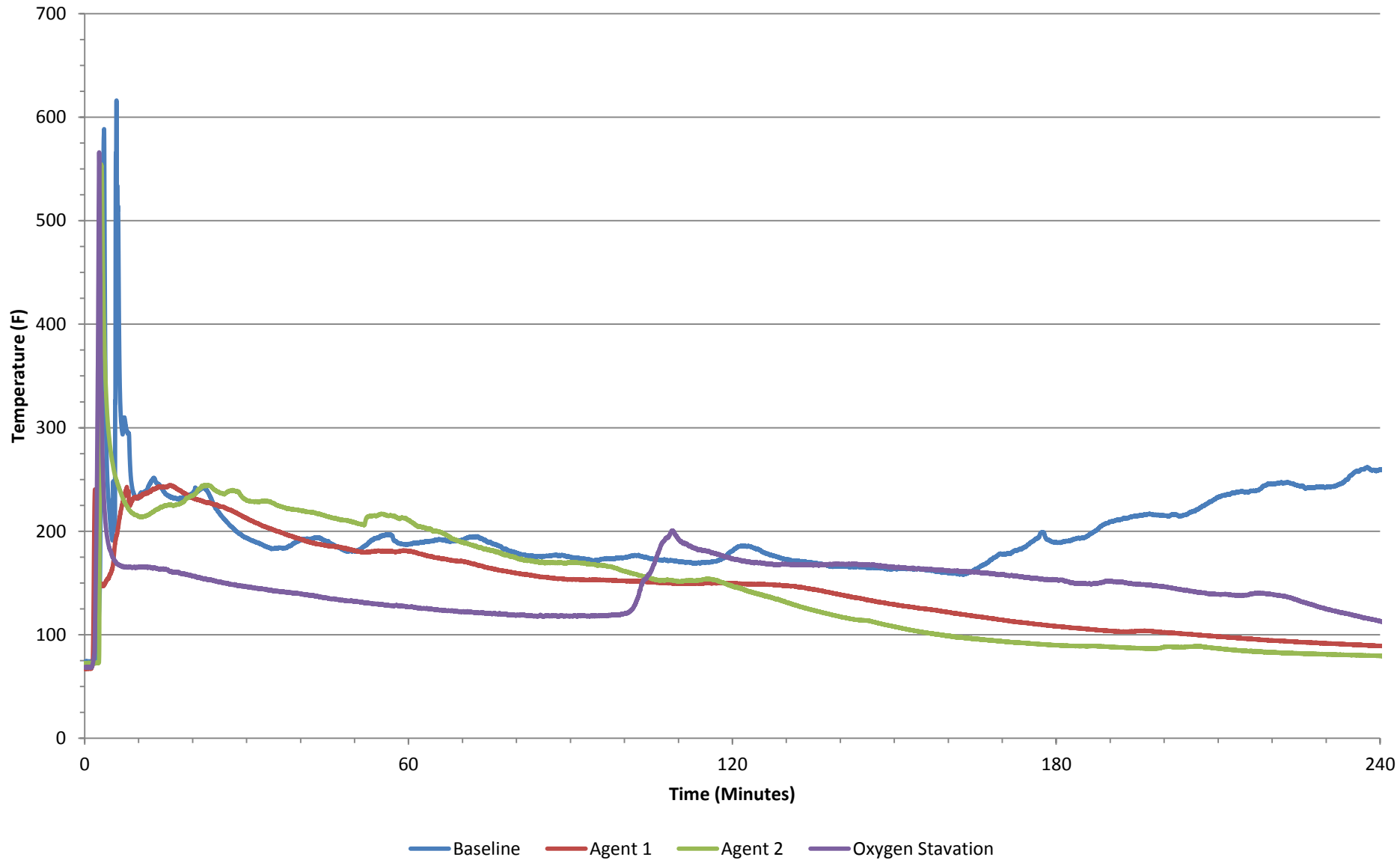
Location 4: TC8, TC15

Location 5: TC5, TC12

Location 6: TC7, TC14

Location 7: TC9, TC 16

Average Ceiling Temperature - Test Series 2



Observations

- **Aerosol Agent**

- Effective initial knockdown, observed via viewport.
- Sealed container contained most of the aerosol agent throughout the 4 hour test.
- Effectively kept temperatures low within the container for 4 hours.

