



AEROSPACE RECOMMENDED PRACTICE

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GALLEY INSTALLATIONS

1. PURPOSE

This Aerospace Recommended Practice provides criteria for design with respect to overall safety, particularly to afford minimum risk exposure to flight attendants and passengers from injuries due to:

- A. Routine use of galley installations.
- B. Galley components becoming dislodged under routine or abnormal operating conditions and under survivable crash or ditching conditions.
- C. Malfunctions of, or defects in, galleys or associated galley equipment.

NOTE: It is not the purpose of this Aerospace Recommended Practice to specify the design methods or specific design to be followed in the accomplishment of the stated objectives.

2. DEFINITION

2.1 Galley recommendations referenced herein include:

- (1) Galley assemblies as complete units at any location in the aircraft.
- (2) Galley component retention devices or latches,
- (3) Galley items connected to an electrical power supply (ovens, grills, hot plates, etc.) water, drain, vent, environmental systems or any other interface to the aircraft,
- (4) Those items of food or beverage service equipment not permanently attached to the aircraft structure (liquid container, carrier boxes, serving carts, etc.),
- (5) Components of permanently attached units which are non-stationary parts (doors, drawers, etc.),
- (6) Special associated equipment and systems (elevator/lift, dumbwaiter, etc.).

2.2 Galley recommendations referenced herein do not include:

- (1) Design details that provide extended service life and continued airworthiness since this is a function of (a) the total galley and food handling system design, (b) the human factors engineering desired by individual galley operators, (c) the techniques of care in servicing, (d) maintenance philosophy, and (e) trade-offs in weight vs. longevity. However, alerts to these considerations are inserted as appropriate.
- (2) Design details which are covered by Federal Aviation Regulations (FAR's) or which should be covered by galley operator detailed specifications.

SAE Technical Board rules provide that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against infringement of patents."

- 2.3 Basic airframe crash resistance is defined as the structural design criteria (ultimate inertia forces, etc.) applied by the aircraft designer, in accordance with his specification and FAR's to the basic airframe as well as to galleys.

3. DETAIL RECOMMENDATIONS

The following criteria are recommended:

3.1 General

- 3.1.1 Refer also to ARP 503 "EMERGENCY EVACUATION ILLUMINATION"

ARP 577 "EMERGENCY PLACARDING - INTERNAL AND EXTERNAL"

ARP 583 "CABIN ATTENDANT STATIONS"

ARP 712 "GALLEY LIGHTING"

ARP 767 "IMPACT PROTECTIVE DESIGN OF OCCUPANT ENVIRONMENT-TRANSPORT AIRCRAFT"

ARP 917 "STOWAGE OF FLIGHT CREW'S SURVIVAL, EMERGENCY, AND MISCELLANEOUS EQUIPMENT"

ARP 997 "PASSENGER CABIN EMERGENCY EQUIPMENT STOWAGE"

ARP 998 "CREW RESTRAINT SYSTEM"

- 3.1.2 Design requirements (strength, flame resistance, etc.) of current applicable sections of FAR shall be considered as minimum requirements only. Galley structures and associated equipment shall be designed to those flight and crashworthiness criteria applicable, at that particular phase of flight, to the occupancy of the compartment in which the galley is located.

- 3.1.3 Consideration shall be given to the possible detrimental effects of abusive handling, liquid spillage, solid spillage, moisture, corrosion, etc., on safety, structural integrity and continued airworthiness over long periods of service.

- 3.1.4 If electromagnetic interference suppression devices are required, they shall be a part of the galley or galley equipment.

- 3.1.5 Construction shall facilitate maintenance of sanitary conditions in all areas to the requirements of the United States Public Health Service (U.S. P. H. S.)/Federal Food and Drug Administration (F. D. A.) Provisions shall be made for display of the U. S. P. H. S. "Certificate of Sanitary Construction."

- 3.1.6 Monitoring of the passengers from the galley area shall be possible by direct observation; however, a mirror or other supplemental viewing device may assist in passenger observation for (1) compliance with safety instructions, and (2) for routine assistance needs in routine flight.

- 3.1.7 Galley floor surface characteristics shall minimize personnel slipping hazard from liquids and food spillage.

3.2 Structural Design Shall Include:

- 3.2.1 Strength requirements at least equal to basic airframe crash load requirements (see Definitions).

- 3.2.2 Doors, drawers, or equipment configurations which do not interfere with access to or operation of escape devices, evacuation of the aircraft, nor foul or damage stowed safety equipment.

- 3.2.3 Details to minimize the possibility of injury to the flight attendants or occupants from contact with corners, edges, surface and protrusions in the normal use or accident mode. Corner and edge radii shall be as large as possible with 0.25 in. (6.35 mm) considered as minimum recommended.

