

# Hand Held Extinguishers

## Contaminated Halon 1211

Presented to: Systems Fire Working Group

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Federal Aviation  
Administration



# Background

- **All of the Halon 1211 currently installed in aircraft hand held fire extinguishers comes from recycled stock piles**
- **A major Halon recycler, LyonTech Engineering Ltd, in the United Kingdom has been accused of falsifying purity analysis**
- **Halon 1211, with varying types and amounts of contaminants has been installed in hand held extinguishers supplied by Fire Fighting Enterprises (FFE)**
- **Initial analysis indicated some extinguishers may contain less than 50% Halon 1211**
- **The contaminated extinguishers were installed on European aircraft, some on US carriers.**

# EASA, FAA Airworthiness Directives

- **Specific batches of contaminated Halon 1211 were identified.**
- **EASA issued ADs to remove and replace any FFE extinguishers with less than 90% 1211, remaining extinguishers to be removed at a later date**
- **FAA issued AD to remove all affected extinguishers**

# FAA Contaminated Halon Tests

- **The FAA Tech Center Fire Safety Team was requested to evaluate the fire fighting effectiveness and potential toxicity hazard of 90% Halon 1211 / 10% contaminant hand held fire extinguishers.**
- **Extinguishers were prepared using 90/10 mixtures Halon 1211 and R12, R11, R141b and R600a. These were selected based on potential toxicity and flammability**
- **The R600a test was repeated using a 50% 1211 and 50% R600a (isobutane)**

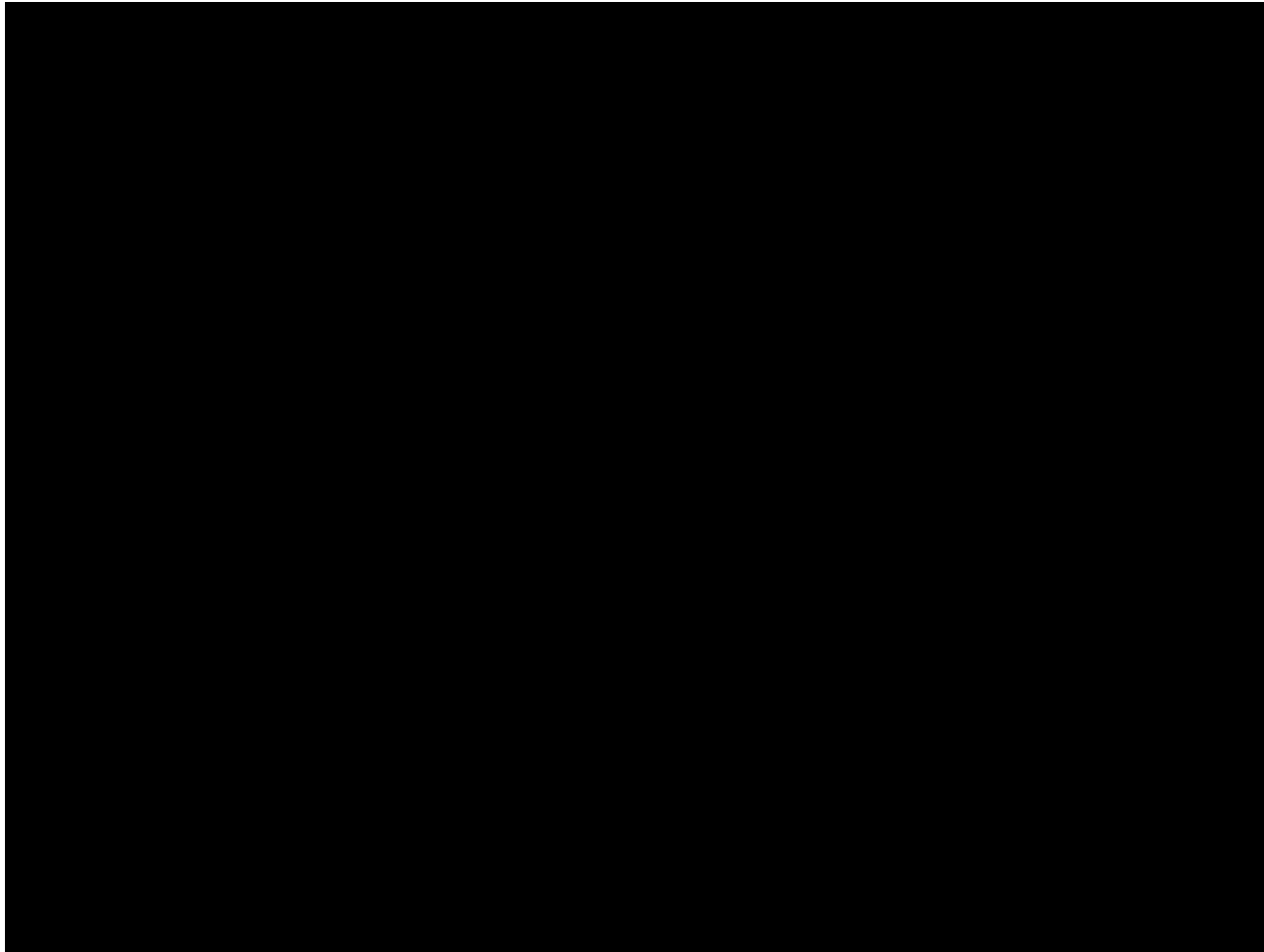
# Test Method

- **A modified version of the Hand Held Extinguisher Minimum Performance Standard was employed**
- **Seat Fire Test: Simulated triple seat fire, primed with 50ml of gasoline, preburn time 35 seconds**
- **Remote actuated and controlled extinguisher**
- **Toxic gas measurement by gas absorption tube and FTIR. Phosgene gas by colormetric badge.**
- **Hidden Fire Test: Measures the flooding characteristics on the Halon 1211 mixture**

