

# EASA WG 1 GROUP MEETING

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## AFI ALM NON CRITICAL PARTS EXAMPLE

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CVE

# ALM POLYMER NON CRITICAL PARTS

## FROM 2018 UNTIL NOW FOR AIRCRAFTS INTERIORS

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### Air France ALM journey

- 2017: First interest for ALM for interiors modification and refurbishing;
- 2018: DOA processes & capability for ALM parts qualification has been validated by EASA (no or low criticality parts)
- Since 2018 15 P/N non critical have been developed and certified (600 parts)

### Air France developed Cabin ALM non critical parts :

- Due to the lack of existence of specific filler panels, new panels/covers have been developed;
- Type of parts often used for aircraft modification/refurbishing;
- Reasons for developments:
  - Not find on the market (doesn't defined by Aircraft OEM or by suppliers);
  - Color matching or finish doesn't provided by OEM or by the market;
  - Delay to obtain parts.

# ALM POLYMER NON CRITICAL PARTS

## FIRST EXAMPLE

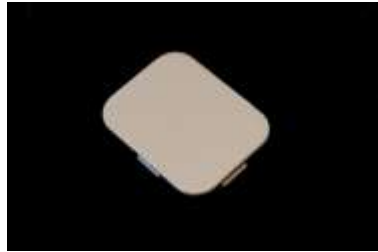
### Filler panels for systems removing on wall (partition, galley,...)

- Dimensions : 68mm x 13mm (or 24mm) x 3 mm;
- Weight : 3 grams for the 13mm wide and 6 grams for 24mm wide;
- Fitting systems : screws and inserts in panel;
- Manufacturing process : PA12 material and EOS machines, parts/assembly usually made with aluminum;
- Dominant concept defining design : system function and improving design (to fill gap or openings), flammability, safety of aircraft and passengers;
- Assessment of the criticality made by safety analysis (25.1309, FHA). Evaluated themes are: flammability, passenger injuries, evacuation of the aircraft, safety of the flight. Result of analysis : Non critical parts;
- Substantiation of flammability can be made by analysis (small parts) and/or test of manufacturing process flammability. No other load other than its own weight. Mechanical by analysis. Results are ok;
- Machine parameters set as a basic set to ensure better reproducibility;
- Dominant failure mode are : Flammability and broke of the part or broke of fitting systems. For the flammability of material it fullfill 25.853 criteria. To ensure mechanical safety they are fitted by two screws (redundant) and it will not create any sharp edge if broke.



# ALM POLYMER NON CRITICAL PARTS

## SECOND EXAMPLE



### Filler for system removing on seats :

- Dimensions : 45mm x 45mm (30mm) x 10 mm;
- Weight : 8 grams for the 45mm wide and 6 grams for 30mm wide;
- Fitting system : two pair of clips (2 per directions) made in the design of the part;
- Manufacturing process : PA12 material and EOS machines, parts/assembly usually made with aluminum;
- Dominant concept defining design : system function and improving design (to fill gap or openings), flammability, safety of aircraft and passengers;
- Assessment of the criticality made by safety analysis (25.1309, FHA). Evaluated themes are: flammability, passenger injuries, evacuation of the aircraft, safety of the flight. Result of analysis : Non critical parts;
- Substantiation of flammability can be made by analysis (small parts) and/or test of manufacturing process flammability. No other load other than its own weight. Mechanical by analysis. Results are ok;
- Machine parameters set as a basic set to ensure better reproducibility;
- Dominant failure mode are : Flammability and broke of the part or broke of fitting systems. For the flammability of material it fullfill 25.853 criteria. To ensure mechanical safety they are fitted by two pair of clips (redundant) and it will not create any sharp edge if broke.

# PROPOSAL FOR FUTURE DEVELOPMENT FOR WG1

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- For classification an analysis is needed, FHA type seems to be more suitable than a complete SA more accurate for electronic system;
- Defining criteria and associated results for those analysis per type of system will be helpful to define a common approach for the classification;
- Defining certification objectives per type of system in relation to the no or low criticality classification;

# THANK YOU FOR YOUR ATTENTION

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