- 3.2.4 Provision (hand hold, shaped edge of work surface, etc.) for flight attendant's self-support during minor short duration unexpected turbulent flying conditions. The design shall preclude the possibility of entrapment or wrenching of a finger or hand. Contour shall be smooth.
- 3.2.5 Requirements for removable components or equipment at least equal to the strength requirements established for the basic galley structure with consideration given to effective operation with normal use and even after abusive handling.
- 3.2.6 A positive retention system for doors, drawers, removable components and insert equipment. The system shall consist of latches, uniform in design type, minimum in number and simple to operate by a single motion. Details of recommended design are as follows:
- (1) Latching devices shall have visual indication of full positive engagement, self evident by latch design or by integral indicators.
 - (2) Forces generated by hard landings turbulence, crash loads, vibration or the weight of the latch itself shall not unlatch retention devices.
 - (3) Latch bolt movement shall fail-safe to the latched position if a detent or spring becomes defective.
 - (4) An automatic retention latch shall be provided for the open position of any upswinging door.
 - (5) Latch design must permit rapid stowing action if turbulence is expected in order to minimize contents spillage.
- 3.2.7 Flight attendant's seating, if secured to galley structure, integrated into the galley structural design requirements with provisions (seating, emergency equipment, communications, stowage, etc.) in accordance with ARP 583. The location of such seating shall be evaluated in its relation to galley equipment which, if equipment retention failed in the survivable crash condition or in turbulence, could cause personnel injury; spillage pattern of food, liquid, dishes, glasses, utensils, etc. must also be considered.
- 3.2.8 All structural compartments (particularly those which have sealed doors and heated liquid vessels) designed to allow for rapid decompression without hazard to personnel.
- 3.2.9 Decorative trim or closure (curtains, etc.) and attachments that do not constitute a hazard in normal use nor in the crashworthiness or fireworthiness cases.
- 3.3 Electrical/Electronic System Design Shall Include:
- 3.3.1 Electrical power sufficient to meet maximum operating demand on the ground or in flight, with protective devices on galley or individual components, to provide manual or automatic removal of power (circuit breakers, over temperature switches, etc.) if a galley electrical overload or component fault/overheating occurs. Where total galley electrical load would exceed the power provided, selector switches or other interlocks shall be provided to limit the equipment utilization to the required power level.
- 3.3.2 Provisions in the galley area for selectively de-energizing power to the galley units and removable equipment, such as serving carts.
- 3.3.3 Plainly identified controls, indicators and/or audible signals, as required, for electrical equipment visible to and operated by flight attendants or other personnel.

- 3.3.4 Bonding of galley internal electrical components to galley unit structure and bonding of galley unit structure to aircraft structure.
 - 3.3.5 Provisions for protection of flight attendants and ground personnel from electrical shock hazards.
 - 3.3.6 Electrical components located to minimize their exposure to galley cooking steam, cooking or waste residue or water interface leakage if such equipment is not designed to operate under such exposure. However, components must be accessible with galley assembly structurally secured in place.
 - 3.3.7 Measures to prevent accessibility to electrical equipment areas which might be used improperly for storage with resultant fire hazard.
 - 3.3.8 Ready accessibility to all components for fire extinguishing if the area cannot contain or smother fire.
 - 3.3.9 An electrical disconnect or terminal junction at the interface.
 - 3.3.10 Protective shrouds for wiring which could be damaged during normal galley use.
 - 3.3.11 Level of galley illumination adequate for personnel avoidance of hazard (see ARP 712).
 - 3.3.12 Emergency lighting for securing, or other emergency duties, to allow design objectives of ARP 503 as applicable to the passenger cabin and the remote galley areas.
 - 3.3.13 Communication with the flight compartment, flight attendants' stations and all other galley areas as required for flight attendant coordination in emergency situation. An audible and visual signal shall be provided for incoming communications.
 - 3.3.14 Safeguards on fixed units containing electronic heating devices or heating elements to ensure that flight attendants or other personnel cannot inadvertently touch hot heating elements or otherwise be exposed to heat or radiation hazards in performing their duties.
 - 3.3.15 Insulation or equivalent protection on external surfaces of heated components to avoid personnel exposure to burn injury.
 - 3.3.16 Provisions such that no hazard will exist from food spillage on heating elements, etc.
 - 3.3.17 A vent system for coffeemakers and boilers to ensure air purging of the system prior to use, to avoid malfunction and hazardous hot liquid spillage.
 - 3.3.18 Pressure vessels (such as used in coffeemakers and boilers) adequately protected from over-pressurization due to failure of the pressure relief valve or thermostat. Preferably, the unit should include a visual or audible warning of such over pressure (also see 3.5.4).
- 3.4 Cooling/Refrigeration System Design Shall Include:
- 3.4.1 Leakproof connections with ventilation or overboard venting of refrigerants or gas, such as Co₂, which, due to normal use or leakage, could constitute a personnel hazard or lead to deterioration of surrounding equipment.
 - 3.4.2 Indicators, as required, for hazardous fume or gas accumulation.
 - 3.4.3 Means to protect personnel from "freeze on touch" hazard, i.e., adherence of skin to cold surfaces.
 - 3.4.4 Protection of units from puncture damage, and subsequent leakage of refrigerant, in normal or abusive handling of galley components.
 - 3.4.5 Sealed refrigerant system shall be basic design with normal galley inserts loading/unloading not requiring use of quick disconnects in refrigerant lines.

