

European Aviation Safety Agency

European Technical Standard Order

Subject: Airplane Galley Insert Equipment, Electrical/Pressurised

1 - Applicability

This ETSO gives the requirements which Airplane Galley Insert Equipment, Electrical/Pressurised that is manufactured on or after the date of this ETSO must meet in order to be identified with the applicable ETSO marking.

2 - Procedures

2.1 - General

Applicable procedures are detailed in CS-ETSO Subpart A.

2.2 - Specific

None.

3 - Technical Conditions

3.1 - Basic

3.1.1 - Minimum Performance Standard

Standards set forth in the Society of Automotive Engineers (SAE) Aerospace Standard (AS) 8057, Minimum Design and Performance of Airplane Galley Insert Equipment, Electrical/Pressurized, issued July, 2008 as modified by Appendix 1 of this document.

3.1.2 - Environmental Standard

See AS 8057, *paragraph 3.17* as modified by appendix 1 of this document.

3.1.3 - Computer Software

See CS-ETSO Subpart A paragraph 2.2.

3.1.4 - Electronic Hardware Qualification

See CS-ETSO Subpart A paragraph 2.3.

3.2 - Specific

3.2.1 - Failure Condition Classification

See CS-ETSO Subpart A paragraph 2.4.

Failure of the function defined in paragraph 3.1.1 of this ETSO has been determined to be a minor failure condition.

4 - Marking

ETSO-C184

Date: 05.07.2012

4.1 - General

Marking as detailed in CS-ETSO Subpart A paragraph 1.2.

4.2 - Specific

None.

5 - Availability of Referenced Document

See CS-ETSO Subpart A paragraph 3.

APPENDIX 1. MINIMUM PERFORMANCE STANDARD FOR AIRPLANE GALLEY INSERT EQUIPMENT, ELECTRICAL/PRESSURIZED

This Appendix prescribes the minimum performance standards (MPS) for airplane galley insert equipment. The applicable standard is SAE AS 8057, *Minimum Design and Performance of Airplane Galley Insert Equipment, Electrical/Pressurized*, issued July, 2008. EASA did revise it as follows:

- 1 .** Page 5, replace paragraph 1.3.b. with:

"The word "should" indicates a criterion for which an alternative, including non-compliance, may be applied."
- 2 .** Page 8, disregard paragraph 2.2 Definitions: "ACCEPTANCE TEST", "ASSOCIATED COMPONENTS", "DETRIMENTAL PERMANENT DEFORMATION", and "FAILSAFE".
- 3 .** Page 8, replace paragraph 2.2 Definitions: "FAILURE" with: "FAILURE: is a failure to meet the Minimum Performance Standard of the ETSO. The standard ensures a level of safety that is acceptable.
- 4 .** Page 9, replace paragraph 2.2 Definitions: INTERCHANGEABILITY with:

"INTERCHANGEABILITY: That quality which allows an assembly or part to substitute or be substituted for another and to meet all physical, functional, and structural requirements of the original."
- 5 .** Page 9, replace paragraph 2.2 Definitions: MAXIMUM NORMAL OPERATING PRESSURE (MNOP) with: "MAXIMUM NORMAL OPERATING PRESSURE (MNOP):
The maximum attainable pressure of the equipment's pressure system when all the equipment's components are functioning normally."
- 6 .** Page 9, replace paragraph 2.2 Definitions: OPTION with

"OPTION: A function capable of being included as part of equipment. It shall be fully developed and able to be incorporated without adverse effects to meeting the performance requirements of this AS included in this ETSO."
- 7 .** Page 9, disregard paragraph 2.2 Definitions: "PERIODIC TESTING".
- 8 .** Page 10, disregard paragraph 2.2 Definitions: "PROCESS SPECIFICATION"
- 9 .** Page 10, replace paragraph 3.1 with:

"Table 1 identifies applicable requirements for typical galley insert equipment designs. Novel designs may require compliance to additional requirements, or requirements in Table 1 not identified by a bullet. To use the table, find the equipment in question along the top row, and then read down that column; the row in which a bullet appears indicates

requirements that shall be addressed. A bullet in brackets indicates that the requirements are applicable for only a part of the equipment in question.”

