

CABIN



## WASTE COMPARTMENT FIRE CONTAINMENT MOCS AND TEST HARMONIZATION

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June 18, 2019  
IAMFTF – Cologne, Germany

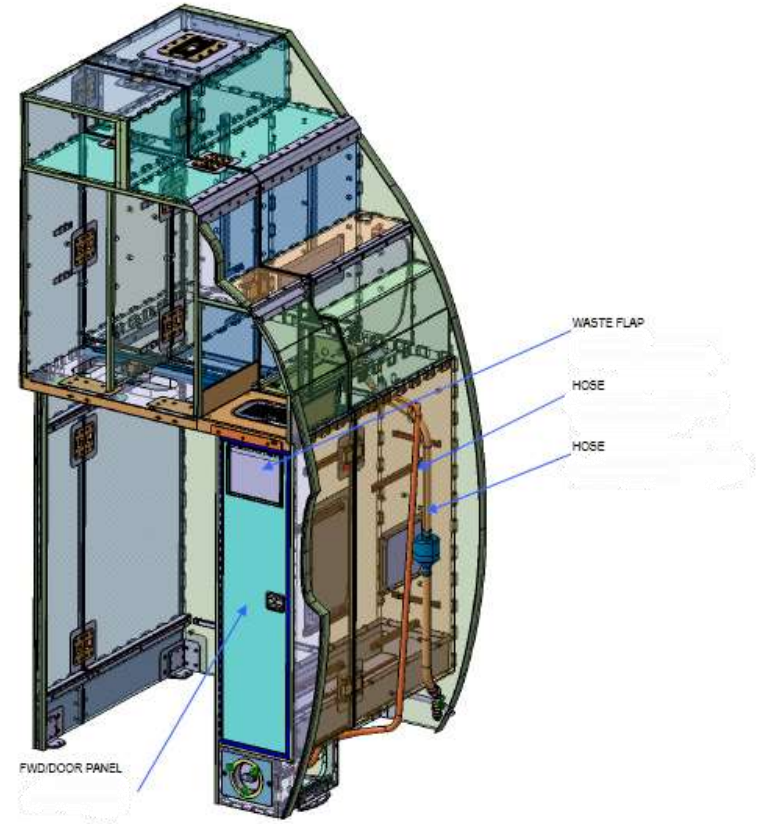


# Waste Compartment Fire Containment

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 26 proposed MOCs & design guidelines and 12 test standardization guidelines.

Only a few of these are specifically mentioned in FAA ACs

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

Additionally several test aspects are not harmonized.



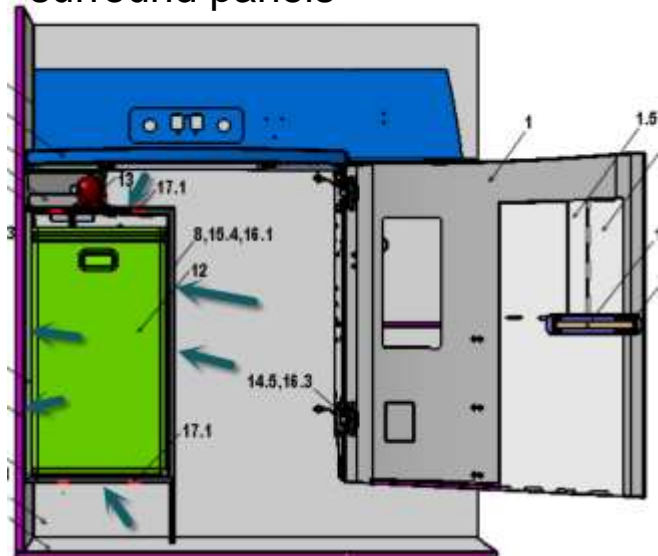
## Waste Compartment Fire Containment- Shimming gaps

Shimming designs with nested doors, overlapping door and door trims that overlap the door surround panels.

Nested Doors:  
Place shims on door



Overlapping Door:  
Place shims on surround panels



Door Trim overlaps surround panels: Place shims on surround panels



## Waste Compartment Fire Containment- Shimming gaps

Shim size and placement- not standardized. Recommend considering approximately 1" x 0.5" x thickness (representing the max engineering gap). [25.4mm x 12.5mm x thickness mm]

### Shimming Guidelines

- Door- At least 1" from corners and latches with 5-10" between shims
- Waste flap- 2 shims on the sides or 1 shim centered on the side opposite the hinged side.
- All shims should be placed with the .5" width inserted into the gap.
- Door seals do not need shimming if shown the compressed seal creates a 'zero' gap AND the seal material meets an F5 Bunsen burner test.
- No shims required for features such as access panels if the access panel overlaps the compartment panel by a minimum of 0.5" all around.