3.5 Water System Design Shall Include:

- 3.5.1 A main shut-off valve which is readily accessible without tools. Location shall avoid exposure to hot liquid leakage. In addition to a main shut-off valve, each item of equipment requiring water shall have an isolation valve for safety reasons.
- 3.5.2 Protective shrouds for lines which could be damaged during normal galley use.
- 3.5.3 Means to drain and flush systems for sanitary reasons.
- 3.5.4 Units containing or dispensing hot liquids which are plainly marked and designed to minimize the possibility of burning or scalding personnel.
- 3.5.5 Leakproof connection(s) at the interface, accessible with the galley secured in place.

3.6 Drainage System Design Shall Include:

- 3.6.1 Provisions to minimize seepage of galley liquid residue, which could result in destructive corrosion in galley work areas and galley base areas. If "pan" protection is used, it must be removable for structural integrity inspection (also see 3.1.3).
- 3.6.2 Provisions for safely cleaning and draining of galley and work areas to avoid potential corrosion with resultant structural deterioration.
- 3.6.3 A simple means of on-ground draining, overboard if possible, the total galley plumbing system (supply and drain systems) to avoid freezing failure of lines and components which could result in hazard on reactivation of the water system.

3.7 Solid Waste Provisions Design Shall Include:

- 3.7.1 Containers and their stowage compartment which prevent, smother, or contain combustion of contents.
- 3.7.2 Containers and their stowage compartments designed to preclude accumulation of waste outside of the container with subsequent fire or corrosion hazard.

3.8 Galley Environment Design Shall Include:

- 3.8.1 Consideration given to galley associated effects on the flight attendant's safety and efficiency and the passengers safety and comfort from the following:

- (1) Heating
- (2) Cooling
- (3) Moisture/Steam
- (4) Odors (cooking, sanitation or insectant treatment, etc.)
- (5) Lighting
- (6) Acoustics
- (7) Traffic (intercompartment, to lavatories, for galley use, for emergency evacuation, etc.)
- (8) Intrusion of safety equipment into galley work area or removable equipment handling paths.
- (9) Soiling, deteriorating or reducing reliable operation of safety equipment.
- (10) Microwave radiation.
- (11) Gas or fumes from refrigerants including "dry ice" (CO₂).

3.9 Galley Placards Shall Include:

- 3.9.1 Placards regarding safe operation of systems which follow design objectives or ARP 577.
- 3.9.2 Placards for the maximum load of contents of each cavity or enclosed compartment.
- 3.9.3 Placard each lift in galley for entering or operation only by authorized personnel, i.e., no passengers.

3.10 Galley Removable Equipment Design Shall Include:

- 3.10.1 Consideration of details for structures, systems, and placards as described above.
- 3.10.2 Retention devices for removable equipment contents equal to galley design retention requirements (see 3.2.6 (1) through (4)). The removable equipment content retention device shall be designed as a supplemental security means.
- 3.10.3 Considerations for serving equipment which is moved through the passenger compartment as follows:
 - (1) Maneuverability (control) within the design use envelope of cart load, personnel physical capability of control, handle design, floor angle, rolling resistance, etc.
 - (2) A specific location designated for stowage and retention when not in active use.
 - (3) A braking device easily operable from either end of the equipment or from the working end if there is only one working end.
 - (4) Means to restrain the equipment, contents and loose equipment in flight at various specific points in the passenger compartment (such as seats, tracks, special floor fittings, etc.) in the event of turbulence. Restraint devices shall not be unduly sensitive in operating ease due to accumulation of dirt. Retractable floor fittings should be foot operated or remotely controlled. Design of latching devices shall avoid the possibility of passage past the retention device during engagement and permit easy removal and installation of the cart without hazard to personnel. Location of restraining device shall not restrict access to exits, flight attendant's seats or emergency equipment at any time. The device shall be installed in such quantity to meet the requirements of the operator.
 - (5) Provision to preclude damage to electrical connector and cabling.
- 3.10.4 Provisions to preclude incorrect installation.
- 3.11 Galley Food Service Support Compartments, Remote From the Passenger Compartment, Design Shall Include:
 - 3.11.1 The same crashworthiness and evacuation design requirements as the passenger cabin if the area is to be occupied for take-off and landing.
 - 3.11.2 Flight attendant's stations with suitable restraints for all personnel in the compartment in the event of need (see ARP 583 and ARP 998).
 - 3.11.3 The same strength requirements as galley installations described elsewhere in this ARP.
 - 3.11.4 Provisions for in-flight airworthiness requirements (including fire resistant materials) as well as crashworthiness requirements in relation to adjacent cargo compartments (see 3.6.1.1) and other aircraft design features, such as landing gear design failure path, etc.