PART 20

CIVIL REGISTERED AIRCRAFT RULES FOR JORDANIAN GOVERNMENT AND ROYAL JORDANIAN AIRFORCE

This new part of the Jordanian Civil Aviation Regulations is hereby adopted under the authority and provisions of the Civil Aviation Law No. (41) dated 2007, and its amendments.

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Chief Commissioner/CEO
Civil Aviation Regulatory Commission

المملكة الاردنية الهاشمية
هيئة تنظيم الطيران المدني
CIVIL AVIATION REGULATORY COMMISSION
THE HASHEMITE KINGDOM OF JORDAN

Revision Control Sheet

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Amendment Summary

Amendment No.	Effective Date	Subpart	Remarks	
			Removed	Replaced with
(1)	Dec. .2012	ALL	*DGCAA *CAA *Civil Aviation Authority * Civil Aviation Law No.(50), dated 1985	*Chief Commissioner/CEO *CARC *Civil Aviation Regulatory Commission *Civil Aviation Law No.(41), dated 2007

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SUBPART- A
General

20.1 Applicability.

(a) Except as provided in paragraph (b), of this section, this part prescribes rules governing the operations of civil aircraft which are Jordanian Registered to Jordanian government or RJAF and used by the RJAF in government service for non-commercial and non-military operations.

(b) The rules of this part do not apply to the operations of airplanes specified in paragraph (a) when:

(1) They are required to be operated under JCAR Part Ops1;

(2) They have been issued restricted airworthiness certificates, special flight permits, or experimental certificates;

(3) They are being operated without carrying passengers or cargo under JCAR Part 91 for training, ferrying, positioning, or maintenance purposes;

(4) They are being operated under JCAR Part 91 by an operator certificated to operate those airplanes under JCAR Part Ops1; or

(5) They are being operated under a deviation authority issued under section 20.3.

20.3 Deviation authority.

(a) Chief Commissioner /CEO may, upon consideration of the circumstances of a particular operation, issue deviation authority providing relief from specified sections of this part. This deviation authority will be issued as a Letter of Deviation Authority.

(b) A Letter of Deviation Authority may be terminated or amended at any time by Chief Commissioner /CEO.

(c) A request for deviation authority must be submitted to Chief Commissioner /CEO, not less than 15 days prior to the date of intended operations. A request for deviation authority must contain a complete statement of circumstances and justification for deviation requested.

20.5 Operating certificate and operations specifications required.

(a) No person may engage in operations governed by this part unless that person holds a certificate and operations specifications or appropriate deviation authority.

20.7 Display of certificate.

(a) The certificate holder must display a true copy of the certificate in each of its aircraft.

(b) Each operator holding a Letter of Deviation Authority issued under this part must carry a true copy in each of its airplanes.

20.9 Definitions.

(a) For the purposes of this part, “maximum payload capacity” means:

(1) For an airplane for which a maximum zero fuel weight is prescribed in the technical specifications, the maximum zero fuel weight, less empty weight, less all justifiable airplane equipment, and less the operating load (consisting of minimum flightcrew, food and beverages and supplies and equipment related to food and beverages, but not including disposable fuel or oil).

(2) For all other airplanes, the maximum certificated takeoff weight of an airplane, less the empty weight, less all justifiable airplane equipment, and less the operating load (consisting of minimum fuel load, oil, and flightcrew). The allowance for the weight of the crew, oil and fuel is as follows:

(i) Crew - 200 pounds (90 KG) for each crewmember required under JCAR.

(ii) Oil -350 pounds (160 KG).

(iii) Fuel - the minimum weight of fuel required under JCAR for a flight between domestic points 174 nautical miles apart under VFR weather conditions that does not involve extended overwater operations.

(b) For the purposes of this Part “empty weight” means the weight of the airframe, engines, propellers, and fixed equipment. Empty weight excludes the weight of the crew and payload, but includes the weight of all fixed ballast, unusable fuel supply, undrainable oil, total quantity of engine coolant, and total quantity of hydraulic fluid.

(c) For the purposes of this Part, "maximum zero fuel weight" means the maximum permissible weight of an airplane with no disposable fuel or oil. The zero fuel weight figure may be found in either the airplane Type Certificate Data Sheet or the approved Airplane Flight Manual, or both.

(d) For the purposes of this section, "Justifiable airplane equipment" means any equipment necessary for the operation of the airplane. It does not include equipment or ballast specifically installed, permanently or otherwise, for the purpose of altering the empty weight of an airplane to meet the maximum payload capacity.

20.11 Certificate eligibility and prohibited operations.

(a) No person is eligible for a certificate under this part if that person is authorized to operate airplanes under any Air carrier Operating Certificate.

(b) No certificate holder may conduct any operation which results directly or indirectly from any person's holding out to the general public to furnish transportation.

20.13 thru 20.20 Reserved.

SUBPART- B
Certification Rules and Miscellaneous Requirements

20.21 Application for operating certificate.

(a) Each applicant for issuance of an operating certificate must submit an application in a form and manner prescribed by Chief Commissioner /CEO. The application must be submitted at least 60 days before the date of intended operations.

(b) Each application submitted under paragraph (a) of this section must contain a signed statement showing the names of each officer of person employed or who will be employed in a management position required by section 20.25.

20.23 Rules applicable to operations subject to this part.

Each person operating an airplane under this part shall:

(a) While operating inside Jordan comply with the applicable rules of JCAR Part 91, and

(b) While operating outside of the Kingdom, comply with Annex 2, Rules of the Air Convention on International Civil Aviation (ICAO) or the regulations of

any foreign country, whichever applies, and with any sections of JCAR Parts FCL1, 63, 65, 67, 91 and this part that are more restrictive than that Annex or those regulations and that can be complied with without violating that Annex or those regulations.

20.25 Management personnel required.

(a) The applicant for a certificate under this part must show that it has enough management personnel, including at least a director of operations, to assure that its operations are conducted in accordance with the requirements of this part.

(b) Each applicant shall:

(1) Set forth the duties, responsibilities, and authority of each of its management personnel in the general policy section of its manual.

(2) List in the manual the names of the key management personnel responsible for the aircraft operated under this part.

(3) List the flight crewmember with the type of airman certificate held, including ratings and certificate numbers.

(4) Designate a person as responsible for the scheduling of inspections required by the manual and for the updating of the approved weight and balance system on all airplanes.

(c) The certificate holder shall promptly advise Chief Commissioner /CEO of any changes in the above listed personnel, if the changes are intended to last longer than 30 days.

20.27 Issue of certificate.

An applicant for a certificate under this part is entitled to a certificate if Chief Commissioner /CEO finds that the applicant is properly and adequately equipped and able to conduct a safe operation in accordance with the requirements of this part and the operations specifications provided for in this part.

20.29 Duration of certificate.

(a) A certificate issued under this part is effective until surrendered, suspended, or revoked.

(b) If the certificate is terminated the holder shall return it to the Chief Commissioner /CEO.

20.31 Contents of certificate and operations specifications.

(a) Each certificate issued under this part contains the following:

(1) The holder's name.

(2) A description of the operations authorized.

(3) The date of issue.

(b) The operations specifications issued under this part contain the following:

(1) The kind of operations authorized.

(2) The types and registration numbers of airplanes authorized for use.

(3) Approval of the provisions of the operator's manual relating to airplane inspections, together with necessary conditions and limitations.

(4) Registrations marking of airplanes that are to be inspected under an approved airplane inspection program under section 20.247.

(5) Procedures for control of weight and balance of airplanes.

(6) Any other item that Chief Commissioner/CEO determines is necessary to cover a particular situation.

20.33 Operations specifications not a part of certificate.

Operations specifications are not a part of an operating certificate.

20.35 Amendment of operations specifications.

(a) The CARC may amend any operations specifications issued under this part if:

(1) It determines that safety requires an amendment; or

(2) Upon application by the holder, it determines that safety allows that amendment.

(b) The certificate holder must file an application to amend operations specifications at least 15 days before the date proposed by the applicant for the amendment to become effective, unless a shorter filing period is approved. The application must be on a form and in a manner prescribed by Chief Commissioner/CEO and be submitted to Chief Commissioner/CEO.

(c) Within 30 days after notice of refusal to approve a certificate holder's application for amendment is received, the holder may petition the Chief Commissioner/CEO to reconsider the refusal to amend.

(d) If Chief Commissioner/CEO finds that there is an emergency situation affecting aviation safety and that it is related to the certificate holder's operations specifications, Chief Commissioner/CEO may notify the certificate holder that an amendment to its operations specifications is effective on date of receipt, without any previous notice.

20.37 Reserved.

20.39 Carriage of narcotic drugs, hashish, and depressant or stimulant drugs or substances.

If the holder of a certificate issued under this part permits any airplane owned or leased by that holder to be engaged in any operation that the certificate holder knows to be in violation of 91.19 of JCAR, that operation is a basis for suspending or revoking the certificate.

20.41 Availability of certificate and operations specifications.

The certificate holder shall make its operating certificate and operations specification available to Chief Commissioner/CEO or those CARC inspectors designated by Chief Commissioner/CEO for inspection at its principal operations base.

20.43 Use of operations specifications.

(a) The certificate holder shall keep each of its personnel informed of the provisions of its operations specifications that apply to the individual's duties and responsibilities.

(b) The certificate holder shall maintain a complete and separate set of operations specifications. In addition, the certificate holder shall insert excerpts of its operations specifications, or reference thereto, in its manual in such a manner that they retain their identity as operations specifications.

20.45 Amendment of certificate.

Chief Commissioner/CEO may amend an operating certificate issued under this part:

(a) Upon application by the holder, if Chief Commissioner/CEO determines that safety in air transportation and the public interest allows the amendment; or

(b) Under the provisions of Jordanian Civil Aviation Law, if Chief Commissioner/CEO determines that safety in air transportation and the public interest requires the amendment.

20.47 Inspection authority.

Each certificate holder shall allow Chief Commissioner/CEO or his designated representative, at any time or place, to make any inspection or test to determine its compliance with the Jordan Civil Aviation Regulations.

20.49 Airport requirements.

(a) No certificate holder may use any airport unless it is adequate for the proposed operation, considering such items as size, surface, obstructions, and lighting.

