



Federal Aviation Regulations for an Air Transport Fuel Cell Installation

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Preview

- Background
- Challenge
- Approach
- Test and Analysis
- Documentation

Background

- Code of Federal Regulations 14 – Aeronautics and Space
- Part 25 – Airworthiness Standards: Transport Category Airplanes
- Subparts
 - Structure (e.g. lightning)
 - Design and Construction (e.g. fire protection)
 - Powerplant (e.g. fuel tank ignition protection)
 - Equipment (e.g. function and installation)
 - Operating Limitations and Information (e.g. instructions for continued airworthiness)

Challenge

- Applying the applicable FARs to a Fuel Cell installation in a Transport Category Airplane
- Ensure each FAR applies to a specific part of the installation where compliance should and can be determined
- Establish means of compliance to each FAR
 - Analysis
 - Inspection
 - Similarity
 - Test
- Get Certification Credit!

Approach

- Aerospace Vehicle Integration Team (Boeing, Cessna, FAA) developed the following:
 - Preliminary list of applicable FARs
 - Certification Plan
 - Identifies applicable FARs and means of compliance
 - Compliance by analysis, inspection, similarity, or test
 - Issue Paper
 - Identifies FAA position and provides guidance for approval of the Cell Stack and balance of plant equipment
 - Identifies applicable certification documentation

Test and Analysis

- Test to RTCA/DO-160D, Environmental Conditions and Test Procedures for Airborne Equipment
- Safety Analysis to SAE Aerospace Recommended Practice
 - ARP4761, Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment
- Flammability Analysis
 - Working with White Sands Test Facility
 - Looking into other resources (Fuel Cells Summit is a great place to ask, any help?)

Documentation

- Certification Plan
- System Description Document
- System Drawings
- Installation Procedures
- Software/Controller Design Assurance
 - Software Accomplishments Summary
 - Version Description Document
- Conformity of equipment and installation for test
- Test procedures and reports
- Flight and maintenance manual supplements
- Minimum Dispatch Configuration supplement

Looking for Help

- Information regarding:
 - Test
 - Methods, Parameters, Equipment
 - Analysis
 - Issues, Methods, Tools
 - Lessons Learned
 - What areas and issues have we overlooked?
 - Comments now or later would be appreciated
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