Overview: Cargo Standards (ULDs, FRCs and FCCs)

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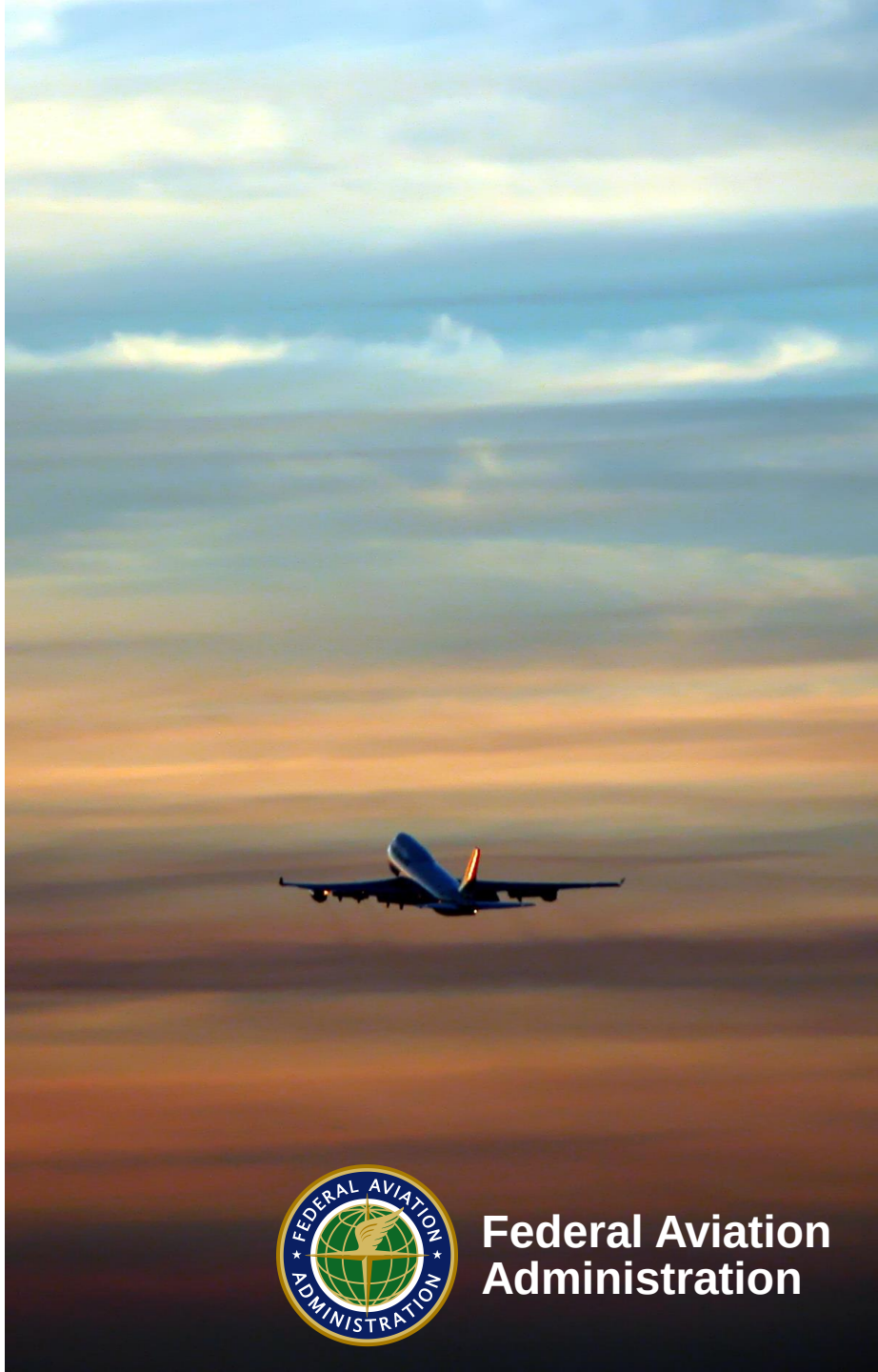

Topics

- **What is a Technical Standard Order (TSO)?**
- **Unit Load Devices (ULDs)**
- **Fire Resistant Containers (FRCs) and Fire Containment Covers (FCCs)**
- **Additional Cargo Standards, Policy and Research Work**

TSO Policy

- **FAA has developed Technical Standards Orders (TSOs) for several articles**
  - Many TSO approved articles are then installed on an aircraft
  - Cargo-related articles are not installed
- **What is a TSO?**
  - Minimum Performance Standard (MPS), defined by the FAA, used to evaluate an article
  - Typically levies an Industry Standard for the MPS Requirements
  - One way to get an article approved
  - FAA design and production approval issued to the manufacturer of the article

What is a ULD?