(b) No pilot of an airplane carrying passengers at night may take off from, or land on, an airport unless:

(1) That pilot has determined the wind direction from an illuminated wind direction indicator or local ground communications, or, in the case of takeoff, that pilot's personal observations; and

(2) The limits of the area to be used for landing or takeoff are clearly shown by boundary or runway marker lights.

20.51 En route navigational facilities.

(a) Except as provided in paragraph (b) of this section, no certificate holder may conduct any operation over a route unless nonvisual ground aids are:

(1) Available over the route for navigating airplanes within the degree of accuracy required for ATC; and

(2) Located to allow navigation to any airport of destination, or alternate airport, within the degree of accuracy necessary for the operation involved.

(b) Non-visual ground aids are not required for operations where the use of celestial or other specialized means of navigation, such as an inertial navigation system, is approved.

20.53 Flight locating requirements.

(a) Each certificate holder must have procedures established for locating each flight for which a CARC flight plan is not filed that:

(1) Provide the certificate holder with at least the information required to be included in a VFR flight plan;

(2) Provide for timely notification of a CARC facility or search and rescue facility if an airplane is overdue or missing; and

(3) Provide the certificate holder with the location, date, and estimated time for reestablishing radio or telephone communications if the flight will operate in an area where communications cannot be maintained.

(b) Flight locating information shall be retained at the certificate holder's principal operations base, or at other places designated by the certificate holder in the flight locating procedures, until the completion of the flight.

(c) Each certificate holder shall furnish the representative of Chief Commissioner/CEO with a copy of its flight locating procedures and any changes or additions, unless those procedures are included in a manual required under this part.

20.55 thru 20.60 Reserved.

SUBPART- C
Manual Requirements

20.61 Preparation.

(a) The certificate holder shall prepare and keep current a manual setting forth the certificate holder's procedures and policies. This manual must be acceptable to Chief Commissioner/CEO. This manual must be used by the certificate holder's flight, ground, and maintenance personnel in conducting its operations.

(b) Each certificate holder shall maintain at least one copy of the manual at its principal operations base.

(c) The manual shall not be contrary to any applicable Civil Aviation Regulations, foreign regulations applicable to the certificate holder's operations in foreign countries, or the certificate holder's operating certificate or operations specifications.

(d) A copy of the manual, or appropriate portions of the manual (and changes or additions) shall be made available to maintenance and ground operations personnel by the certificate holder and furnished to:

(1) Its flight crewmembers; and

(2) The CARC Flight Safety Directorate.

(e) Each employee, to whom a manual or appropriate portions of it are furnished under subparagraph (d) (1) of this section shall keep it up to date with the

changes and additions furnished to them. Each certificate holder shall carry appropriate parts of the manual in each airplane when away from the principal operations base. The appropriate parts must be available for use by ground or flight personnel. If a certificate holder carries aboard an airplane all or any portion of the maintenance part of its manual in microfilm, it must also carry a reading device that provides a legible facsimile image of the microfilmed maintenance information and instructions.

(f) If a certificate holder conducts airplane inspections or maintenance at specified station where it keeps the approved inspection program manual, it is not required to carry the manual aboard the airplane en route to those stations.

20.63 Contents.

Each manual shall have the date of the last revision and revision number on each revised page. The manual must include:

(a) The name of each management person who is authorized to act for the certificate holder, the person's assigned area of responsibility, and the person's duties, responsibilities, and authority;

(b) Procedures for ensuring compliance with airplane weight and balance limitations;

(c) Copies of the certificate holder's operations specifications or appropriate extracted information, including area of operations authorized, category and class of airplane authorized, crew complements, and types of operations authorized;

(d) Procedures for complying with accident notification requirements;

(e) Procedures for ensuring that the pilot in command knows that required airworthiness inspections have been made and that the airplane has been approved for return to service in compliance with applicable maintenance requirements;

(f) Procedures for reporting and recording mechanical irregularities that come to the attention of the pilot in command before, during, and after completion of a flight;

(g) Procedures to be followed by the pilot in command for determining that mechanical irregularities or defects reported for previous flights have been corrected or that correction has been deferred;

(h) Procedures to be followed by the pilot in command to obtain maintenance, preventive maintenance, and servicing of the airplane at a place where previous arrangements have not been made by the operator.

(i) Procedures for the release, or continuation, of flight if any item of equipment required for the particular type of operation becomes inoperative or unserviceable en route;

(j) Procedures for refueling airplanes, eliminating fuel contamination, protecting from fire (including electrostatic protection), and supervising and protecting passengers during refueling;

(k) Procedures to be followed by the pilot in command in the briefing under section 20.357;

(l) Flight locating procedures;

(m) Procedures for ensuring compliance with emergency procedures, including a list of the functions assigned each category of required crewmembers in connection with an emergency and emergency evacuation;

(n) The approved airplane inspection program;

(o) Procedures and instructions to enable personnel to recognize dangerous articles, as defined in JCAR Part Ops1 and ICAO Annex 18, and if these materials are to be carried, stored, or handled, procedures and instructions for:

(1) Accepting shipment of dangerous goods required by applicable parts of JCAR and ICAO Annex 18 to assure proper packaging, marking, labeling, shipping documents, compatibility of articles, and instructions on their loading, storage, and handling;

(2) Notification and reporting dangerous goods incidents as required by JCAR Part Ops1 and ICAO Annex 18; and

(3) Notification of the pilot in command when there are dangerous goods aboard, as required by JCAR Part Ops1 and ICAO Annex 18;

(p) Procedures for the evacuation of persons who may need the assistance of another person to move expeditiously to an exit if an emergency occurs.

20.65 Airplane flight manual.

(a) The certificate holder shall keep a current approved Airplane Flight Manual or approved equivalent for each type airplane that it operates.

(b) The certificate holder shall carry the approved Airplane Flight Manual or the approved equivalent aboard each airplane it operates. The certificate holder may elect to carry a combination of the manuals required by this section and paragraph 20.61. If it so elects, the certificate holder may revise the operating

procedures sections and modify the presentation of performance from the applicable Airplane Flight Manual if the revised operating procedures and modified performance data presentation are approved by Chief Commissioner/CEO.

20.67 thru 20.70 Reserved.

SUBPART –D
Airplane Requirements

20.71 Airplane requirements: general.

(a) No certificate holder may operate an airplane governed by this part unless it:

(1) Is registered as a civil aircraft and carries a current airworthiness certificate; and

(2) Is in an airworthy condition and meets the applicable airworthiness requirements of JCAR including those relating to identification and equipment.

(b) No person may operate an airplane unless the current empty weight and center of gravity are calculated from the values established by actual weighing of the airplane within the preceding 36 calendar months.

20.73 thru 20.76 Reserved.

SUBPART- E
Special Airworthiness Requirements

20.77 General.

The certificate holder shall not use an airplane powered by engines rated at more than 600 horsepower each for maximum continuous operation unless that airplane meets requirements of sections 20.79 through 20.147.

20.79 Cabin Interiors.

Each compartment used by the crew or passengers must meet the following requirements:

(a) Materials must be at least flash resistant.

(b) The wall and ceiling linings and the covering of upholstering, floors, and furnishings must be flame resistant.

(c) Each compartment where smoking is to be allowed must be equipped with self-contained ashtrays that are completely removable and other compartments

must be placarded against smoking.

(d) Each receptacle for used towels, papers, and wastes must be of fire-resistant material and must have a cover or other means of containing possible fires started in the receptacles.

20.81 Internal doors.

In any case where internal doors are equipped with louvers or other ventilating means, there must be a means convenient to the crew for closing the flow air through the door when necessary.

20.83 Ventilation.

Each passenger or crew compartment must be suitably ventilated. Carbon monoxide concentration may not be more than one part in 20,000 parts of air, and fuel fumes may not be present. In any case where partitions between compartments have louvers or other means allowing air to flow between compartments, there must be a means convenient to the crew for closing the flow of air through the partitions when necessary.

20.85 Fire precautions.

(a) Each compartment must be designed so that, when used for storing cargo or baggage, it meets the following requirements:

(1) No compartment may include controls, wiring, lines, equipment, or accessories that would upon damage or failure, affect the safe operation of the airplane unless the item is adequately shielded, isolated, or otherwise protected so that it cannot be damaged by movement of cargo in the compartment and so that damage to or failure of the item would not create a fire hazard in the compartment.

(2) Cargo or baggage may not interfere with the functioning of the fire-protective features of the compartment.

(3) Materials used in the construction of the compartments, including tie-down equipment, must be at least flame resistant.

(4) Each compartment must include provisions for safeguarding against fires according to the classifications set forth in paragraphs (b) through (f) of this section.

(b) Class A. Cargo and baggage compartments are classified in the “A” category if a fire therein would be readily discernible to a member of the crew while at that crewmember’s station, and all parts of the compartment are easily accessible

in flight. There must be a hand fire extinguisher available for each Class A compartment.

(c) Class B. Cargo and baggage compartments are classified in the "B" category if enough access is provided while in flight to enable a member of the crew to effectively reach all of the compartment and its contents with a hand fire extinguisher and the compartment is so designed that, when the access provisions are being used, no hazardous amount of smoke, flames, or extinguishing agent enters any compartment occupied by the crew or passengers. Each Class B compartment must comply with the following:

(1) It must have a separate approved smoke or fire detector system to give warning at the pilot or flight engineer station.

(2) There must be a hand-held fire extinguisher available for the compartment.

(3) It must be lined with fire-resistant material, except that additional service linging of flame-resistant material may be used.

(d) Class C. Cargo and baggage compartments are classified in the "C" category if they do not conform with the requirements for the "A", "B", "D" or "E" categories. Each Class C compartment must comply with the following:

(1) It must have a separate approved smoke or fire detector system to give warning at the pilot or flight engineer station.

(2) It must have an approved built-in-fire extinguisher system controlled from the pilot or flight engineer station.

(3) It must be designed to exclude hazardous quantities of smoke, flames, or extinguishing agents from entering into any compartment occupied by the crew or passengers.

(4) It must have ventilation and draft controls so that the extinguishing agent provided can control any fire that may start in the compartment.

(5) It must be lined with fire-resistant material, except that additional service lining of flame-resistant material may be used.

(e) Class D. Cargo and baggage compartments are classified in the "D" category if they are so designed and constructed that a fire occurring therein will be completely confined without endangering compartment must comply with the following:

(1) It must have a means to exclude hazardous quantities of smoke, flames, or noxious gases from entering any compartment occupied by the crew or passengers.

