International Aircraft Materials Fire Test Forum Meeting

Development of New Flammability Test for Magnesium-Alloy Cabin Components

Presented to: International Aircraft Materials Fire Test Forum, Cologne, Germany

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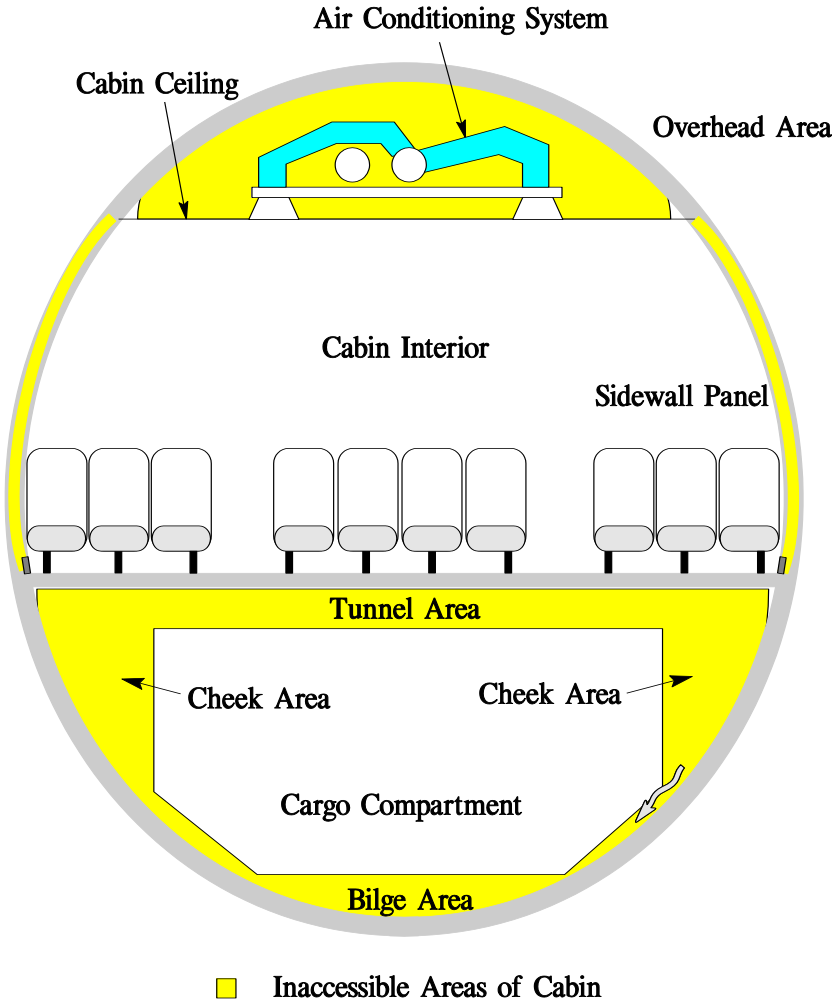
Federal Aviation Administration

Development of Flammability Test for Magnesium Components Used in Inaccessible Areas