10 . Page 11, disregard paragraphs 3.2.1 and 3.2.1.1.

11 . Page 12, disregard paragraph 3.2.1.2.a.

12 . Page 12, replace paragraph 3.2.1.2.c with:

“Aluminium honeycomb core shall be finished for corrosion resistance.”

13 . Page 12, disregard paragraphs 3.2.1.4. through 3.2.1.6.

14 . Page 12, replace paragraph 3.2.1.8 with:

“Components shall be protected against deterioration or loss of strength in service due to environmental causes. Selection and finishing of material (including fasteners), where dissimilar metals may be placed in contact, shall be per MIL-STD-889 or equivalent. Material not inherently corrosion resistant shall be finished with a protective treatment or coating. Magnesium alloys shall not be used.”

15 . Page 13, disregard paragraphs 3.2.1.9. through 3.2.2.3.

16 . Page 14, replace paragraph 3.2.2.4 with:

“Bonded joints shall not be loaded primarily in tension”

Disregard paragraphs 3.2.2.4.a through d.

17 . Page 14, disregard paragraph 3.2.2.5.

18 . Page 14, replace paragraph 3.2.3 with:

“Construction for Trash Compactors

Trash compactors shall be constructed of fire-resistant materials capable of containing fire (see 3.10) under the conditions expected to result in service.”

Note: Fire-resistant, with respect to sheet or structural members, means the capacity to withstand the heat associated with fire at least as well as aluminium alloy in dimensions appropriate for the purpose for which they are used.

19 . Page 15, disregard paragraph 3.2.4.

20 . Page 15, replace paragraph 3.2.5 with:

“Interface clearances between equipment and the surrounding galley or structure required for ventilation, heat dissipation, installation, loading, etc. shall be clearly defined and included in the application data for this ETSO.”

21 . Page 15, replace paragraph 3.2.6 with:

"Equipment shall comply with US Food and Drug Administration (FDA) requirements for sanitary construction in Sections 1, 2, 4, and 6 of Attachment 3 *Guidelines for Sanitary Construction of Aircraft Galleys and Galley Equipment*, to FDA document, *Guide to Inspections of Interstate Carriers and Support Facilities*, (Reference 2.1.5)."

22 . Page 15, disregard paragraph 3.2.7.

23 . Page 16, disregard paragraph 3.2.8.

24 . Page 16, replace paragraph 3.3.1.a. with:

"Equipment shall be designed to meet the structural loading as specified in 4.2.1."

25 . Page 16, replace paragraph 3.3.2.a. with:

"The structure of equipment shall address the load case in each direction and be verified according to 4.2.1."

26 . Page 16, replace paragraph 3.3.2.b with:

"The loading conditions shall be determined by assuming installation of equipment around the z-axis of the airplane (see Figure 1)."

27 . Page 16, disregard paragraph 3.3.2.c.

28 . Page 16, replace paragraph 3.3.2.d. with:

"Failure shall not occur under ultimate load cases. All permanent deformation that occurs under ultimate or limit load cases shall be reported in the data furnished with each article."

Disregard "NOTE" following paragraph 3.3.2.d.

29 . Page 16, replace paragraph 3.3.3 with:

"A local attachment factor of 1.33 shall be applied in addition to the design load factors for attachments (such as door hinges, latches and retaining devices)."

30 . Page 16, replace paragraph 3.3.4 with:

"Material strength properties shall be based on tests of material meeting industry specifications to establish design values on a statistical basis. Design values shall be chosen to minimize the probability of structural failure due to material variability. The applicable specifications are Metallic Materials Process Development and Standardization (MMPDS, formerly MIL-Handbook-5) and the Composite Materials Handbook (CMH-17, formerly MIL-Handbook-17).

Analytical substantiation of material strength shall be based on material design values shown to be statistically reliable by repeated structural testing. Strength substantiation shown by full scale testing shall account for the variability of the materials and processes used to fabricate the parts by applying an appropriate overload factor. See chapter 2 in

General Aviation Manufacturer's Association (GAMA) document Publication 13 for guidance in determining the appropriate overload factor."