(2) Ventilation and drafts must be controlled within each compartment so that any fire likely to occur in the compartment will not progress beyond safe limits.

(3) It must be completely lined with fire-resistant material.

(4) Consideration must be given to the effect of heat within the compartment on adjacent critical parts of the airplane.

(f) Class E. On airplanes used for the carriage of cargo only, the cabin area may be classified as a Class E compartment. Each class E compartment must comply with the following:

(1) It must be completely lined with fire-resistant material.

(2) It must have a separate system of an approved type smoke or fire detector to give warning at the pilot or flight engineer station.

(3) It must have a means to shut off the ventilating air flow to or within the compartment and the controls for that means must be accessible to the flightcrew in the crew compartment.

(4) It must have a means to exclude hazardous quantities of smoke, flames, or noxious gases from entering the flightcrew compartment.

(5) Required crew emergency exits must be accessible under all cargo loading conditions.

20.87 Proof of compliance with section fire precautions.

Compliance with those provisions of section 20.85 that refer to compartment accessibility, the entry of hazardous quantities of smoke or extinguishing agent into compartment occupied by the crew or passengers, and the dissipation of the extinguishing agent in Class “C” compartments must be shown by tests in flight. During these tests it must be shown that no inadvertent operation of smoke or fire detectors in other compartments within the airplane would occur as a result of fire contained in any one compartment, either during the time it is being extinguished, or thereafter unless the extinguishing system floods those compartments simultaneously.

20.89 Propeller deicing fluid.

If combustible fluid is used for propeller deicing, the certificated holder must comply with section 20.119.

20.91 Pressure cross-feed arrangements.

(a) Pressure cross-feed lines may not pass through parts of the airplane used for carrying persons or cargo unless there is a means to allow crewmembers to shut off the supply of fuel to these lines or the lines are enclosed in a fuel and fume-proof enclosure that is ventilated and drained to the exterior of the airplane. However, such an enclosure need not be used if those lines incorporate no fittings on or within the personnel or cargo areas and are suitably routed or protected to prevent accidental damage.

(b) Lines that can be isolated from the rest of the fuel system by valves at each end must incorporate provisions for relieving excessive pressures that may result from exposure of the isolated line to high temperatures.

20.93 Location of fuel tanks.

(a) Fuel tanks must be located in accordance with section 20.119.

(b) No part of the engine nacelle skin that lies immediately behind a major air outlet from the engine compartment may be used as the wall of an integral tank.

(c) Fuel tanks must be isolated from personnel compartments by means of fume- and fuel-proof enclosures.

20.95 Fuel system lines and fittings.

(a) Fuel lines must be installed and supported so as to prevent excessive vibration and so as to be adequate to withstand load due to fuel pressure and accelerated flight conditions.

(b) Lines connected to components of the airplane between which there may be relative motion must incorporate provisions for flexibility.

(c) Flexible connections in lines that may be under pressure and subject to axial loading must use flexible hose assemblies rather than hose clamp connections.

(d) Flexible hoses must be of an acceptable type or proven suitable for the particular application.

20.97 Fuel lines and fittings in designated fire zones.

Fuel lines and fittings in each designated fire zone must comply with section 20.123.

20.99 Fuel valves.

Each fuel valve must:

(a) Comply with section 20.121.

(b) Have positive stops or suitable index provisions in the “on” and “off” positions; and

(c) Be supported so that bade resulting from its operation or from accelerated flight conditions are not transmitted to the lines connected to the valve.

20.101 Oil lines and fittings in designated fire zones.

Oil lines and fittings in each designated fire zone must comply with section 20.123.

20.103 Oil valves.

(a) Each oil valve must:

(1) Comply with paragraph 20.121.

(2) Have positive stops or suitable index provisions in the “on” and “off” positions; and

(3) Be supported so that loads resulting from its operation or from accelerated flight conditions are not transmitted to the lines attached to the valve.

(b) The closing of an oil shutoff must not prevent feathering the propeller, unless equivalent safety provisions are incorporated.

20.105 Oil system drains.

Accessible drains incorporating either a manual or automatic means for positive locking in the closed position must be provided to allow safe drainage of the entire oil system.

20.107 Engine breather lines.

(a) Engine breather lines must be so arranged that condensed water vapor that may freeze and obstruct the line cannot accumulate at any point.

(b) Engine breathers must discharge in a location that does not constitute a fire

hazard in case foaming occurs and so that oil emitted from the line does not impinge upon the pilot's windshield.

(c) Engine breather may not discharge into the engine air induction system.

20.109 Firewalls.

Each engine, auxiliary power unit, fuel-burning heater, or other item of combusting equipment that is intended for operation in flight must be isolated from the rest of the airplane by means of firewalls or shrouds, or by other equivalent means.

20.111 Firewall construction.

Each firewall and shroud must:

(a) Be so made that no hazardous quantity of air, fluids, or flame can pass from the engine compartment to other parts of the airplane;

(b) Have all openings in the firewall or shroud sealed with close-fitting fireproof grommets, bushings, or fire fittings;

(c) Be made of fireproof material; and

(d) Be protected against corrosion.

20.113 Cowling.

(a) Cowling must be made and supported so as to resist the vibration, inertia, and air loads to which it may be normally subjected.

(b) Provisions must be made to allow rapid and complete drainage of the cowling in normal ground and flight attitudes. Drains must not discharge in locations constituting a fire hazard. Parts of the cowling that are subjected to high temperatures because they are near exhaust system parts or because of exhaust gas impingement must be made of fireproof material. Unless otherwise specified in these regulations, all other parts of the cowling must be made of material that is at least fire resistant.

20.115 Engine accessory section diaphragm.

Unless equivalent protection can be shown by other means, a diaphragm that complies with section 20.111 must be provided on air-cooled engines to isolate the engine power section and all part of the exhaust system from the engine accessory compartment.

20.117 Powerplant fire protection.

(a) Designated fire zones must be protected from fire by compliance with sections 20.119 through 20.125.

(b) Designated fire zones are:

(1) Engine accessory sections;

(2) Installations where no isolation is provided between the engine and accessory compartment; and

(3) Areas that contains auxiliary power units, fuel-burning heaters, and other combustion equipment.

20.119 Flammable fluids.

(a) No tanks or reservoirs that are a part of a system containing flammable fluids or gases may be located in designated fire zones, except where the fluid contained, the design of the system, the materials used in the tank, the shutoff means, the connections, lines and controls complaint with required safety measures.

(b) At least one-half inch of clear airspace must be provided between any tank or reservoir and a firewall or shroud isolating a designated fire zone.

20.121 Shutoff means.

(a) Each engine must have a means for shutting off or otherwise preventing hazardous amounts of fuel, oil, deicer and other flammable fluids from flowing into, within, or through any designated fire zone. However, means need not be provided to shut off flow in lines that are in integral part of an engine.

(b) The shutoff means must allow an emergency operating sequence that is compatible with the emergency operation of other equipment, such as feathering the propeller, to facilitate rapid and effective control of fires.

(c) Shutoff means must be located outside of designated fire zones, unless safety measures are provided, and it must be shown that no hazardous amount of flammable fluid will drain into any designated fire zone after a shutoff.

(d) Adequate provisions must be made to guard against inadvertent operation of the shutoff means and to make it possible for the crew to reopen the shutoff means after it has been closed.

20.123 Lines and fittings.

(a) Each line, and its fittings, that is located in a designated fire zone, if it carries flammable fluids or gases under pressure, or is attached directly to the engine, or

is subject to relative motion between components (except lines and fittings forming an integral part of the engine), must be flexible and fire-resistant with factory-fixed, detachable, or other approved fire-resistant ends.

(b) Lines and fittings that are not subject to pressure or to relative motion between components must be of fire-resistant materials.

20.125 Vent and drain lines.

All vent and drain lines, and their fittings, that are located in a designated fire zone must, if they carry flammable fluids or gases, comply with section 20.123, if Chief Commissioner/CEO finds that the rupture or breakage of any vent or drain line may result in a fire hazard.

20.127 Fire-extinguishing systems.

(a) Unless the certificate holder shows that equivalent protection against destruction of the airplane in case of fire is provided by the use of fireproof materials in the nacelle and other components that would be subjected to flame, fire-extinguishing systems must be provided to serve all designated fire zones.

(b) Materials in the fire-extinguishing system must not react chemically with the extinguishing agent so as to be a hazard.

20.129 Fire-extinguishing agents.

Only methyl bromide, carbon dioxide, or another agent that has been shown to provide equivalent extinguishing action may be used as a fire-extinguishing agent. If methyl bromide or any other toxic extinguishing agent is used, provisions must be made to prevent harmful concentrations of fluid or fluid vapors from entering any personnel compartment either because of leakage during normal operation of the airplane or because of discharging the fire extinguisher on the ground or in flight when there is a defect in the extinguishing system. If a methyl bromide system is used, the containers must be charged with dry agent and sealed by the fire-extinguisher manufacturer or some other person using satisfactory recharging equipment. If carbon dioxide is used, it must not be possible to discharge enough gas into the personnel compartments to create a danger of suffocating the occupants.

20.131 Extinguishing agent container pressure relief.

Extinguishing agent containers must be provided with a pressure relief to prevent bursting of the container because of excessive internal pressures. The discharge line from the relief connection must terminate outside the airplane in a place convenient for inspection on the ground. An indicator must be provided at the discharge end of the line to provide a visual indication when the container has discharged.

20.133 Extinguishing agent container compartment temperature.

Precautions must be taken to ensure that the extinguishing agent containers are installed in places where reasonable temperatures can be maintained for effective use of the extinguishing system.

20.135 Fire-extinguishing system materials.

(a) Except as provided in paragraph (b) of this section, each component of a fire-extinguishing system that is in a designated fire zone must be made of fireproof materials.

(b) Connections that are subject to relative motion between components of the airplane must be made of flexible materials that are at least fire-resistant and be located so as to minimize the probability of failure.

20.137 Fire-detector systems.

Enough quick-acting fire detectors must be provided in each designated fire zone to assure detection of any fire that may occur in that zone.

20.139 Fire detectors.

Fire detectors must be made and installed in a manner that assures their ability to resist, without failure, all vibration, inertia, and other be unaffected by exposure to fumes, oil, water, or other fluids that may be present.