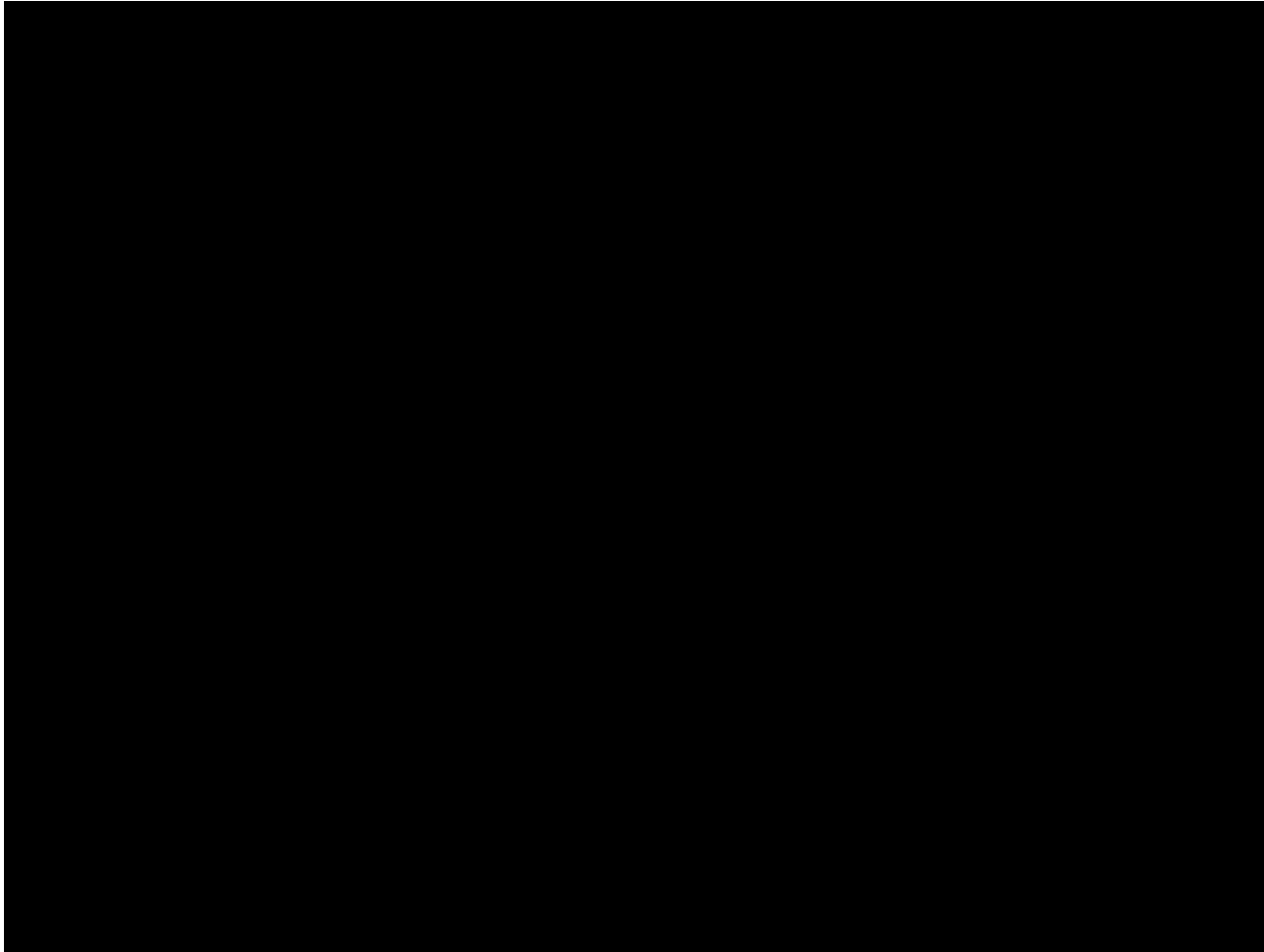
# Results

- **Seat Fire Test:**
  - All of the 90/10 mixtures were effective in extinguishing the triple seat fire
  - The 50/50 R600a mixture failed and actually increased the fire intensity
- **Hidden Fire Test**
  - All of the 90/10 mixtures were at least as effective as pure Halon 1211
  - The 50/50 R600a was not tested
- **Toxicity**
  - Analysis pending

# Pure Halon 1211, Seat Fire Test



# 90% Halon 1211 / 10% R600a





# 50% Halon 1211 / 50% R600a