31 . Page 18, replace paragraph 3.3.5.i. with:

"Forces generated by the conditions tested in 3.17, 4.2.1., or the weight of the retaining device itself, shall not cause the retaining device to release."

32 . Page 18, replace paragraph 3.3.5.m. with:

"Equipment with a stowage compartment (e.g., trash compactors, ovens, refrigerators and freezers, wine chillers) shall be designed such that the stowage compartment completely encloses its contents."

33 . Page 18, correct 3.3.6.b.2. to read:

"maximum wet weight, including associated components used for normal operation of the equipment (with the exception of attached hoses, tubes, pipes and/or electrical conduit), maximum amount of water in the equipment plumbing system and including water in tank, beverage in server, soaked pillow pack (if applicable)."

34 . Page 19, disregard paragraph 3.3.8.

35 . Page 19, disregard paragraph 3.3.9.

36 . Page 19, replace paragraph 3.4.1.a. with:

"Equipment shall be designed for the primary power levels typically found in aircraft (e.g., 28VDC, and/or 115 VAC (Constant frequency (CF) or Wide variable frequency (WF), or 230 VAC (CF) or (WF))."

37 . Page 20, replace paragraph 3.4.4 with:

"Equipment shall be designed to be capable of withstanding over-voltage events without arcing, sparking, smoke or fire. Equipment shall be designed to pass the following dielectric tests: (Note: Components (filters, protection diodes) normally not capable of withstanding the dielectric withstanding voltage test without damage may be disconnected or individually disabled (e.g., short circuited) for these tests. The dielectric withstanding voltage test shall be run prior to the insulation resistance test.)" Paragraphs 3.4.4.a and b. remain unchanged.

38 . Page 21, replace paragraph 3.4.7. with:

"In addition to the requirements of this document, microwave ovens shall meet the provisions of the U.S.A. Code of Federal Regulation 21 CFR § 1030.10, Performance Standards for Microwave and Radio Frequency Emitting Products."

39 . Page 21, replace paragraph 3.4.8.a. with:

"Equipment shall be designed to minimize the generation of or susceptibility to electromagnetic interference."

40 . Page 21, disregard paragraph 3.4.8.b.

41 . Page 22, replace paragraph 3.4.9.b. with:

"Hidden installed equipment (e.g., remote water heater, air chiller) may have a separate control module capable of being installed on the front of the galley for the following functions:" Information in bullets remains unchanged.

42 . Page 23, replace paragraph 3.6.2.a. with:

"Show the complete equipment plumbing interface in the application data for this ETSO."

43 . Page 23, disregard paragraphs 3.6.2.c and 3.6.2.d.

44 . Page 23, replace paragraph 3.6.3 with:

"Equipment, capable of being connected to the potable water system of an airplane, that heats and stores water shall incorporate a feature for sensing a low water condition. Indication of low water shall both illuminate a warning light and interrupt power to the equipment heating elements."

45 . Page 23, replace paragraph 3.6.4.a. with:

"Equipment capable of being connected to an airplane potable water system shall incorporate a self-venting device."

46 . Page 23, replace paragraph 3.6.4.b. with:

"Equipment capable of being connected to an airplane potable water system shall be self-draining."

47 . Page 24, replace paragraph 3.6.6.a. with:

"Demonstrate equipment proof and burst pressure values by test and provide pressure values in the application data for this ETSO."

48 . Page 25, replace paragraph 3.6.7.b. with:

"Water taps/faucets shall be self-closing unless the application data for this ETSO specify this equipment is intended for installation above a sink in the galley monument."

49 . Page 25, revise paragraph 3.8.c. first sentence with:

"External surfaces that have to be heated directly to meet the equipment purpose (e.g., toaster slot, skillet surface, heating plates of a sandwich press, warmer pad for beverage server) are excluded from 3.8.a. and 3.8.b."

50 . Page 25, replace paragraph 3.9 with:

"Materials (including finishes or decorative surfaces applied to the materials) shall comply with the appropriate paragraphs of CS-25, App. F, as follows:"

51 . Page 25, replace paragraph 3.9.1.a. with:

"Equipment shall comply with the appropriate flammability requirements of CS-25 when tested per Appendix F, Part I."