20.141 Protection of other airplane components against fire.

(a) Except as provided in paragraph (b) of this section, all airplane surfaces aft of the nacelles in the area of one nacelle diameter on both sides of the nacelle centerline must be made of material that is at least fire resistant.

(b) Paragraph (a) of this section does not apply to tail surfaces lying behind nacelles unless the dimensional configuration of the airplane is such that the tail

surfaces could be affected readily by heat, flames, or sparks emanating from a designated fire zone or from the engine from a designated fire zone or from the engine compartment of any nacelle.

20.143 Control of engine rotation.

(a) Except as provided in paragraph (b) of this section, each airplane must have a means of individually stopping and restarting the rotation of any engine in flight.

(b) In the case of turbine engine installations, a means of stopping rotation need be provided only if Chief Commissioner/CEO finds that rotation could jeopardize the safety of the airplane.

20.145 Fuel system independence.

(a) Each airplane fuel system must be arranged so that the failure of any one component does not result in the irrecoverable loss of power of more than one engine.

(b) A separate fuel tank need not be provided for each engine if the certificate holder shows that the fuel system incorporates features that provide equivalent safety.

20.147 Induction system ice prevention.

A means for preventing the malfunctioning of each engine due to ice accumulation in the engine air induction system must be provided for each airplane.

20.149 Carriage of cargo in passenger compartments.

(a) Except as provided in paragraph (b) or (c) of this section, no certificate holder may carry cargo in the passenger compartment of an airplane.

(b) Cargo may be carried aft of the foremost seated passengers if it is carried in an approved cargo bin that meets the following requirements:

(1) The bin must withstand the load factors and emergency landing conditions applicable to the passenger seats of the airplane in which the bin is installed, multiplied by a factor of 1.15, using the combined weight of the bin and the maximum weight of cargo that may be carried in the bin.

(2) The maximum weight of cargo that the bin is approved to carry and any instructions necessary to ensure proper weight distribution within the bin must conspicuously marked on the bin.

(3) The bin may not impose any load on the floor or other structure of the airplane that exceeds the load limitations of the structure.

(4) The bin must be attached to the seat tracks or to the floor structure of the airplane, and its attachment must withstand the load factors and emergency landing conditions applicable to the passenger seats of the airplane in which the bin is installed, multiplied by either the factor 1.15 or the seat attachment factor specified for the airplane, whichever is greater, using the combined weight of the bin and the maximum weight of cargo

that may be carried in the bin.

(5) The bin may not be installed in a position that restricts access to or use of any required emergency exit, or of the aisle in the passenger compartment.

(6) The bin must be fully enclosed and made of material that is at least flame-resistant.

(7) Suitable safeguards must be provided within the bin to prevent the cargo from shifting under emergency landing conditions.

(8) The bin may not be installed in a position that obscures any passenger's view of the "seat belt" sign, "no smoking" sign, or any required exit sign, unless an auxiliary sign or other approved means for proper notification of the passenger is provided.

(c) All cargo may be carried forward of the foremost seated passengers and carry-on baggage may be carried alongside the foremost seated passengers if the cargo (including carry-on baggage) is carried either in approved bins as specified in paragraph (b) of this section or in accordance with the following:

(1) It is properly secured by a safety belt or other tie down having enough strength to eliminate the possibility of shifting under all normally anticipated flight and ground conditions.

(2) It is packaged or covered in a manner to avoid possible injury to passengers.

(3) It does not impose any load on seats or the floor structure that exceeds the load limitation for those components.

(4) Its location does not restrict access to or use of any required emergency or regular exit, or of the aisle in the passenger compartment.

(5) Its location does not obscure any passenger's view of the "seat belt" sign, "no smoking" sign, or required exit sign, unless an auxiliary sign or other approved means for proper notification of the passenger is provided.

20.151 Carriage of cargo in cargo compartment.

When cargo is carried in cargo compartment that are designed to require the physical entry of a crewmember to extinguish any fire that may occur during flight, the cargo must be loaded so as to allow a crewmember to effectively

reach all parts of the compartment with the contents of a handheld fire extinguisher.

20.153 Landing gear: aural warning device.

(a) Each airplane must have a landing gear aural warning device that functions continuously under the following conditions:

(1) For airplanes with an established approach wing-flap position, whenever the wing flaps are extended beyond the maximum certificated approach climb configuration position in the Airplane Flight Manual and the landing gear is not fully extended and locked.

(2) For airplanes without an established approach climb wing-flap position, whenever the wing flaps are extended beyond the position at which landing gear extension is normally performed and the landing gear is not fully extended and locked.

(b) The warning system required by paragraph (a) of this section:

(1) May not have a manual shutoff;

(2) Must be in addition to the throttle actuated device installed under the type certification airworthiness requirements; and

(3) May utilize any part of the throttle actuated system including the aural warning device.

The flap position sensing unit may be installed at any suitable place in the airplane.

20.155 Demonstration of emergency evacuation procedures.

(a) Each certificate holder must show, by actual demonstration conducted in accordance with paragraph (a) of Appendix C to this part, that the emergency evacuation procedures for each type and model of airplane with a seating of more than 44 passengers, that is used in its passenger-carrying operations, allow

the evacuation of the full seating capacity, including crewmembers, in 90 seconds or less, in each of the following circumstances:

(1) A demonstration must be conducted by the certificate holder upon the initial introduction of a type and model of airplane into passenger-carrying operations. However, the demonstration need not be repeated for any airplane type or model that has the same number and type of exits, the same cabin configuration, and the same emergency equipment as any other airplane used by the certificate holder in successfully demonstrating emergency evacuation in compliance with this paragraph.

(2) A demonstration must be conducted:

(i) Upon increasing by more than 5 percent the passenger seating capacity for which successful demonstration has been conducted; or

(ii) Upon a major change in the passenger cabin interior configuration that will affect the emergency evacuation of passengers.

(b) If a certificate holder has conducted a successful demonstration required by JCAR OPS1 in the same type airplane as a JCAR Part OPS1 certificate holder, it need not conduct a demonstration under this paragraph in that type airplane to achieve certification under this part.

(c) Each certificate holder operating or proposing to operate one or more landplanes in extended overwater operation, or otherwise required to have certain equipment under section 20.175, must show, by a simulated ditching conducted in accordance with paragraph (b) of Appendix B to this part, that it has the ability to efficiently carry out its ditching procedures.

(d) If a certificate holder has conducted a successful demonstration required by JCAR Ops1 in the same type airplane as a part Ops1 certificate holder, it need not conduct a demonstration under this paragraph in that type airplane to achieve certification under this part.

20.157 thru 20. 160 Reserved.

SUBPART- F
Instrument and Equipment Requirements

20.161 Applicability.

This subpart prescribes instrument equipment requirements for all certificate holders.

20.163 Airplane instrument and equipment.

(a) Unless otherwise specified, the instrument equipment requirements of this subpart apply to all operations under this part.

(b) Instruments and equipment required by section 20.77 through 20.227 must be approved and installed in accordance with the airworthiness requirements applicable to them.

(c) Each airspeed indicator must be calibrated in knots, and each airspeed limitation and item of related information in the Airplane Flight Manual and

pertinent placards must be expressed in knots.

(d) Except as provided in section 20.421(b) and (c), no person may take off any airplane unless the following instruments and equipment are in operable condition:

(1) Instruments and equipments required to comply with airworthiness requirements under which the airplane is type certificated and is required by sections 20.77 through 20.181, 20.185, 20.207, 20.209, 20.225 and 20.227.

(2) Instruments and equipment specified in sections 20.77 through 20.185 for all operations, and the instruments and equipment specified in sections 20.187 through 20.227 for the kind of operation indicated, wherever these items are already required by subparagraph (1) of this paragraph.

20.165 Flight and Navigation Equipment.

No person may operate an airplane unless it is equipped with the following flight and navigation instruments and equipment:

(a) An airspeed indicating system with heated pitot tube or equivalent means for preventing malfunctioning due to icing.

(b) Two sensitive altimeters.

(c) A sweep-second hand clock (or approved equivalent).

(d) A free-air-temperature indicator.

(e) A gyroscopic bank and pitch indicator (artificial horizon).

(f) A gyroscopic rate-of-turn indicator combined with an integral slip-skid

indicator (turn-and-bank indicator), except that only a slip-skid indicator is required when a third attitude instrument system useable through flight attitudes of 360º of pitch and roll is installed in accordance with paragraph (j) of this section.

(g) A gyroscopic direction indicator (directional gyro or equivalent).

(h) A magnetic compass.

(i) A vertical speed indicator (rate-of-climb indicator).

(j) On large turbojet powered airplanes, in addition to two gyroscopic bank-and-

pitch indicators (artificial horizons) for use at the pilot stations, a third such instrument that:

(1) Is powered from a source independent of the electrical generating system;

(2) Continues reliable operation for a minimum of 30 minutes after total failure of the electrical generating system;

(3) Operates independently of any other attitude indicating system;

(4) Is operative without selection after total failure of the electrical generating system; and

(5) Is appropriately lighted during all phases of operations.

20.167 Engine instruments.

Unless Chief Commissioner/CEO allows or requires different instrumentation for reciprocating engine powered airplanes to provide equivalent safety, no person may conduct any operation under this part without the following engine instruments:

(a) A carburetor air temperature indicator for each engine.

(b) A cylinder head temperature indicator for each air-cooled engine.

(c) A fuel pressure indicator for each engine.

(d) A fuel flow-meter or fuel moisture indicator for each engine not equipped with an automatic altitude moisture control.

(e) A means for indicating fuel quantity in each fuel tank to be used.

(f) A manifold pressure indicator for each engine.

(g) An oil pressure indicator for each engine.

(h) An oil quantity indicator for each oil tank when a transfer or separate oil reserve supply is used.

(i) An oil-in temperature indicator for each engine.

(j) A tachometer for each engine.

(k) An independent fuel pressure warning device for each engine or a master

warning device for all engines with a means for isolating the individual warning circuits from the master warning device.

(l) A device for each reversible propeller, to indicate to the pilot when the propeller is in reverse pitch, that complies with the following:

(1) The device may be actuated at any point in the reversing cycle between the normal low pitch stop position and full reverse pitch, but it may not give an indication at or above the normal low pitch stop position.

(2) The source of indication must be actuated by the propeller blade angle or be directly responsive to it.

