

CABIN

WASTE COMPARTMENT FIRE CONTAINMENT UPDATE & Other Handbook Proposals

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April 16, 2024
IAMFTF, Bremen

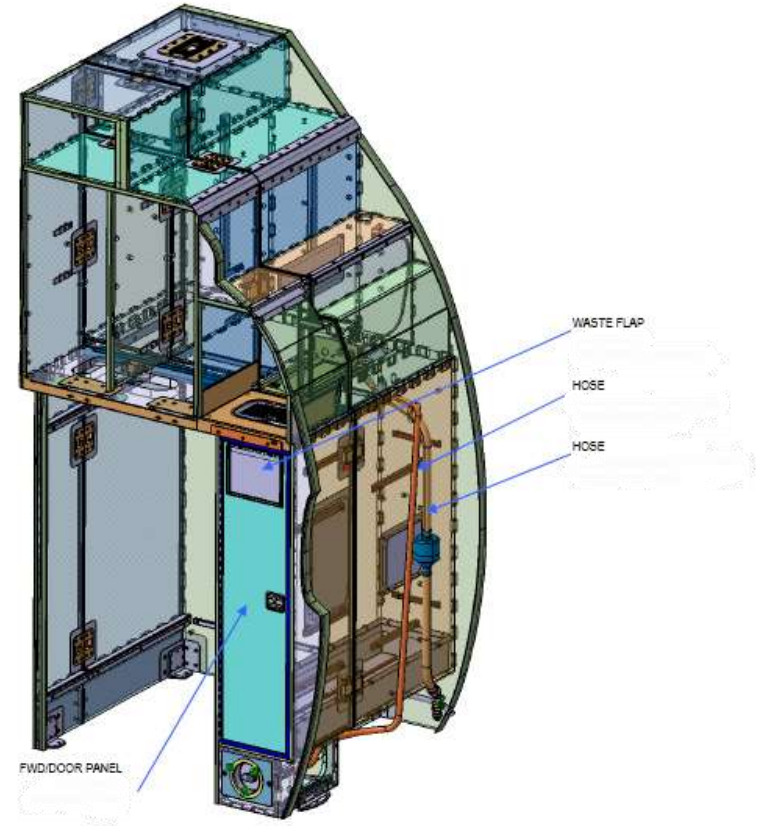


Waste Compartment Fire Containment

14 CFR 25.853(h)

All Waste Compartments, Meal Trolleys & Waste Trolleys must be substantiated by Test or Analysis.

Industry/Regulators lack harmonized published methods of compliance (MOCs) to substantiate by analysis.



Waste Compartment Fire Containment

Our task group is assessing non test proposed MOCs & critical similarity design criteria.

Only a few of these are specifically mentioned in FAA ACs

The others are straight forward often using aspects of the flammability Policy Statement.



Harmonizing Test Aspects

Update:

The FAA agreed & published the task group's proposed Chp 10 updates in February 2023.

In February 2024 the Boeing company submitted additional comments for review and potential incorporation to further improve the test method.

Key comment topics include

- Smoke
- Alternate test unit shimming strategy
- Alternate method to condition trash before testing
- More discussion on testing standard containers / meal boxes
- Ensuring the test unit latch is engaged with minimum tolerance overlap.
- Door and flap seal installations



Methods of Compliance (MOC)- Similarity

Fire Containment Test is costly!

The Task Group set out to identify current MOCs for similarity and propose additional non-test MOCs based on existing Policy Statement MOCs used for Bunsen burner & Heat Release. Regulators have already identified paths for MOC incorporation once approved.

The task group identified 15 non-test MOCs and 7 critical Similarity Design Criteria. Six task group members have currently agreed to formalize MOC proposals for submittal to the regulators for acceptance.

The task group is targeting to complete this activity in 2024.