# Waste Compartment Fire Containment- Shimming gaps

## Shimming Guidelines- Continued

- Do not shim sealed split line features. Shim non-sealed split line features per maximum gap per drawing
- Test plan must define shim placement
- Aluminum tape has been shown to be an acceptable solution for mounting shims.

## Waste Compartment Fire Containment- Fire Load Discussion

Current Fire loads.

Replace the cigarette box with a paper cup.

Accufleet study showed many airlines going 'green' are using more paper cups vs plastic- AND paper more readily burns in our test.

Add alternative trash sizes to accommodate non-USA test locations.



## Waste Compartment Fire Containment- Trash Density

Developed trash density exercise and initial results of 3 company's test trash density showed:

Up to 16% difference in trash weight.

Up to 81% difference in trash density.

Need more data and will discuss next actions in our task group breakout.



# Waste Compartment Fire Containment- Trash Density



## Waste Compartment Fire Containment- Trash Density

Trash density considerations:

- Does trash density impact fire containment test results?
- FAA Technical study discovered trash density does impact potty bottle qualification results. More densely packed trash was easier to extinguish.
- Dense trash represents more fuel, but more difficult to ignite.
- A compartment with dense trash has less oxygen to support a fire.
- Dense trash could be worse-case for a more ventilated compartments.
- Less dense trash is worse-case for less ventilated compartments

What to do? Characterize a metric for ventilation? Or just define a worse-case lower trash density range?

## Waste Compartment Fire Containment- Trash Conditioning

The task recommends that test trash be stored in a conditioned area prior to test. An air conditioned office environment is acceptable – it limits high humidity and extreme heat / cold conditions.



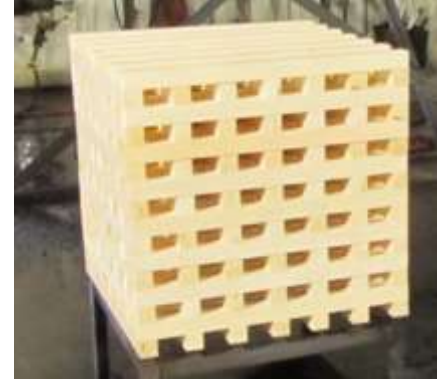
## Waste Compartment Fire Containment- Fire Load Discussion

Explore alternate fire loads.

Gulfstream suggested for consideration the scalable wood crib fuel load specified per UL 711. A small pan of heptane is used to ignite. More to be discussed tomorrow.

And what about the foam block?

All work is committed to ensure that future fire loads are equivalent to those used today.



## Waste Compartment Fire Containment- Seals and Sealant

What needs to be 45-degree BB test compliant?

Mortise and tenon panel joints – NO.

Used to fill gaps that create a barrier to exit the waste compartment- YES.

Waste containers installed in compartments that require waste containers be installed

May need to consider repairs for continued compliance.



# Waste Compartment Fire Containment- Wear, Tear and Misalignment

Chp 10 of the Fire Test Handbook states:

## Chapter 10 Supplement

This supplement contains advisory material pertinent to referenced paragraphs.

10.2.5 An integral floor is part of the galley/cart waste compartment. It is not the aircraft floor panel.

10.5.1 Misalignment generally refers to maximum air gaps, maximum seal interfaces, minimum overlaps, etc., allowed by drawing tolerances. Misalignment must be simulated during testing because with repeated waste receptacle handling, seals are unlikely to remain airtight. Misalignment may be represented during the test by using a 3/4-inch-long shim to support the door opening representing the allowable tolerance in the design drawings.