20.169 Lavatory fire protection.

(a) No person may operate a passenger carrying transport category airplane unless each lavatory in the airplane is equipped with a smoke detector system or equivalent that provides a warning light in the passenger cabin which would be readily detected by a flight attendant, taking into consideration the positioning of flight attendants throughout the passenger compartment during various phases of flight.

(b) No person may operate a passenger carrying transport category airplane unless each lavatory in the airplane is equipped with a built-in fire extinguisher for each disposal receptacle for towels, paper, or waste located within the lavatory. The built-in fire extinguisher must be designed to discharge automatically into each disposal receptacle upon occurrence of a fire in the receptacle.

20.171 Emergency equipment.

(a) General. No person may operate an airplane unless it is equipped with the emergency equipment listed in this section and in Appendix A.

(b) Each item of emergency and flotation equipment listed in this section and in sections 20.201, 20.203 and Appendix A.

(1) Must be inspected regularly in accordance with inspection periods established in the operations specifications to ensure its condition for continued serviceability and immediate readiness to perform its intended emergency purposes;

(2) Must be readily accessible to the crew and, with regard to equipment located in the passenger compartment, to passengers;

(3) Must clearly identified and clearly marked to indicate its method of

operation;

(4) When carried in a compartment or container, must be carried in a compartment or container marked as to contents and the compartment or container, or the item itself, must be marked as to date of last inspection.

(c) Hand fire extinguishers for crew, passenger, and cargo compartments.

Hand fire extinguishers of an approved type must be provided for use in crew, passenger, and cargo compartments in accordance with the following:

(1) The type and quantity of extinguishing agent must be suitable for the kinds of fires likely to occur in the compartment where the extinguisher is intended to be used, and, for passenger compartments, must be designed to minimize the hazard of toxic gas concentrations.

(2) At least one hand fire extinguisher must be provided conveniently located for use in each class E cargo compartment which is accessible to crewmembers during flight, and at least one must be located in each upper and lower lobe galley.

(3) At least one hand fire extinguisher must be conveniently located on the flight deck for use by the flight crew.

(4) At least one hand fire extinguisher must be conveniently located in the passenger compartment of each airplane accommodating more than 6 but less than 31 passengers, and at least two hand fire extinguishers must be conveniently located in each airplane accommodating more than 30 passengers. At least 2 hand fire extinguishers must be conveniently located and uniformly distributed in the passenger compartment of airplanes having a passenger seating capacity of 60 or less and for the passenger compartment of each airplane having a passenger seating capacity of more

than 60, there must be at least the following number of hand fire extinguishers conveniently located and uniformly distributed throughout the compartment:

Minimum number of hand fire extinguishers.

Passenger sating capacity:

61 through 200	**3**
201 through 300	**4**
301 through 400	**5**

401 through 500	**6**
501 through 600	**7**
601 or more	**8**

(5) At least two of the required hand fire extinguishers installed in the airplane must contain Halon 1211 (bromochlorodifuoromethane) or equivalent as the extinguishing agent.

(d) First-aid equipment. Approved first-aid kits for treatment of injuries likely to occur in flight or in minor accidents must be provided and must meet the specifications and requirements of Appendix A.

(e) Crash Ax. Each airplane must be equipped with a crash ax.

(f) Megaphones. Each passenger-carrying airplane must have a portable battery-powered megaphone or megaphones readily accessible to the crewmembers assigned to direct emergency evacuation, installed as follows:

(1) One megaphone on each airplane with a seating capacity of more than 60 and less than 100 passengers, at the most rearward location in the passenger cabin where it would be readily accessible to a normal flight attendant seat. However, Chief Commissioner/CEO may grant a deviation from the requirements of this subparagraph if he finds that a different location would be more useful for evacuation of persons during an emergency.

(2) Two megaphones in the passenger cabin on each airplane with a seating capacity of more than 99 passengers, one installed at the forward end and the other at the most rearward location where it would be readily accessible to a normal flight attendant seat.

20.173 Seats, safety belts, and shoulder harnesses.

(a) No person may operate an airplane unless there are available during the takeoff, en route flight, and landing:

(1) An approved seat or berth for each person on board the airplane who has reached his second birthday; and

(2) An approved safety belt for separate use by each person on board the airplane who has reached his second birthday, except that two persons occupying a berth may share one approved safety belt and two persons occupying a multiple lounge or divan seat may share one approved safety belt during en route flight only.

(b) During the takeoff and landing of an airplane, each person on board shall occupy an approved seat or berth with a separate safety belt properly secured about him. However, a person who has not reached his second birthday may be held by an adult who is occupying a seat or berth. A safety belt provided for the occupant of a seat may not be used during takeoff and landing by more than one person who has reached his second birthday.

(c) Each sideward facing seat must comply with the applicable requirements of paragraph B of Appendix E.

(d) No certificate holder may takeoff or land an airplane unless each passenger seat back is in the upright position. Each passenger shall comply with instructions given by a crewmember in compliance with this paragraph. This paragraph does not apply to seats on which cargo or persons who are unable to sit erect for a medical reason are carried in accordance with procedures in the certificate holder's manual if the seat back does not obstruct any passenger's access to the aisle or to any emergency exit.

(e) No person may operate a transport category airplane unless it is equipped at each flight deck station, with a combined safety belt and shoulder harness that meets the applicable requirements specified in paragraph B of Appendix F.

(f) Each flight attendant must have a seat for takeoff and landing in the passenger compartment that meets the requirements of paragraph B of Appendix E. The requirements of paragraph B of Appendix E do not apply to passenger seats occupied by flight attendants not required by 20.299.

(g) Each occupant of a seat equipped with a combined safety belt and shoulder harness must have the combined safety belt and shoulder harness properly secured about that occupant during takeoff and landing and be able to properly perform assigned duties.

(h) At each unoccupied seat, the safety belt and shoulder harness, if installed, must be secured so as not to interfere with crewmembers in the performance of their duties or with the rapid egress of occupants in an emergency.

20.175 Materials for compartment interiors.

(a) Upon the first major overhaul of an aircraft or refurbishing of the cabin interior all materials in each compartment used by the crew or passengers that do not meet the following requirements must be replaced with materials that meet these requirements.

(b) Seat cushions, except those on flight crewmember seats, in any compartment occupied by crew or passengers must comply with the type certification requirements pertaining to fire protection of seat cushions.

20.177 Miscellaneous equipment.

No person may conduct any operation unless the following equipment is installed in the airplane:

(a) If protective fuses are installed on an airplane, the number of spare fuses approved for that airplane and appropriately described in the certificate holder's manual.

(b) A windshield wiper or equivalent for each pilot station.

(c) A power supply and distribution system that meets the type certification requirements or that is able to produce and distribute the load for the required instruments and equipment, with use of an external power supply if any one power source or component of the power distribution system fails. The use of common elements in the system may be approved if Chief Commissioner/CEO finds that they are designed to be reasonably protected against malfunctioning. Engine-driven sources of energy, when used, must be on separate engines.

(d) A means for indicating the adequacy of the power being supplied to required flight instruments.

(e) Two independent static pressure systems, vented to the outside atmospheric pressure so that they will be least affected by air flow variation or moisture or other foreign matter, and installed so as to be airtight except for the vent. When a means is provided for transferring an instrument from its primary operating system to an alternate system, the means must include a positive positioning control and must be marked to indicate clearly which system is being used.

(f) A key for each door that separates a passenger compartment from another compartment that has emergency exit provisions. The key must be readily available for each crewmember.

(g) A placard on each door that is the means of access to a required passenger emergency exit, to indicate that it must be open during takeoff and landing.

(h) A means for the crew, in an emergency to unlock each door that leads to compartment that is normally accessible to passengers and that can be locked by passengers.

20.179 Cockpit check procedure.

(a) Each certificate holder shall provide an approved cockpit check procedure for each type of aircraft.

(b) The approved procedures must include each item necessary for flight crewmembers to check for safety before starting engines, taking off, or landing,

and in engine and systems emergencies. The procedures must be designed so that a flight crewmember will not need to rely upon his memory for items to be checked.

(c) The approved procedures must be readily usable in the cockpit of each aircraft and the flightcrew shall follow them when operating the aircraft.

20.181 Passenger information.

(a) No person may operate at airplane unless it is equipped with passenger information signs. When passenger information signs are installed to comply with the operating rules of JCAR, at least one sign (using either letters or symbols) notifying when smoking is prohibited and one sign (using either letters or symbols) notifying when safety belts should be fastened must, when illuminated, be legible to each person seated in the passenger cabin under all probable conditions of cabin illumination. Sings which notify when safety belts should be fastened and when smoking is prohibited must be so constructed that the crew can turn them on and off. They must be turned on for each takeoff and each landing and when otherwise considered to be necessary by the pilot in command.

(b) No person may operate a passenger-carrying airplane under this part unless there is affix to each forward bulkhead and each passenger seat back a sign or placard that reads “Fasten Seat Belt While Seated”. These signs or placards need not meet the requirements of paragraph (a) of this section.

(c) No passenger or crewmember may smoke while the no smoking sign is lighted and each passenger shall fasten that passenger’s seat belt and keep it fastened while the seat belt sign is lighted.

20.183 Public address system.

(a) No person may operate an airplane with a seating capacity of more than 19 passengers unless the airplane is equipped with a public address system that:

(1) Is capable of operation independent of the crewmember interphone system required by section 20.185 except for handsets, headsets, microphones, selector switches, and devices, and

(2) Meets the requirements of paragraph (b) of this section.

(b) The public address system required by paragraph (a) of this section must be approved in accordance with paragraph A of Appendix E and meet the following requirements:

(1) It must be accessible for immediate use from each of two flight crewmember stations in the pilot compartment.

(2) It must be accessible for use from at least one normal flight attendant station in the passenger compartment, and, each public address system microphone intended for flight attendant use must be positioned adjacent to a flight attendant seat that is located near each required floor level emergency exit in the passenger compartment and be readily accessible to the seated flight attendant.

(3) It must be capable of operation within ten seconds by a flight attendant at those stations in the passenger compartment from which its use is accessible.

(4) Transmission must be audible at all passenger seats, lavatories, and flight attendant seats and work stations.

20.185 Crewmember interphone system.

(a) No person may operate an airplane with a seating capacity of more than 19 passengers unless the airplane is equipped with a crewmember interphone system that:

(1) Is capable of operation independent of the public address system required by section 20.183 except for handsets, headsets, microphones, selector switches, and signaling devices; and

(2) Meets the requirements of paragraph (b) of this section.

