



Propulsion Firewall Fire Tests FAA & EASA Interpretations

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- **Purpose:**
- **The FAA Technical Center is developing a new burner for propulsion firewall fire tests.**
- **The FAA and EASA Certification Offices have individual interpretations of the testing requirements.**
- **This presentation provides some of the interpretations that are being enforced by the ACOs with the premise that the new burner and the revised AC 20-135 clarifies the interpretations.**

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FLAME ON TEST UNIT



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- **FAR/CS 25.1191(b)(1):**
 - **(b) Each Firewall and shroud must be**
 - (1) **Fireproof**
 - **AC 20-135 Defines Fire Proof as:**
The capability of a component to withstand 2000F flame (+-150F) for 15 minutes minimum
- The FAA Certification Office interpretation of 2000F is 2000F minimum average with no thermocouple below 1850F during calibration**

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■ AC 20-135:

- Bonded construction fire walls (composites or bonded metal matrix), in addition to being pressurized during testing **may** need to be vibrated.

- FAA and EASA apply this requirement that also includes non-metallic seals and any component with non-metallic material that makes up the fire wall.

- Pressure is the highest and most critical level seen by the firewall.

- Vibration requirements although not very specific in the AC 20-135, need to be determined at the most critical level in service.

- They may also be used as defined in ISO 2685 as follows:

- For fluid system components: Flexible hose assemblies and components shall be vibrated along or perpendicular to the axis of the component at a frequency of 33 Hz and with a minimum amplitude of 1.6 mm.

- For structural components: Components shall be vibrated at an amplitude of 0.4 mm at the non-resonant frequency closest to 50 Hz.

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Pressurizing and vibrating during fire test



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- **AC 20-135: Outgassing**
- **No cold side ignition permitted.**
- **Hot side requirements:**
 - 1) **Any surface flare-up is self extinguishing and does not burn after removal of the flame**
 - 2) **Self re-ignition of the material does not occur after the flame is removed.**

This requirement is interpreted differently by various Certification Offices:

Example: On the hot side (fire side).

One CO allows maximum 30 seconds of flame after removal of burner

Another allows a small pencil flame for a very short duration

Left to individual judgment and interpretation

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- **AC 20-135**

- **Some suppliers try to use the:**

- **“Example, a 0.04” aluminum panel with a 80 Kt minimum scrubbing airflow over the back side has been shown to maintain integrity when subjected to 2000F for 15 minutes”**

Note: The above is only an example. The Certification Office requires a fire test fully documented for compliance.

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- **Fire Testing of Hoses to AS 1055 Standard**

In addition to Vibration, fire testing is required to be at the minimum flows and maximum pressures considered to be critical for the application. In many cases the hose may be dead headed and the pressure would be maximum and the flow through the hose would be zero.

Hoses are therefore evaluated for the application and not necessarily based on qualification to the AS 1055 Standard.

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- **Conclusion:**
- **This presentation provides some of the interpretations of the individual Aircraft Certification Offices in the US and in Europe.**
- **The interpretations need to be addressed in future documentation to provide consistent test methods to the OEMs and other applicants.**

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Questions?