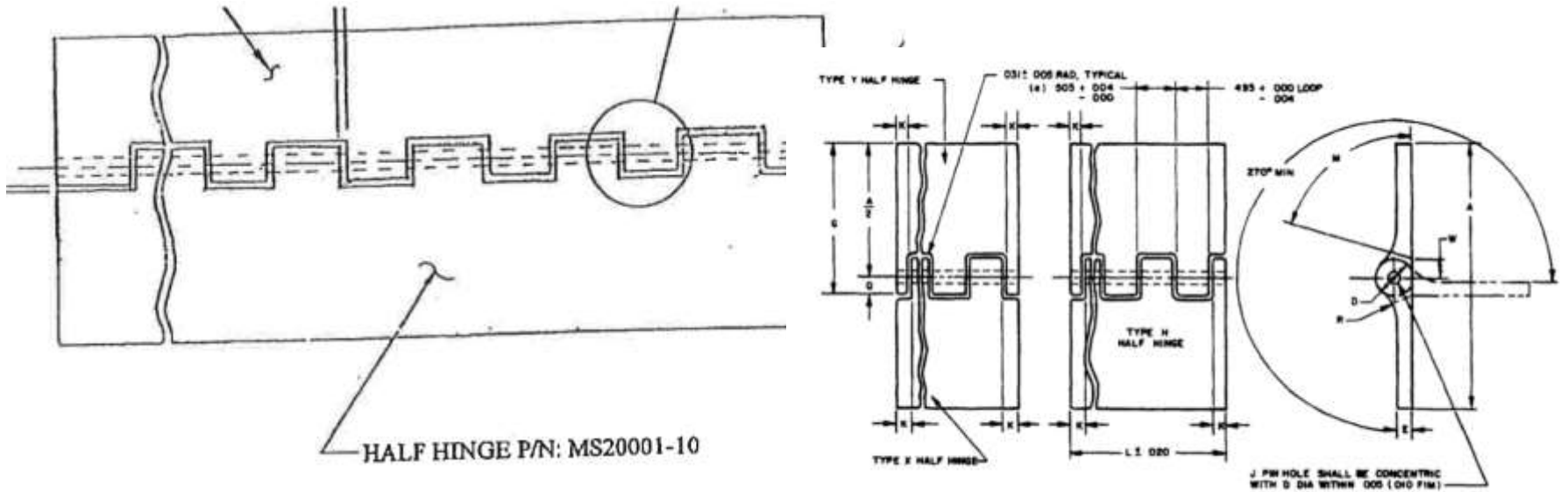
TSO –C184 states:

**b.** Instructions covering periodic maintenance, calibration, and repair, for the continued airworthiness of the airplane galley insert equipment. Include recommended inspection intervals and service life, as appropriate.

Do we need to test for acceptable repairs?

# Waste Compartment Fire Containment- Hinge gaps

Air gap through hinges- Can we create standard values for comparing designs using the same hinge?



# Waste Compartment Fire Containment- Very Small Waste Compartments

Any exclusions for waste compartments?

PS-ANM100-00016 addresses exclusions for 'special' waste compartments under 0.5 cubic feet in volume.

What about small waste compartments in controlled areas such as the cockpit?



# Waste Compartment Fire Containment Task Group Organization

MOCs, Similarity Guidelines and Test Method Guidelines are grouped by type and are being assigned to task group members to flesh out details.

Fire Containment Methods of Compliance (MOCs & Design Requirements)				
ITEM #	MOC Type	MOC Description	Actions	Comments
1	Approved	Greater compartment volume substantiates lesser volume. [FAA AC25-17A]		
2	Approved	Greater air gap substantiates lesser air gap. [FAA AC25-17A]		
3	Approved	Designs with a metal waste can: Testing without the waste can substantiates with waste can 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 (with the same or lesser volume).	Installers may add a metallic container to the compartment if the original design was tested without a container. Additionally, installers may substitute a metallic container, of equal or less volume, in a compartment if the original design was tested using a nonmetallic container- AA	Would also need to verify the fit of a replacement container would ensure trash can not fall between the container and compartment walls. Scott <i>Can we simplify to be a material substitution metal for non-metal container?- Jeff G.</i>
4	P5 Related	Thinner core panels substantiate thicker core panels (same materials) for the same application (sides ceilings, etc).	Scott / Tom (Boeing)	
5	P5 Related	Less skin plies substantiate more skin plies (same material) for the same application (sides, ceilings, etc)	Scott / Tom (Boeing)	Door panels are more critical than compartment panels for thickness, skin plies, etc.- Tom (Boeing)
6	P5 Related	Nomex and Kevlar core are interchangeable and can substantiate aluminum core.		
7	P5 Related	Thinner aluminum skins substantiates thicker aluminum skins.		
8	P5 Related	Waste door with edge cast can substantiate waste door with aluminum edge trim.		<i>non-metallic substantiates metallic feature.</i>
9	P5 Related	How to substantiate a change in panel skin adhesive films? What about structural joint adhesives? (no failures noted through mortise and Tennon joints.)		
10	P5 Related	All material substitutions related to fire containment must also pass a 45-degree test.		Concur with the exception that there may be other considerations such as panel stiffness that also need to be taken into account. - Gulfstream

## Purpose of the Task Group

Harmonize and publish industry and regulator accepted 25.853(h) Similarity requirements & MOCs for waste compartments and galley trolley carts.

Develop new MOCs as needed.

Discuss test set up and test parameters- harmonize as necessary.

**Hope you can join us tomorrow!**