- **Unit Load Device (ULD) is a pallet and net combination, or a container**
- **Device to contain and carry cargo**

ULDs and FRCs

- **FAA has issued TSO-C90 for ULDs**
  - Past revisions focused on structural integrity and basic flammability requirements
  - Latest revision “E” includes a Fire Resistant Container (FRC) Standard
- **Meeting the TSO**
  - Aircraft Weight and Balance Manuals (part of the Aircraft Flight Manual) states whether TSO-C90 is required or not
    - This requirement is structural in nature, only
    - Cargo Containment Devices are not installed equipment (not part of the aircraft)

Fire Resistant Containers (FRCs)

- **ULDs whose panels and doors are typically made out of fire resistant materials**
- **Suppress fires through oxygen starvation**
- **Considered a risk mitigation for certain fires**
- **SAE AS8992 is the design and testing standard for FRCs**
  - Tested to a Class A fire (ordinary combustibles such as wood, paper and fabric)
  - TSO-C90e refers to this standard
- **Currently used on a voluntary basis as an extra layer of fire protection**

Fire Resistant Containers (cont.)

- **Often used in Class E cargo compartments (upper deck) of cargo aircraft where there is no active fire suppression**
- **An FRC tested to AS8992/TSO-C90e may contain fires involving limited amounts of Li-Batteries**
- **FAA is working with SAE and**
  - Develop challenge fires that inclu
  - Verify with Research
  - Can include various sizes types, volumes, chemistries

Fire Containment Covers (FCCs)

- **FCC is a fire-resistant cover designed to contain fires and starve a fire of oxygen**
  - FAA has issued TSOs for ULDs (TSO-C203)
    - Non-Structural
  - TSO levies SAE industry standard AS6453
  - Tested to a Class A fire (ordinary materials)
- **Meeting the TSO is not required**
- **Integrated with net or separate**
- **Considered a risk mitigation for *certain fires***

Fire Containment Covers (cont.)

- **Aircraft Weight and Balance Manuals and Aircraft Flight Manual do not currently address Safety Enhancing Equipment (voluntary)**
- **FCC tested to AS6453/TSO-C203 may contain fires involving limited amounts of Li-Batteries**

Summary: FRC and FCC Standards

- **TSO-C90e Unit Load Devices**
  - Released July 2021
  - Leverages SAE AGE-2 Standard AS8992 “Fire Resistant Container Design, Performance and Testing Requirements”, October 2020
- **TSO-C203 Fire Containment Covers**
  - Released July 2014
  - Leverages SAE AGE-2 Standard AS6453 “Fire Containment Cover – Design, Performance, and Testing Requirements”, August 2013
  - In process of updating to incorporate AS6253A
- **Future versions of both TSOs will potentially include challenge fires that include lithium batteries**

Additional Cargo Standards & Policy Work

- **Attachment and Integration of Active Devices to ULDs**
  - Tracking Devices
  - Temperature Controlled Containers
    - Research to Further Study Airflow
  - Active Fire Suppression Systems
- **Challenge Fires that Include HAZMAT and Lithium Batteries**

Additional Research Work

- **Interactions with aircraft fire detection and suppression**
- **Sensors that improve situational awareness related to fires in containers or on pallets**
- **Representative challenge fires**
  - Mixed Hazmat with Ordinary Materials
  - Lithium Battery Fire Vent Gases can create a flammable/explosive environment in enclosed spaces, including ULDs

Relevant Links

To get involved in ULD/FCC/FRC standards development:

SAE AGE-2 Air Cargo Committee

www.sae.org/works/committeeHome.do?comtID=TEAAGE2

To stay up-to-date on research and guidance related to mitigating cargo hazards:

FAA Cargo Fire Safety Website

www.fire.tc.faa.gov/cargosafety

FAA Fire Safety Research Site

www.fire.tc.faa.gov

FAA Cargo Safety Website (higher level guidance)

www.faa.gov/aircraft/safety/cargosafety

Questions?

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