(b) The crewmember interphone system required by paragraph (a) of this section must be approved in accordance with paragraph A of Appendix E and meet the following requirements:

(1) It must provide a means of two-way communication between the pilot compartment and:

(i) Each passenger compartment; and

(ii) Each galley located on other than the main passenger deck level.

(2) It must be accessible for immediate use from each of two flight crewmember stations in the pilot compartment;

(3) It must be accessible for use from at least one normal flight attendant station in each passenger compartment;

(4) It must be capable of operation within 10 seconds by a flight attendant at those stations in each passenger compartment from which its use is accessible; and

(5) For large turbojet-powered airplanes;

(i) It must be accessible for use at enough flight attendant stations so that all floor level emergency exits (or entry-ways to those exits in the case of exits located within galleys) in each passenger compartment are observable from one or more of those stations so equipped;

(ii) It must have an alerting system incorporating aural or visual signals for use by flight crewmembers to alert flight attendants and for use by flight attendants to alert flight crewmembers;

(iii) The alerting system required by subparagraph (b) (5) (ii) of this section must have a means for the recipient of a call or an emergency call; and

(iv) When the airplane is on the ground, it must provide a means of two-way communication between ground personnel and either or at least two flight crew-members in the pilot compartment. The interphone system station for use by ground personnel must be so located that personnel using the system may avoid visible detection from within the airplane.

20.187 Instrument and equipment for operations at night.

No person may operate an airplane at night unless it is equipped with the following instruments and equipment in addition to those required by section 20.165 through 20.185.

(a) Position lights.

(b) An anti-collision light for large airplanes.

(c) Two landing lights.

(d) Instrument lights providing enough light to make each required instrument, switch, or similar instrument, easily readable and installed so that the direct rays are shielded from the flight crewmember’s eyes and that no objectionable reflections are visible to them. There must be a means of controlling the intensity of illumination unless it is shown that non-dimming instrument lights are satisfactory.

(e) An airspeed indicating system with heated pitot tube equivalent means for preventing malfunctioning due to icing.

(f) Two sensitive altimeters.

20.189 Instruments and equipment for operations under IFR.

No person may operate an airplane under IFR conditions unless it is equipped with the following instruments and equipment, in addition to those required by sections 20.165 through 20.185.

(a) An airspeed indicating system with heated pitot tube or equivalent means for preventing malfunctioning due to icing.

(b) Two sensitive altimeters.

(c) Instruments lights providing enough light to make each required instrument, switch, or similar instrument, easily readable and so installed that direct rays are shielded from the flight crewmembers' eyes and that no objectionable reflections are visible to them, and a means of controlling the intensity of illumination unless it is shown that nondimming instrument lights are satisfactory.

20.191 Supplemental oxygen for sustenance turbine engine powered airplanes.

(a) General. When operating a turbine engine powered airplane, each certificate holder shall equip the airplane with sustaining oxygen and dispensing equipment for use as set forth in this section:

(1) The amount of oxygen provided must be at least the quantity necessary to comply with paragraphs (b) and (c) of this section.

(2) The amount of sustaining and first-aid oxygen required for a particular operation to comply with the rules in this part is determined on the basis of cabin pressure altitudes and flight duration, consistent with the operating procedures established for each operation and route.

(3) The requirements for airplanes with pressurized cabins are determined on the basis of cabin pressure altitude and the assumption that a cabin pressurization failure will occur at the altitude or point of flight that is most critical from the standpoint of oxygen need, and that after the failure that airplane will descent in accordance with the emergency procedures specified in the Airplane Flight Manual, without exceeding its operating

limitations, to a flight altitude that will allow successful termination of the flight.

(4) Following the failure, the cabin pressure altitude is considered to be the same as the flight altitude unless it is shown that no probable failure of the cabin or pressurization equipment will result in a cabin pressure altitude equal to the flight altitude. Under those circumstances, the maximum cabin pressure altitude attained may be used as a basis for certification or determination of oxygen supply, or both.

(b) Crewmembers. Each certificate holder shall provide a supply of oxygen for crewmembers in accordance with the following:

(1) At cabin pressure altitudes above 10,000 feet (3000 meters), up to and including 12,000 feet (3600 meters), oxygen must be provided for and used by each member of the flight crew on flight deck duty and must be provided for other crewmembers for that part of the flight that is of more than 30 minutes duration.

(2) At cabin pressure altitudes above 12,000 feet (3600 meters), oxygen must be provided for, and used by, each member of the flight crew on flight deck duty, and must be provided for other crewmembers during the entire flight at those altitudes.

(3) When a flight crewmembers is required to use oxygen, he must use it continuously except when necessary to remove the oxygen mask or other dispenser in connection with his regular duties. Standby crewmembers who are on call or are definitely going to have flight deck duty before completing the flight must be provided with an amount of supplemental oxygen equal to that provided for crewmembers on duty other than on flight duty. If a standby crewmember is not on call and will not be on flight deck duty during the remainder of the flight, he is considered to be a passenger for the purposes of supplemental oxygen requirements.

(c) Passengers. Each certificate holder shall provide a supply of oxygen for passengers in accordance with the following:

(1) For flights at cabin pressure altitudes above 10,000 feet (3000 meters), up to and including 14,000 feet (4200 meters), enough oxygen for that part of the flight at those altitudes that is of more than 30 minutes duration for 10 percent of the passengers.

(2) For flights at cabin pressure altitudes above 14,000 feet (4200 meters), up to and including 15,000 feet (4500 meters), enough oxygen for that part of the flight at those altitudes for 30 percent of the passengers.

20.193 Supplemental oxygen requirements for pressurized cabin airplanes: Reciprocating engine powered airplanes.

(a) When operating a reciprocating engine powered airplane pressurized cabin, each certificate holder shall equip the airplane to comply with paragraphs (b) through (d) of this section in the event of cabin pressurization failure.

(b) For crewmembers. When operating at flight altitudes above 10,000 feet (3000 meters), the certificate holder shall provide enough oxygen for each crewmember for the entire flight at those altitudes and not less than a two-hour supply for each flight crewmember of flight deck duty. The required two hours supply is that quantity of oxygen necessary for a constant rate of descent from the airplane's maximum certificated operating altitude to 10,000 feet (3000 meters) in ten minutes and followed by 110 minutes at 10,000 feet (3000 meters). The oxygen required by section 20.199 may be considered in determining the supplemental breathing supply required for flight crewmembers on flight deck duty in the event of cabin pressurization failure.

(c) For passengers. When operating at flight altitudes above 8,000 feet (2400 meters), the certificate holder shall provide oxygen as follows:

(1) When an airplane is not flown at a flight altitude above flight level 250, enough oxygen for 30 minutes for 10 percent of the passengers, if at any point along the route to be flown the airplane can safely descend to a flight altitude of 14,000 feet (4200 meters) or less within four minutes.

(2) If the airplane cannot descend to a flight altitude of 14,000 feet (4200 meters) or less within four minutes, the following supply of oxygen must be provided:

(i) For that part of the flight that is more than four minutes duration at flight altitudes above 10,000 feet (3000 meters) the supply required by section 20.191.

(ii) For that part of the flight at flight altitudes above 14000 feet (4200 meters), up to and including 15,000 feet (4500 meters), the supply required by section 20.191.

(iii) For flight at flight altitudes above 8,000 feet (2400 meters) up to and including 14,000 feet (4200 meters) enough oxygen for 30 minutes for 10 percent of the passengers.

(3) When an airplane is flown at a flight altitude above flight level 250, enough oxygen for 30 minutes for 10 percent of the passengers for the entire flight (including emergency descent) above 8,000 feet (2400 meters), up to and including 14,000 feet (4200 meters), and to comply with 20.191(c)(2) and (3) for flight above 14,000 feet (4200 meters).

(d) For the purposes of this section, it is assumed that the cabin pressurization failure occurs at time during flight that is critical from the standpoint of oxygen need and that after the failure the airplane will descend, without exceeding its normal operating limitations, to flight altitudes allowing safe flight with respect to terrain clearance.

20.195 Supplemental oxygen for emergency descent and for first aid; turbine engine powered airplanes with pressurized cabins.

(a) General. When operating a turbine engine powered airplane with a pressurized cabin, the certificate holder shall furnish oxygen and dispensing equipment to comply with paragraphs (b) through (e) of this section in the event of cabin pressurization failure.

(b) Crewmembers. When operating at flight altitudes above 10,000 feet (3000 meters), the certificate holder shall supply enough oxygen to comply with section 20.191, but not less than a two-hour supply for each flight crewmember on flight deck duty. The required two hours supply is that quantity of oxygen necessary for a constant rate of descent from the airplane's maximum certificated operating altitude to 10,000 feet (3000 meters) in ten minutes and followed by 110 minutes at 10,000 feet (3000 meters). The oxygen required in the event of cabin pressurization failure by section 20.199 may be included in determining the supply required for flight crewmembers on flight deck.

(c) Use of oxygen masks by flight crewmembers:

(1) When operating at flight altitudes above flight level 250, each flight crewmember on flight deck duty must be provided with an oxygen mask so designed that it can be rapidly placed on his face from its ready position, properly secured, sealed, and supplying oxygen upon demand; and so designed that after being placed on the face it does not prevent immediate communication between the flight crewmember and other crew-members over the airplane intercommunication system. When it is not being used at flight altitudes above flight level 250, the oxygen mask must be kept in condition for ready use and located so as to be within the immediate reach of the flight crewmember while at his duty station.

(2) When operating at flight altitudes above flight level 250, one pilot at the controls of the airplane shall at all times wear and use an oxygen mask secured, and supplying oxygen, except that the one pilot need not wear and use an oxygen mask while at or below flight level 410 if each flight crewmember on flight deck has a quick-donning type of oxygen mask that the certificate holder has shown can be placed on the face from its ready position, properly secured, sealed, and supplying oxygen upon demand, with one hand and within five seconds. The certificate holder shall also show that the mask can be put on without disturbing eye-g1asses and without delaying the flight crewmember from proceeding with his assigned

emergency duties. The oxygen mask after being put on must not prevent immediate communication between the flight crewmember and other crewmembers over the airplane intercommunication system.