52 . Page 25, replace paragraph 3.9.1.b. with:

"Thermal and acoustic insulation material and components (batting, cover foil, foam, etc.) shall comply with the flame propagation requirements of CS-25, Appendix F, Part

VI. Consult Advisory Circular AC 25.856-1, *Thermal/Acoustic Insulation Flame Propagation Test Method Details*, for appropriate guidance."

53 . Page 26, replace paragraph 3.9.2. with:

"Exposed surfaces of equipment, when stowed, shall meet the heat release and smoke density requirements of CS-25, Appendix F, Parts IV and V."

54 . Page 26, replace paragraph 3.10.a. with:

"Equipment dedicated to, or that may be used for, waste stowage (e.g., trash compactors) shall meet AC 25-17A *Transport Airplane Cabin Interiors Crashworthiness Handbook Appendix 8 Fire Containment Test Methods*, Sections 4.2 CARTS and 5.2 ACCEPTANCE CRITERIA."

55 . Page 26, replace paragraph 3.11. with:

"Equipment shall be marked using materials and/or processes that will ensure legibility during its lifespan. Markings shall be conspicuous and worded in mandatory "command" English. Non-English language marking is acceptable, in addition to English. Non-English marking may be used alone when airworthiness requirements are not involved. Marking location, style and wording should be consistent. Weight placards shall include both English and metric units. The location and wording of placards shall be shown in the application data for this ETSO."

56 . Page 26, replace paragraph 3.11.3.a. with:

"No Cigarette Disposal" shall be placed on or near each waste receptacle disposal door (e.g., the waste disposal flap of a trash compactor)."

57 . Page 27, disregard paragraphs 3.14.a, 3.14.b, and 3.14.c.

58 . Page 27, disregard paragraph 3.17 Note #1 on Pass/Fail criteria at bottom of Table 2 and replace Note #2 with:

"(2) Equipment shall comply with the performance requirements of this ETSO in each instance RTCA/DO-160 reads 'DETERMINE COMPLIANCE WITH APPLICABLE EQUIPMENT

PERFORMANCE STANDARDS'. The equipment shall also comply with the performance standards of this ETSO after DO-160 testing.

- 59 .** Page 30, replace paragraph 3.18.1 with:

"The power consumption of the equipment shall be defined in the application data for this ETSO."

- 60 .** Page 32, replace paragraph 3.19. with:

"A Failure Mode and Effects Analysis (FMEA) shall be performed at the equipment level independent of the aircraft. The analysis shall include typical and hidden failure modes throughout the entire operating range and include the effects of mishandling."

- 61 .** Page 33, replace paragraph 4.2.1 Table 3 Note (2) with:

"(2) Load factors may be increased to meet aircraft flight and ground cases. If increased factors are used, they shall be provided in a manual, containing operating instructions and equipment limitations sufficient to describe the equipment's operational capability, as part of the application data for this ETSO."

- 62 .** Page 33, replace paragraph 4.2.1 Table 3 Note (5) with:

"(5) For equipment with a stowage compartment, maximum door deflections shall meet 3.3.5.n.

- 63 .** Page 34, replace paragraph 4.2.4.a. with:

"Proof Pressure Test: The qualification unit shall have its pressurized components tested to the required proof pressure; this pressure shall be held for five minutes. The equipment shall not be damaged nor leak as a result of the test."

- 64 .** Page 35, replace paragraph 4.2.6.2.b. with:

"The top, sides and front surfaces of equipment shall be tested per CS-25, Appendix F, Parts IV and V."

- 65 .** Page 35, correct 4.2.7. to read:

"Trash compactors used to receive combustible material shall comply with the fire containment requirements of 3.10, when substantiated per AS 8056, 4.6."

- 66 .** Page 35, disregard section 4.2.9.

- 67 .** Page 37, replace paragraph 4.2.15. with:

"Conduct and prepare the FMEA in accordance with ARP 4761 at the equipment level independent from the aircraft."

- 68 .** Page 38, disregard section 4.3.

69 . Page 39, replace paragraph 5.1.b.12 with:

“Maximum amount of discharge air emitted by equipment, if applicable.”

70 . Page 40, disregard section 5.2.

71 . Page 41, disregard section 6.