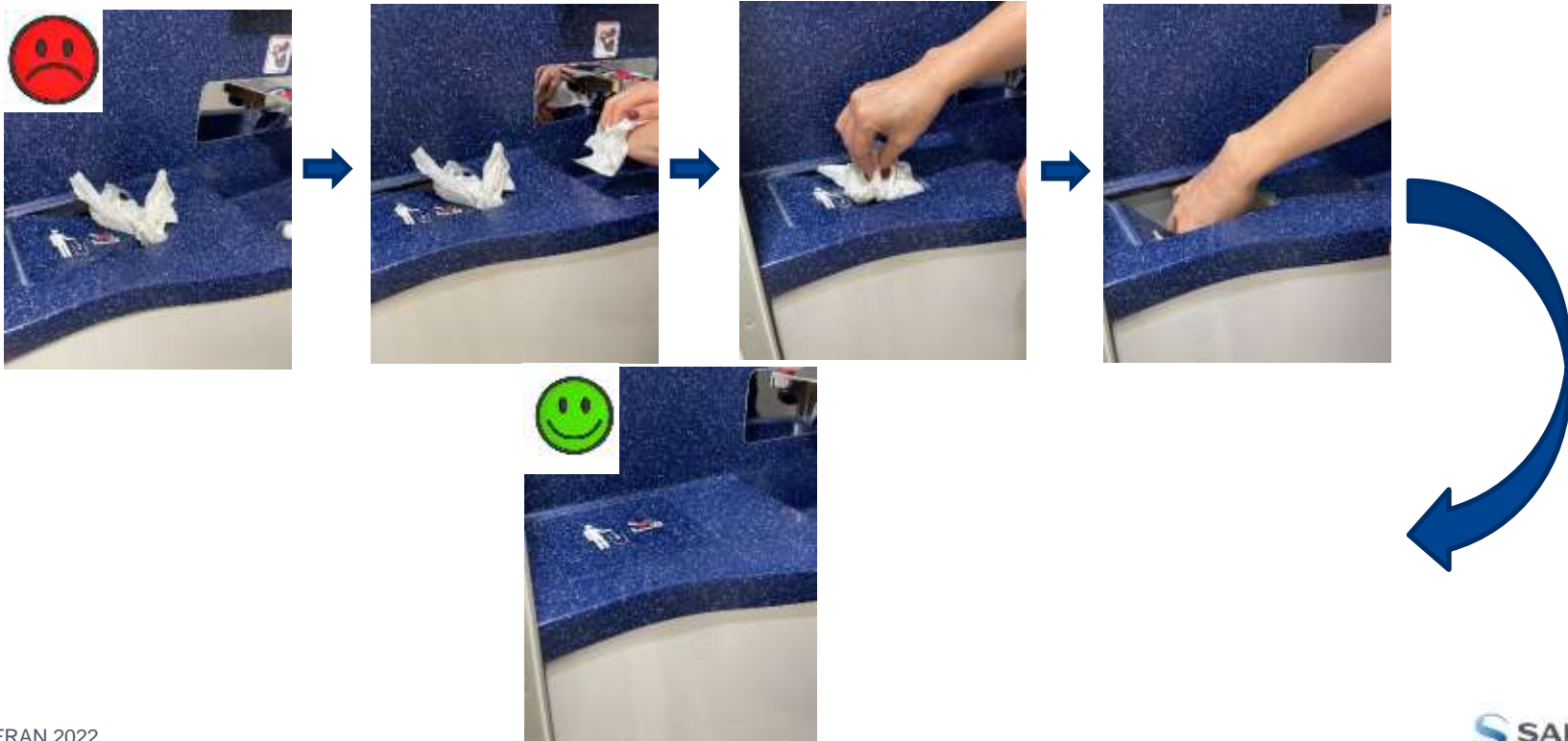
Task Group Meeting

Come Join us Thursday @ 8:30 AM to work on these test & MOC topics.



Conclusion

You know you're one of us if you do this in an aircraft lavatory!!