(3) Notwithstanding subparagraph (2) of this paragraph, if for any reason at any time it is necessary for one pilot to leave his station at the controls of the airplane when operating at flight altitudes above flight level 250, the remaining pilot at the controls shall put on and use his oxygen mask until the other pilot has returned to his duty station.

(4) Before the takeoff of a flight, each flight crewmember shall personally preflight his oxygen equipment to insure that the oxygen mask is functioning, fitted properly, and connected to appropriate supply terminals, and that the oxygen supply and pressure are adequate for use.

(d) Use of portable oxygen equipment by cabin attendants. Each attendant shall, during flight above flight level 250 flight altitude, carry portable oxygen equipment with at least a 15 minute supply of oxygen unless it is shown that enough portable oxygen units with masks or spare outlets and masks are distributed throughout the cabin to insure immediate availability of oxygen to each cabin attendant, regardless of his location at the time of cabin depressurization.

(e) Passenger cabin occupants. When the airplane is operating at flight altitudes above 10,000 feet (3000 meters) the following supply of oxygen must be provided for the use of passenger cabin occupants:

(1) When an airplane certificated to operate at flight altitudes up to and including flight level 250, can at any point along the route to be flown, descend safely to a flight altitude of 14,000 feet (4200 meters) or less within four minutes, oxygen must be available at the rate prescribed by this part for a 30 minute period for at least 10 percent of the passenger cabin occupants.

(2) When an airplane is operated at flight altitudes up to and including flight level 250 and cannot descend safely to a flight altitude of 14,000 feet (4200 meters) within four minutes, or when the airplane is operated at flight altitudes above flight level 250, oxygen must be available at the rate prescribed by this part for not less than 10 percent of the passenger cabin occupants for the entire flight after cabin depressurization, at cabin pressure altitudes above 10,000 feet (3000 meters) up to and including 14,000 feet (4200 meters) and, as applicable, to allow compliance with section 20.191, except that there must be not less than a 10-minute supply for the passenger cabin occupants.

(3) For first-aid treatment of occupants who for physiological reasons might require undiluted oxygen following descent from cabin pressure altitudes above flight level 250, a supply of oxygen in accordance with the requirements of paragraph C of Appendix E must be provided for two percent of the occupants for the entire flight after cabin depressurization at cabin pressure altitudes above 8,000 feet (2400 meters), but in no case to less than one person. An appropriate number of acceptable dispensing units, but in no case less than two, must be provided, with a means for the cabin attendants to use this supply.

(f) Passenger briefing. Before flight is conducted above flight level 250, a crewmember shall instruct the passengers on the necessity of using oxygen in the event of cabin depressurization and shall point out to them the location and demonstrate the use of the oxygen-dispensing equipment.

20.197 Equipment standards.

Turbine engine powered airplanes. The oxygen apparatus, the minimum rate of oxygen flow and the supply of oxygen necessary, must meet the standards required for type certification.

20.199 Protective breathing equipment for the flight crew.

Pressurized cabin airplanes. Each required flight crewmember on flight deck duty must have readily available at his station protective breathing equipment covering the eyes, nose, and mouth (or the nose and mouth if accessory equipment is provided to protect the eyes) to protect him from the effects of smoke or carbon dioxide or other harmful gases. There must be at least a 300 liter standard temperature and pressure dry supply of oxygen for each required flight crewmember on flight deck duty. (Standard temperature and pressure dry oxygen at 0º Centigrade, 760 mm. Hg.).

20.201 Emergency equipment for extended over-water operations.

(a) Except where Chief Commissioner/CEO, by amending the operations specifications of the certificate holder, requires the carriage of all or any specific items of the equipment listed below for any overwater operation, or upon application of the certificate holder, Chief Commissioner/CEO allows deviation for a particular extended overwater operation, no person may operate an airplane in extended over-water operations without having on the airplane the following equipment:

(1) Life preserver equipped with an approved survivor locator light, for each occupant of the airplane.

(2) Enough life-rafts (each equipped with an approved survivor locator light) of a rated capacity and buoyancy to accommodate the occupants of

the airplane. Unless excess rafts of enough capacity are provided, the buoyancy and seating capacity beyond the rated capacity of the rafts must accommodate all occupants of the airplane in the event of a loss of one raft of the largest rated capacity.

(3) At least one pyrotechnic signaling device for each life raft.

(4) A survival type emergency locator transmitter that meets the applicable requirements of approved standards. Batteries used in this transmitter must be replaced (or recharged, if the battery is rechargeable when the transmitter has been in use for more than 1 cumulative hour, and also when 50 percent of their useful life (or for rechargeable batteries, 50 percent of' their useful life of charge), as established by the transmitter manufacturer standards has expired. The new expiration date for the replacement (or recharged) battery must be legibly marked on the outside of the transmitter. The battery useful life (or useful life of charge) requirements of this subparagraph do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

(b) The required life rafts, life preservers, and survival type emergency locator transmitter must be easily accessible in the event of a ditching without appreciable time for preparatory procedures. This equipment must be installed in conspicuously marked approved locations.

(c) A survival kit, appropriately equipped for the route to be flown must be attached to each required life raft.

20.203 Emergency flotation means.

(a) Except as provided in paragraph (b) of this section, no person may operate a large airplane in any overwater operation unless it is equipped with life preservers in accordance with section 20.201(a)(1), or with an approved flotation means for each occupant. This means must he within easy reach of each seated occupant and must be readily removable from the airplane.

(b) Upon application by the certificate holder, Chief Commissioner/CEO may approve the operation of an airplane over water without the life preservers or flotation means required by paragraph (a) of this section, if the operator shows that the water over which the airplane is to be operated is not of such size and depth that life preservers of flotation means would be required for the survival of its occupants in the event the flight terminates in that water.

20.205 Equipment for operating in icing conditions.

(a) Unless an airplane is certificated under the transport category airworthiness

requirements relating to ice protection, no person may operate an airplane in icing conditions unless it is equipped with means for the prevention or removal of ice on windshields, wings empennage, propellers, and other parts of the airplane where ice formation will adversely affect the safety of the airplane.

(b) No person may operate an airplane in icing conditions at night unless means are provided for illuminating or otherwise determining the formation of ice on the parts of the wings that are critical from the standpoint of ice accumulation. Any illuminating that is used must be of a type that will not cause glare or reflection that would handicap crewmembers in the performance of their duties.

20.207 Pitot heat indication systems.

(a) No person may operate a transport category airplane equipped with a flight instrument pitot heating system unless the airplane is also equipped with an operable pitot heat indication system that provides indication to the flight crew when the pitot heating system is not operating. The indication system must comply with the following requirements:

(1) The indication provided must incorporate an amber light that is in clear view of a flight crew member.

(2) The indication provided must be designed to alert the flight crew if either of the following conditions exist:

(i) The pitot heating system is switched off;

(ii) The pitot heating system is switched “on” and any pitot tube heating element is inoperative.

20.209 Flight recorders.

(a) No person may operate a large airplane that is certificated for operations above 25,000 feet (7500 meters) altitude or is turbine engine powered, unless it is equipped with one or more approved flight recorders that record data from which the following information may be determined within the ranges, accuracies, and record intervals specified in Appendix B to this part:

(1) Time, altitude, airspeed, vertical acceleration, heading, pitch attitude, roll attitude, sideslip angle or lateral acceleration, pitch trim position, control column or pitch control surface position, control wheel or lateral control surface position, rudder pedal or yaw control surface position, thrust of each engine, position of each thrust reverser, trailing edge flap or cockpit flap control position, and leading edge flap or cockpit flap control position.

(b) Whenever a flight recorder required by this section is installed, it must be operated continuously from the instant the airplane begins the takeoff roll until it has completed the landing roll at an airport.

(c) Except as provided in paragraph (d) of this section, and except for recorded data erased as authorized in this paragraph, each certificate holder shall keep the recorded data prescribed in paragraph (a) of this section until the airplane has been operated for at least 25 hours of the operating time specified in section 20.225. A total of 1 hour of recorded data may be erased for the purpose of testing the flight recorder or the flight recorder system. Any erasure made in accordance with this paragraph must be of the old recorded data accumulated at the time of testing. Except as provided in paragraph (d) of this section, no record need to be kept more than 60 days.

(d) In the event of an accident or occurrence that requires immediate notification of Chief Commissioner/CEO and that results in termination of the flight, the certificate holder shall remove the recording media from the airplane and keep the recorded data required by paragraph (a) of this section for at least 60 days and for a longer period upon the request of Chief Commissioner/CEO.

(e) Each flight recorder required by this section must be installed in accordance with the requirements of Appendix F to this part:

(1) That are of the same type.

(2) On which the model flight recorder and its installation are the same; and

(3) On which there is no difference in type design with respect to the installation of those first pilot's instruments associated with the flight recorder.

The most recent instrument calibration, including the recording medium from which this calibration is derived, and the recorder correlation, must be retained by each certificate holder.

(f) Each flight recorder required by this section that records data specified in subparagraph (a) (1) of this section must have an approved device to assist in locating that recorder under water.

(g) Each flight recorder required by this section must record data from which the time of each radio transmission either to or from ATC can be determined.

20.211 Radio equipment.

(a) No person may operate an airplane unless it is equipped with radio equipment required for the kind of operation being conducted.

(b) Where two independent (separate and complete) radio systems are required by sections 20.213 and 20.215. Each system must have an independent antenna installation except that, where rigidly supported non-wire antennas or other antenna installations of equivalent reliability are used, only one antenna is required.

(c) ATC transponder equipment installed.

20.213 Additional radio equipment.

(a) No person may operate an airplane unless it is equipped with the radio equipment necessary under normal operating conditions to fulfill the following:

(1) Communicate with at least one appropriate ground station from any point on the route.

(2) Communicate with appropriate traffic control facilities from any point in the control zone within which flights are intended.

(3) Receive meteorological information from any point en route by either of two independent systems. One of the means provided to comply with this subparagraph may be used to comply with subparagraphs (1) and (2) of this paragraph.

(b) No person may operate an airplane at night unless that airplane is equipped with the radio equipment necessary under normal operating conditions to fulfill the functions specified in paragraph (a) of this section and to receive radio navigational signals applicable to the route flown, except that a marker beacon receiver or ILS receiver is not required.