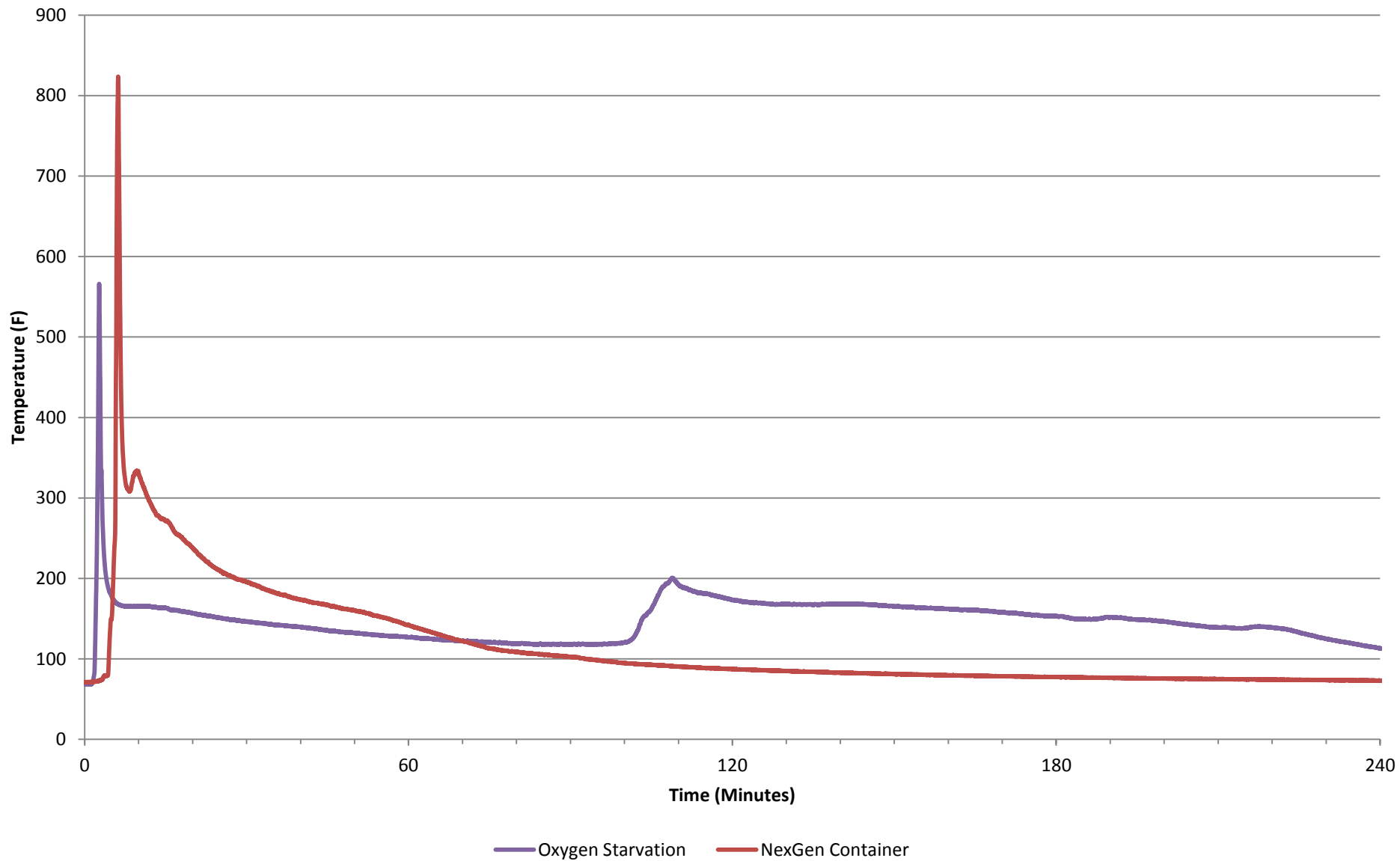
- **Oxygen Starvation**

- Effective when the container is strong enough to withstand the initial bursts of fire.

Nexgen Container



Average Ceiling Temperatures



Observations

- **Container is well sealed and employs oxygen starvation effectively.**
- **Container is able to withstand the initial burst of fire.**
- **More tests will be conducted with a more practical door.**

DC-10 Cargo Hold



Future Work

- **Conduct tests in a container with better fire withstanding capabilities.**
- **Conduct tests with medium expansion foam.**
- **Conduct tests with a zone based water mist system in the DC-10 cargo hold.**