Fire Test Handbook Update Requests

Wire – con't

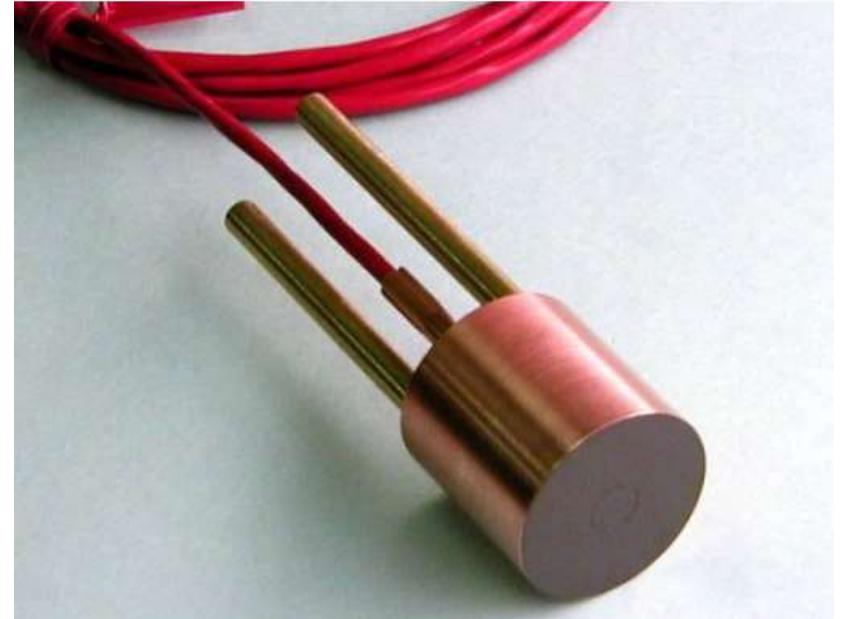
FAA Fire Test Handbook - Chapter 4, Wires (proposal)

- Wire Length: Minimum of 8 inches
- Position: Ensure there is a minimum of 5 inches above the flame impingement point and 3 inches below the flame impingement point.
- All burn lengths must terminate before reaching the end of the wire.
- Fix ends with extensions (wire/cord) and alligator clips attaching over wire insulation to prevent being a heat sync.



2/ FTH CHP 6 Par. 6.3.1.6.4 Smoke Heat Flux Density Gauge

Update this paragraph to provide provisions / requirements (furnace coil) to be able to use a water cooled heat flux transducer consistent with what most labs are using.

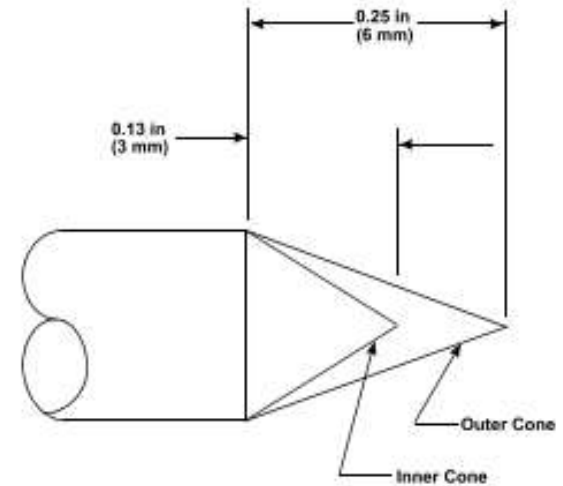


3/ FTH CHP 6 Par. 6.3.1.8 Smoke Flamelets

Currently chapter 6 of the FTH states requirements for both gas & air flowrates to produce the 6 flamelets AND a figure with measurements of the acceptable inner and outer cones of the flamelets.

Experience has shown that it isn't always possible to satisfy both requirements. Most assume that the flamelet figure with flame dimensions is most critical for standardization. And that the flow rates stated are a good starting point to achieve this. (Several labs have found gas flowrates around 25-30 cm³/min to work).

Request this chapter to be modified to explain such.



4/ FTH CHP 6 Par. 6.6.2.1 Smoke Linearity check instructions

Update chapter 6 of the FTH to replicate FAA RR procedure (filter combinations) to demonstrate the light beam and photometer are functioning – no erratic behavior. Recommend engaging industry to define what is good. Commercial ND-filters are not scientific instruments, so there will be some drift from theoretical. We are monitoring for out of the ordinary swings that suggest the photometric system is not functioning properly. Below is from the FAA RR.

HUNTINGTON BEACH SMOKE MACHINE								
ND FILTER	AVG Ds*	Ds MAX	Theoretical %T	Theoretical Ds	Actual Max Ds Less Theoretical	Actual AVG Ds Less Theoretical		
2	37	37	50	39.7	-2.7	-2.7		
4	85	86	25	79.5	6.5	5.5		
8	113	115	12.5	119.2	-4.2	-6.2		
8+2	152	154	6.25	158.9	-4.9	-6.9		
8+4	201.5	203	3.12	198.8	4.2	2.7		

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Methods of Compliance (MOC)- Similarity

