SAE Aerospace
An SAE International Group

AEROSPACE RECOMMENDED PRACTICE

SAE ARP695 | REV. D

Issued 1962-01
Revised 2002-09
Reaffirmed 2007-11

Superseding ARP695C

(R) Galley System Design and Installation Criteria

1. SCOPE:

This Aerospace Recommended Practice provides design and installation criteria intended to enhance overall safety by mitigating exposure of cabin crew and passengers to risks from:

a. Routine use of galley systems.

b. Galley components or equipment becoming dislodged under routine or abnormal operating conditions and under survivable crash or ditching conditions.

c. Malfunctions of, or defects in, a galley system or associated galley equipment.

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

2. APPLICABLE DOCUMENTS:

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA, 15096-0001.

ARP503	Emergency Evacuation Illumination
ARP577	Emergency Placarding - Internal and External
ARP583	Flight Attendant Stations
ARP712	Galley Lighting
ARP767	Impact Protective Design of Occupant Environment - Transport Aircraft
ARP917	Stowage of Flight Crew's Survival, Emergency and Miscellaneous Equipment
ARP997	Passenger Cabin Emergency Equipment and Stowage
ARP998	Crew Restraint System

2.2 Federal Aviation Administration (FAA) Regulations, Advisory Circulars, and Reports:

Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325.

AC25.785 Seats, Berths, Safety Belts, and Harnesses

3. DEFINITIONS:

3.1 Applicable Galley Systems and Components:

a. Complete galley assemblies at any location in the aircraft.

b. Galley component and equipment restraint devices (latches).

c. Non-stationary components (doors, drawers, etc) of permanently attached galley assemblies.

d. Galley components connected to an electrical power supply (ovens, grills, hot plates, refrigerators, coffeemakers, heated carts, etc), water source, vent, drain system, environmental system, or any other interface to the aircraft.

e. Items of food or beverage service equipment not permanently attached to the galley assembly (liquid containers, carrier boxes, service carts, etc), including associated special purpose systems and equipment (lift, dumbwaiter, etc).

3.2 Inapplicable Galley System Considerations:

a. Design details that provide extended service life and continued airworthiness, since this is a function of: (a) the complete galley and food handling system design, (b) human factors engineering features desired by individual operators, (c) specific maintenance and servicing techniques, (d) maintenance philosophy, and (e) compromises in weight vs. longevity. However, alerts to these issues are inserted as appropriate.

b. Design details that are covered by Federal Aviation Regulations (FAR) or that should be covered by detailed specifications of operators.

4. RECOMMENDATIONS:

4.1 General:

4.1.1 Appropriate design practices shall be applied to minimize the detrimental effects of abusive use and handling, spillage of liquids and solids, moisture, corrosion, etc., on safety, structural integrity, and continued airworthiness over long periods of service.

4.1.2 Construction practices shall facilitate maintenance of sanitary conditions in all areas.

4.1.3 Direct visual monitoring of the passenger cabin from the galley(s) or service center area(s) on the main deck(s) shall be possible to assure compliance with safety instructions and to meet routine assistance needs in flight. However, a mirror or other viewing device may be provided to allow supplemental observation of the passenger cabin. The design and placement of any such device shall be consistent with good ergonomic practice.

4.1.4 The coefficient of friction of the galley floor surface shall provide for ease of service cart operation, while minimizing slipping hazards related to spillage of liquids and solids. The floor surface should also provide insulation against vibration and cold.

4.1.5 The floors of the galley area, and their interface with the service cart stowage bins, should be level and flat, and without ridges or other variations in surface height, to facilitate smooth operation of the carts.

4.2 Galley Environment:

Appropriate design practices shall be applied to facilitate personnel safety, efficiency, and comfort associated with the following galley conditions:

a. Lighting
b. Heating/Cooling
c. Acoustics
d. Noise (especially during flight) from overboard drains, environmental systems, refrigeration condensing units, equipment noises, etc.)
e. Moisture/Steam (pressure relief)
f. Odors (cooking, sanitation, pesticides, etc.)
g. Gas or fumes from refrigerants, including 'dry ice' (CO_2)
h. Traffic (between compartments, to toilets, for galley use, emergency egress, etc.)
i. Intrusion of safety equipment into galley work areas or removable equipment handling paths
j. Effects of contamination and deterioration on safety equipment
k. Microwave radiation
l. Glass breakage

4.3 Galley Assembly:

4.3.1 Minimum structural strength shall be equivalent to the crashworthiness requirements of the host aircraft, as specified in the FAR.

4.3.2 Minimum structural strength of removable components or equipment, including service carts, shall be equivalent to that of the galley structure, with consideration given to effective operation in normal use and after repetitive/abusive handling.