Magnesium Flammability Test Using Radiant Panel Apparatus

Current Test Parameters

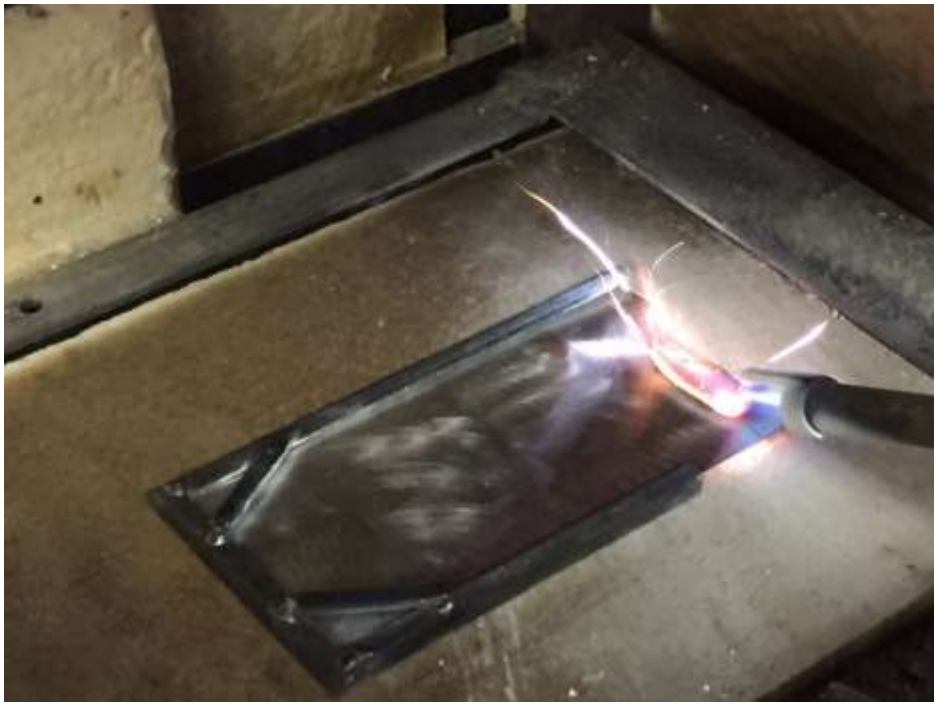
- *Radiant Panel Apparatus*
- *3- by 6-inch sample size, 0.025-inch thickness*
- *2-minute pilot ignition*
- *4-minute exposure to radiant heat*
- *Maximum weight loss of 30% (proposed)*

…Test Method inserted as Chapter 26 in current Fire Test Handbook!

Aircraft Materials Fire Test Handbook

Chapter 10	Fire Containment Test of Waste Stowage Compartments
Chapter 11 Updated	Powerplant Hose Assemblies Test
Chapter 12	Powerplant Fire Penetration Test
Chapter 13	Test for Electrical Connectors used in Firewalls
Chapter 14	Test for Electrical Wire used in Designated Fire Zones
Chapter 15	Two Gallon per hour Oil Burner Certification Testing for Repaired Cargo Compartment Liners
Chapter 18	Recommended Procedure for the 4-Ply Horizontal Flammability Test for Aircraft Blankets Lab Test Form - Bunsen Burner Test
Chapter 19	Smoke test for Insulated Aircraft Wire
Chapter 20	Dry Arc Tracking Test Procedure
Chapter 21	Dry Arc-Propagation Resistance
Chapter 22	Cotton Swab Test for Thermal Acoustic Insulation Blankets
Chapter 23 June Update	Test Method To Determine the Flammability and Flame Propagation Characteristics of Thermal/Acoustic Insulation Materials Advisory Circular on Thermal/Acoustic Insulation Flame Propagation Test Method Details Radiant Panel Procedures Training Video: View Online | Download
Chapter 24 September Update	Test Method To Determine the Burnthrough Resistance of Thermal/Acoustic Insulation Materials Advisory Circular on Installation of Thermal/Acoustic Insulation for Burnthrough Protection
Chapter 25	Oil Burner Flammability Test for Magnesium Alloy Seat Structure
Chapter 26 February Update	Test Method to Determine the Flammability and Flame Propagation Characteristics of Magnesium Alloy
Appendix A	FAA Regulations
Appendix B	The Approval Process

Truncated Perimeter Sample Holder



Interlab Study

Prepare identical samples for participating laboratories, to determine lab-to-lab reproducibility:

- *8 laboratories (FAA, Accufleet, Boeing, CEAT, Airbus, Govmark, Honda, Skandia)*
- *3 types magnesium alloy (EL43, EL21, ZE41)*
- *25 samples of each (75 tests) per lab*
- *Test results compiled by FAA*
- *Test samples received from Luxfer (Magnesium Elektron) 2019*
- *Samples manufactured to 0.125-inch thickness, will then need to be milled down to 0.025-inch thickness by FAA for testing*

*Refine test parameters and pass/fail criteria based on results of interlab study

EDM Electrical Discharge Machining

Wire EDM is an electro thermal manufacturing process where components are made using electrical discharges. A thin strand of metal wire accompanied by de-ionized water allows the wire to cut through metal just from the heat of the sparks.

Charmilles Technologies Wire EDM machine

Discussion Items for Task Group

Discuss the key elements of the new flammability test for components located in inaccessible areas:

- *Time until ignition (cannot be less than 30 seconds)*
- *Should there be a limit on self extinguishment? (currently not required)*
- *Discuss sample milling options*

Discuss any other items related to the use of magnesium alloy in either seats or other cabin components

Questions?