ITEM #	MOC Type	MOC Description
1	Approved	Greater compartment volume substantiates lesser volume. [FAA AC25-17A]
2	Approved	Greater air gap substantiates lesser air gap. [FAA AC25-17A] (Includes designs with split lines can substantiate designs without split lines given total airgap/ volume is less than tested).
3	Approved	Designs with a metal waste can: Testing without the waste bin substantiates with waste bin installed. [FAA AC25-17A, Appendix 8, par. 4.1a.]. An agreed upon corollary, testing a compartment with a non-metallic waste bin can substantiate a waste compartment with a metal waste bin (waste compartment with the same or lesser volume/ smaller air gaps). Additionally, a waste compartment tested with a non-metallic waste bin can substantiate the same waste compartment with a metallic waste bin (similar size and shape as the non-metallic waste bin/ material substitution).
4	PS Related	Thinner core panels substantiate thicker core panels (same materials) for the same application (sides ceilings, etc).
5	PS Related	Less skin plies substantiate more skin plies (same material) for the same application (sides, ceilings, etc)

Methods of Compliance (MOC)- Similarity

ITEM #	MOC Type	MOC Description
6	PS Related	Thinner aluminum skins substantiates thicker aluminum skins. Waste Compartment Fire Contam...
7	PS Related	Waste door with edge cast can substantiate waste door with aluminum edge trim.
8	PS Related	Nomex and Kevlar core are interchangeable and can substantiate aluminum core. (ALT: Nomex and Kevlar core can substantiate aluminum core for the same thickness.)
9	PS Related	How to substantiate a change in panel skin-to-honeycomb core adhesive films?
10	PS Related	How to substantiate a change structural joint adhesives? (no failures noted through mortise and Tennon joints.)

Methods of Compliance (MOC)- Similarity

ITEM #	MOC Type	MOC Description
11	Latch MOC	1 Latch door can substantiate 2 latch door. (see item 16 for other latch requirements)
12	Trash container replacement MOC	Trash container replacement MOC [Compartment passes w/o trash container] Trash container different material, but meets a 45-degree test. Container must fit compartment to ensure trash can't fall between container and compartment walls. The compartment must also be compliant without the waste container installed.
13	Waste flap MOC	2 waste flaps tested can substantiate a waste compartment with 1 waste flap (given all other similarity conditions are met).
14	Gasket Guidelines & MOC	Access panel gap: with gasket- no gap. Without gasket- shim. Is size and number of attach points critical? Pitch and overlap considerations. Testing without a gasket can substantiate with a gasket.
15	Small cockpit waste compartments MOC	Cockpit waste compartment criteria. Should criteria be different? Propose criteria for no test for small waste receptacles in the cockpit.

Methods of Compliance (MOC)- Similarity

ITEM #	MOC Type	MOC Description
16	Similarity Design Criteria	Latch features: must have equal or greater engagement and made of similar material. Must be in a similar location and same quantity (some W.C have two latches but most with just one). Thin doors more critical with latch location.
17	Similarity Design Criteria	Waste flap design features must be similar (hinge, movement, overlap, material, thickness, location, etc). Waste flap location and surround panel must be similar (ceiling vs side). Designs featuring a narrow strip of panel between a side mounted flap and the waste compartment door has shown to be more vulnerable to panel material/width of panel material. Additionally, Number of waste flaps is a condition for similarity.
18	Similarity Design Criteria	Waste compartment door features must be the same (same hinge type, similar door closeout features- does door metal trim overlap the door gap? Or does it nest with closeout metallic rubstrips on the inside?)
19	Similarity Design Criteria	Compartments with unique access panel/removable panel designs or pass through plumbing features must be similar to the test unit tested
20	Similarity Design Criteria	Design requirement: All seals that actively help prevent fire from escaping the compartment may be bonded but additionally must be mechanically fastened. Generally applicable to seals installed around waste compartment door and / or waste flaps.

Methods of Compliance (MOC)- Similarity

ITEM #	MOC Type	MOC Description
21	Similarity Design Criteria	For Galley carts: Similarity must be 1 st based on same generic design (meal cart, entrée cart, waste cart or standard container box. These applications have different test methods (different combustibles). Next, cart ventilation must be taken into account. Some have galley air over carts, air piped through the cart, or ice cooling. Then similarity MOCs in 1-15 may be taken into account.
22	Similarity Design Criteria	Fastening features- consider spacing, edge margin, stress concentration effects, etc. At a fastener component level, blind fasteners are not similar to through fasteners. Consider fastener engagement, torque, and strength to meet approved standards.