Federal Aviation Administration

Microscale Combustion Calorimeter

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Tenants/Agencies Located at the Tech Center

- **Technical Center**
  - Test, evaluation, validation, and verification
- **Airport and Aircraft Safety R&D Program (FAA)**
- **Federal Air Marshals (DHS)**
- **Transportation Security Laboratory (DHS)**
- **Coast Guard (DHS)**
- **177th NJ Fighter Wing (DOD)**
- **South Jersey Transportation Authority**

Airport and Aircraft Safety R&D

To provide a safe global air transportation system by developing technology, technical information, tools, standards, and practices to promote the safe operation of the civil aircraft fleet.

Aircraft Fire Safety and Fire Research

- **Enhancement of fire safety in commercial transport is a high priority**
  - Near-term that address specific aircraft applications and fire problems
- **Forty percent of the passengers who survive the impact of an aircraft accident subsequently die in a post-crash fire**
  - Long-range research to develop ultra fire-resistant aircraft interior materials

Resulting Fire Standards

- **Seat cushion fire-blocking layers**
- **Low heat and smoke release interior panels**
- **Cargo compartment fire protection requirements**
- **Heat-resistant evacuation slides**
- **Floor proximity lighting**
- **Flight recorder fire endurance**
- **Halon hand-held extinguishers**

Primary Indicators of a Material's Fire Hazards

- **Temperature at which it ignites**
- **Rate at which the material releases heat as it burns**
- **Maximum amount of heat that can be released by burning**

Regulations Governing Flammability of Plastics

- **Developed tens of billions of pounds of flame retardant plastics**
- **Environmental concerns, increasing concerns over flammability of plastics and driving the search for fire-resistant alternatives**

Testing Requirements

- **Indicators were measured separately in at least 3 different devices**
- **American Society of Testing and Materials required at least 1 kilogram (2.2 lbs.) of material to complete all tests**
- **Time consuming and costly**

Microscale Combustion Calorimeter

- **Calorimeter provides a valuable research tool for the study and development of flame retardant additives for plastics**
- **Determines the flammability parameters of materials using small samples (1 to 10 milligrams)**
- **Conditions that simulate flaming combustion (burning) in a nonflaming laboratory test**
- **Results in minutes instead of hours**
- **Reduces cost, resource consumption, pollution**
- **Single MCC test is comparable to fire calorimeters costing 3 times as much to buy and 10 times as much to operate and maintain**

Patents

- **Three patents**
  - *5,981,290, 11/9/99 – Microscale Combustion Calorimeter*
  - *6,464,391, 10/15/02 – Heat Release Calorimeter for Milligram Samples*
  - *Filed, 1/05 – Flammability Tester*

Licenses

- **Three licensing agreements have been signed**
- **One international, two national**
  - One is anonymous to test and marketing their testing ability
- **Signing fees of $5,000 each**
  - Inventor has already received over $5,000
- **Royalties at 5% of net sales**
- **Five year licensing agreements**
  - ***Our first potential revenue stream, ever!***

Technology Transfer Outcome

- **Simultaneous development of a practical invention and supporting theory has resulted in a device that for the first time connects material science to fire science**
- **ASTM and International Standards Organization simultaneously initiated work projects to standardize a test method**
- **MCC will save many lives by accelerating the discovery of fireproof plastics**

Inventor: Dr. Richard Lyon

- **FAA Employee**
- **Worked on this invention for over 10 years**
- **Working with ASTM to establish flammability testing standards**
- **Working with licensees to enhance, develop, and promote technology**

Microscale Calorimeter