4.3.3 Doors, drawers, and equipment configurations shall not interfere with access to, or operation of, aircraft emergency exits and escape devices, nor interfere with the flow of evacuating aircraft occupants, and they shall not damage, or impede to the use of, safety equipment stowed in the galley area.

4.3.4 Features shall avoid/minimize the potential for injury to cabin crew or occupants. All exposed surfaces and protrusions shall be smooth and blunt, and all edges/corners shall be rounded to a minimum radius of 0.25 in (6.35 mm).

4.3.5 Grab bars shall be provided on or near the edge of countertops for support in turbulent flying conditions. The design of these provisions shall be consistent with good ergonomic practice and shall preclude the possibility of entrapment, wrenching of a finger or hand, or interference with movement of personnel and equipment in the galley area. The placement and design of grab bars shall not restrict the removal for servicing of other equipment (e.g., ovens), installed on or above the countertops.

4.3.6 Doors and drawers on galley stowage compartments, service carts, and removable/insertable components and equipment shall incorporate the minimum number of restraint devices (latches) to accomplish reliable retention of the compartment contents to the crashworthiness requirements of the aircraft. However, the principle of redundancy shall be incorporated such that if a primary restraint device fails, a secondary device shall restrain all items of mass in the associated compartment/ drawer. In addition, doors and drawers should resist deformation to avoid adverse crash effects on restraint device engagement. Details of recommended restraint device design are as follows:

a. In a particular galley system, restraint devices shall be uniform in design type, operable by a single simple motion, and shall engage in a positive, reliable manner.

b. Devices shall be designed to avoid release during, or as a result of, dynamic loading, i.e., not disengage by forces generated in hard landings, turbulence, crash loads, vibration, or by the weight of the device itself.

c. Devices shall have a distinctive, permanent color (e.g., red) and shall exhibit high visual contrast with the background material to ensure rapid recognition of device engagement status, even in low light conditions. Provision of small colored dots as indicators of restraint device engagement status is inadequate to meet this requirement.

d. Devices shall fail-safe to the engaged position should a detent or spring become defective.

e. Devices shall permit rapid content stowage and device engagement to minimize spillage of compartment contents during unexpected turbulence.

f. Devices to be used for securing liquid containers, such as coffee pots, shall have smooth operation, particularly after prolonged service, and shall resist liquid residue and other contamination and deterioration that could lead to seizure of the container being restrained, as the removal of seized equipment can require a jerking movement that may cause spills and burns.

4.3.7 Retention provisions for any upwardly-opening door shall be provided, so long as the upward position would not maintain the door in headstrike range. A retention provision (e.g., detent) shall also be provided for the open position of doors that may be hot.

4.3.8 Cabin crew provisions (seating, emergency equipment, communications, stowage, oxygen, etc.) shall be available in accordance with ARP583 and the applicable FAR. Seating shall be located so as to minimize the effects on personnel of loose galley equipment, dishes, glasses, utensils, etc., as well as spillage of hot food and liquids, in turbulence or a crash condition.

4.3.9 The galley support structure and the cabin crew seating unit shall be designed and placed to maintain effective emergency egress routes, should failure occur from loading produced by turbulence or a crash condition.

4.3.10 All structural compartments (particularly those which have sealed doors and heated liquid vessels) shall allow for rapid decompression of the aircraft, or galley system malfunction, without damage to equipment or hazard to personnel.

4.3.11 Insulation or equivalent protection for external surfaces of heated components shall be provided to avoid personnel burn injury.

4.3.12 Disposal receptacles for towels, paper, food, and other waste shall be fully enclosed and constructed of fire-resistant materials.

4.3.13 Ready accessibility for fire-fighting shall be provided to all compartments that cannot contain or smother fire.

4.3.14 Decorative trim or closures with attachments (curtains, etc.) shall not create a hazard in normal use nor in the case of crash or fire.

4.4 Electrical/Electronic System:

4.4.1 The aircraft electrical system loading produced by the maximum operating demands of the galley assembly, including components and equipment, should not exceed the total aircraft electrical power provided to the galley assembly during flight. However, where electrical system loading would exceed the power provided, selector switches or interlocks shall be provided to limit equipment utilization to maintain the proper maximum power loading. There shall be protective devices (circuit breakers, etc) on the galley or individual components to allow manual and automatic power interruption should an electrical overload or component fault/overheating occur.

4.4.2 Provisions shall be available in the galley area for selectively de-energizing power to the galley assembly and components/equipment, such as service carts, coffee makers, ovens, etc. The means shall be on-off switches that are individually controllable. Circuit breakers shall not be used for this purpose.

4.4.3 Plainly identified controls for electrical equipment shall be visible to, and operable by, cabin crew. Visual indicators and/or audible warning signals shall be readily identifiable.

4.4.4 An electrical disconnect or terminal junction shall be provided at the interface of the galley with the aircraft electrical system.

4.4.5 Electrical grounding of the galley assembly to the aircraft structure, and electrical grounding of galley components and equipment to the galley assembly, shall be provided.

4.4.6 Protective shrouds shall be provided for wiring that could be damaged during normal use of the galley area.

4.4.7 Protection of personnel from electric shock shall be provided. This includes plugging/ unplugging of service cart power.

4.4.8 Provisions for prevention of electrical shorting of heating elements by conductive materials inserted into heated cavities or ovens shall be included. Provisions shall also be made so that no hazard will exist from food or liquid spillage onto heating elements, etc.

4.4.9 Safeguards on galley equipment containing heating devices or elements shall be provided to ensure that personnel cannot inadvertently touch hot heating elements or otherwise be exposed to heat or radiation. A door interlock should be provided to de-energize fans, heating elements, and microwave radiation sources when equipment doors are opened.

4.4.10 Electrical components and wire bundles shall be located to minimize exposure to galley cooking steam, cooking residue, waste residue, or water leakage/spillage. However, components shall be accessible with the galley assembly secured in place.

4.4.11 Means shall be provided to limit accessibility to electrically-charged equipment areas that might be used for improper stowage, especially of items that could catch fire.

4.4.12 The general level of galley illumination shall be adequate for performance of cabin crew service duties and avoidance of hazards (see ARP712). Additional emergency lighting shall be provided for securing galley equipment and performing emergency duties in the galley area.

4.4.13 Communication with the flight deck, cabin crew stations, and all other galley areas shall be provided to effect crew coordination in emergency situations. An audible emergency signal shall be provided in the galley area.

4.4.14 A vent system for coffee makers and boilers shall be provided to ensure purging of air from the system prior to use. Any venting of the galley equipment shall avoid excessive or damaging temperatures to the aircraft, galley assembly or personnel.

4.4.15 Pressure vessels, such as those used in coffee makers or boilers, shall be protected from over-pressurization resulting from rapid depressurization of the aircraft or a failure of the pressure vessel relief valve or thermostat. The pressure vessel should include a visible or audible means of excess-pressure warning.

4.5 Cooling/Refrigeration System:

4.5.1 Leak proof connections shall be provided to ensure ventilation or overboard venting of refrigerants or gas, such as CO_2, that could constitute a personnel hazard or cause deterioration of surrounding equipment during normal use or leakage.

4.5.2 Protection of system components from puncture damage and subsequent leakage of refrigerant, in normal or abusive handling of galley components, shall be provided.

4.5.3 The system shall be sealed such that loading/unloading of refrigerated galley inserts shall not require use of quick-disconnect fittings in refrigerant lines.

4.5.4 Means to protect personnel from ‘freeze or touch’ hazard, i.e., adhesion of skin to cold surfaces, shall be provided.

4.6 Water System:

4.6.1 A shut-off valve, which is readily accessible during flight and operable without tools, shall be provided. The location of the valve shall avoid exposure to excessive heat, e.g., hot liquid leakage or spillage.

4.6.2 Protective shrouds shall be provided for water lines that could be damaged during normal use of the galley area.

4.6.3 Means shall be provided to totally drain and flush galley water systems for sanitation and maintenance, and to prevent freezing.

4.6.4 Water system components containing hot liquids shall be marked to minimize the potential for personnel burns/scalding.

4.6.5 A leak-proof connection(s) that is accessible with the galley secured in place shall be provided at the interface to the aircraft and between galley components.

4.7 Liquid Waste System:

4.7.1 Means shall be provided to allow safe cleaning of galley work areas and sealing provisions shall be used to minimize seepage of liquid residue that could corrode galley work areas and galley base areas (e.g., removable pans). Galley components shall be removable for inspection of the galley assembly and aircraft structure.

4.7.2 Means shall be provided for draining (on-ground and overboard if possible) the galley liquid waste system for maintenance, sanitation, and to prevent freezing.

4.7.3 Strainers and a simple means of cleaning all drain lines, which may include removal and replacement, shall be provided.

4.7.4 Liquid waste containers shall be provided.

4.8 Solid Waste System:

4.8.1 Containers and stowage compartments shall prevent, smother, or contain combustion of contents.

4.8.2 Containers and stowage compartments shall be sized and configured to preclude accumulation of waste outside the container, especially with regard to prevention of corrosion inside the galley assembly surrounding the container.

4.8.3 Trash compaction devices shall have provisions that preclude their operation when open, and shall prevent solid or liquid contents from being forcefully ejected from the compaction chamber during or subsequent to operation.