20.215 Radio equipment for operations under IFR.

(a) No person may operate an airplane under IFR, unless the airplane is equipped with that radio equipment necessary under normal operating conditions to fulfill the functions specified in section 20.213 and to receive satisfactorily be either of two independent systems, radio navigational signals from all primary en route and approach navigational facilities intended to be used. However, only one marker beacon receiver providing visual and aural signals and one ILS receiver need be provided. Equipment provided to receive signals en route may be used to receive signals on approach, if it is capable of receiving both signals.

(b) In the case of operation over routes on which navigation is based on low frequency radio range or automatic direction finding, only one low frequency radio range or ADF receiver need be installed if the airplane is equipped with two VOR receivers, and VOR navigational aids are so located and the airplane

is so fueled that, in the case of failure of the low frequency radio range receiver of ADF receiver, the flight may proceed safely to a suitable airport, by means of VOR aids, and complete an instrument approach by use of the remaining airplane radio system.

(c) Whenever VOR navigational receivers are required by paragraph (a) or (b) of this section, at least one approved distance measuring equipment unit (DME), capable of receiving and indicating distance information from VOR/DME facilities, must be installed on each airplane.

(d) If the distance measuring equipment (DME) becomes inoperative en route, the pilot shall notify ATC of that failure as soon as it occurs.

20.217 Radio equipment for extended overwater operations and for certain other operations.

(a) No person may conduct an extended overwater operation unless the airplane is equipped with the radio equipment necessary to comply with section 20.213 and an independent system that complies with section 20.215(a).

(b) No certificate holder may conduct an operation without the equipment specified in paragraph (a) of this section, if Chief Commissioner/CEO finds that equipment to be necessary for search and rescue operations because of the nature of the terrain to be flown over.

20.219 Emergency equipment for operations over uninhabited terrain areas:

Unless it has the following equipment, no certificate holder may conduct an operation over an uninhabited area or any other area that (in its operations specifications) Chief Commissioner/CEO specifies requires equipment for search and rescue in case of an emergency.

(a) Suitable pyrotechnic signaling devices.

(b) A survival type emergency locator transmitter that meets the applicable requirements. Batteries used in this transmitter must be replaced (or recharged if the battery is rechargeable) when the transmitter has been in use for more than 1cumulative hour, and also when 50 percent of their useful life (or for rechargeable batteries, 50 percent of their useful life of charge), as established by the transmitter manufacturer under recommended standards, has expired. The new expiration date for the replacement (or recharge)) battery must be legibly marked on the outside of the transmitter. The battery useful life (or useful life of charge) requirements of this paragraph do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

(c) Enough survival kits, appropriately equipped for the route to be flown, for the number of occupants of the airplane.

20.221 Equipment for operations on which specialized means of navigation are used.

No certificate holder may conduct an operation using Doppler Radar, Omega, an Inertial Navigation System or similar independent system unless such systems have been approved in accordance with Appendix D to this part.

20.223 Airborne weather radar equipment requirements.

(a) No person may operate any airplane certificated under the transport category rules, unless approved airborne weather radar equipment has been installed in the airplane.

(b) Each person operating a transport category airplane required to have approved airborne weather radar equipment installed shall, when using it under this part, operate it in accordance with the following:

(1) Dispatch. No person may dispatch an airplane under IFR conditions when current weather reports indicate that thunderstorms, or other potentially hazardous weather conditions that can be detected with airborne weather radar, may reasonably be expected along the route to be flown, unless the airborne weather radar equipment is in satisfactory operating condition.

(2) If the airborne weather radar becomes inoperative en route, the airplane must be operated in accordance with the approved instructions and procedures specified in the operation manual for such an event.

(c) Notwithstanding any other provisions of JCAR, an alternate electrical power supply is not required for airborne weather radar equipment.

20.225 Cockpit voice recorders.

(a) No certificate holder may operate a large turbine engine powered airplane or a large pressurized airplane with reciprocating engines unless an approved cockpit voice recorder is installed in that airplane and is operated continuously from the start of the use of the checklist (before starting engines for the purpose of flight), to completion of the final checklist at the termination of the flight.

(b) The cockpit voice recorder required by this section must meet the following

application standards.
Each recorder container must:

(i) Be either bright orange or bright yellow;

(ii) Have reflective tape affixed to the external surface to facilitate its location under water; and

(iii) Have an approved underwater locating device on or adjacent to the container which is secured in such a manner that they are not likely to be separated during crash impact, unless the cockpit voice recorder, and the flight recorder required by section 20.209, are installed adjacent to each other in such a manner that they are not likely to be separated during crash impact.

(c) In complying with this section, an approved cockpit voice recorder having an ensure feature may be used so that at any time during the operation of the recorder, information recorded more than 30 minutes earlier may be erased or otherwise obliterated.

(d) In the event of an accident or occurrence requiring immediate notification of Chief Commissioner/CEO, which results in the termination of the flight, the certificate holder shall keep the recorded information for at least 60 days or, if requested by Chief Commissioner/CEO, for a longer period. Information obtained from the record is used to assist in determining the cause of accidents or occurrences in connection with accident/ incident investigations.

20.227 Ground proximity warning-glide slope deviation alerting system.

(a) No person may operate a large turbine-powered airplane unless it is equipped with a ground proximity warning system that meets the performance and environmental standards or incorporates approved ground proximity warning equipment.

(b) For the ground proximity warning system required by this section, the Airplane Flight Manual shall contain:

(1) Appropriate procedures for:

(i) The use of the equipment;

(ii) Proper flight crew action with respect to the equipment;

(iii) Deactivation for planned abnormal and emergency conditions;

(iv) Inhibition of Mode 4 warnings based on flaps being in other than the landing configuration if they system incorporates a Mode 4

flap warning inhibition control; and

(2) An outline of all input sources that must be operating.

(c) No person may deactivate a ground proximity warning system required by this section except in accordance with the procedures contained in the Airplane Flight Manual.

(d) Whenever a ground proximity warning system required by this section is deactivated, an entry shall be made in the airplane maintenance record that includes the date and time of deactivation.

(e) No person may operate a large turbine-powered airplane unless it is equipped with a ground proximity warning-glide slope deviation alerting system that meets the performance and environmental standards, or incorporates approved ground proximity warning-glide slope deviation alerting equipment.

(f) No person may operate a turbojet powered airplane equipped with a system required by paragraph (e) of this section, that incorporates equipment meets the performance and environmental approved standards.

20.228 Thru 20. 240 Reserved.

SUBPART- G
Maintenance

20.241 Applicability.

This subpart prescribes rules, in addition to those prescribed in other parts of JCAR, for the maintenance of airplanes, airframes, aircraft engines, propellers, appliances, each item of survival and emergency equipment, and their component parts operated under this part.

20.243 Certificate holder responsibilities.

(a) With regard to airplanes, including airframes, aircraft engines, propellers, appliances, and survival and emergency equipment, operated by a certificate holder, that certificate holder is primarily responsible for:

(1) The airworthiness of its aircraft, including airframes, aircraft engines, appliances, emergency equipment, and parts thereof;

(2) The performance of maintenance, preventive maintenance, and

alteration in accordance with applicable regulations and the certificate holder's manual;

(3) The scheduling and performance of inspections required by this part; and

(4) Ensuring that maintenance personnel make entries in the airplane maintenance log and maintenance records which meet the requirements of JCAR Part M and the certificate holder's manual, and which indicate that the airplane has been approved for return to service after maintenance, preventive maintenance, or alteration has been performed.

(b) A certificate holder may make arrangements with another person for the performance of any maintenance, preventive maintenance, or alterations. However, this does not relieve the certificate holder of the responsibility specified in paragraph (a) of this section.

20.245 Organization required to perform maintenance, preventive maintenance, and alteration.

The certificate holder must ensure that each person with whom it arranges for the performance of maintenance, preventive maintenance, alteration, or required inspection items identified in the certificate holder's manual in accordance with section 20.249(a)(3)(ii) must have an organization adequate to perform that work.

20.247 Inspection programs and maintenance.

(a) No person may operate an airplane subject to this part unless:

(1) The replacement times for life-limited parts specified in the aircraft type certificate data sheets, or other documents approved by Chief Commissioner/CEO, are complied with.

(2) Defects disclosed between inspections, or as a result of inspection, have been corrected in accordance with Part M of JCAR; and

(3) The airplane, including airframe, aircraft engines, propellers, appliances, and survival and emergency equipment, and their component parts, is inspected in accordance with an inspection program approved by Chief Commissioner/CEO.

(b) The inspection program specified in paragraph (a)(3) of this section must include at least the following:

(1) Instructions, procedures, and standards for the conduct of inspection for the particular make and model of airplane, including necessary tests and checks. The instructions and procedures must set forth in detail the parts and areas of the airframe, aircraft engines, propellers, appliances, and survival and emergency equipment required to be inspected.

(2) A schedule for the performance of inspections that must be performed under the program, expressed in terms of the time in service, calendar time, number of system operations, or any combination of these.

(c) No person may be used to perform the inspections required by this part unless that person is authorized to perform maintenance under Part M of JCAR.

(d) No person may operate an airplane subject to this part unless:

(1) The installed engines have been maintained in accordance with the overhaul periods recommended by the manufacturer or a program approved by Chief Commissioner/CEO; and

(2) The engine overhaul periods are specified in the inspection programs required by paragraph 20.247(a)(3).

(e) Inspection programs which may be approved for use under this part include, but are not limited to:

(1) A continuous inspection program which is a part of a current continuous airworthiness program approved for use by a certificate holder under Part Ops1 of JCAR;

(2) Inspection programs currently recommended by the manufacturer of the airplane, aircraft engines, propellers, appliances, or survival and emergency equipment; or

(3) An inspection program developed by a certificate holder under this part.

20.249 Maintenance policy and procedures manual requirements.

(a) Each certificate holder’s manual required by section 20.61 of this part shall contain, in addition to the items required by section 20.63 of this part, at least the following:

(1) A description of the certificate holder’s maintenance organization, when the certificate holder has such an organization.

(2) A list of those persons with whom the certificate holder has arranged for performance of inspections under this part. The list shall include the persons' names and addresses.

(3) The inspection programs required by section 20.247 of this part to be followed in the performance of inspections under this part including:

(i) The method of performing routine and non-routine inspection (other than required inspections).

(ii) The designation of the items of maintenance and alteration that must be inspected (required inspections), including at least those that could result in a failure, malfunction or defect endangering the safe operation of the airplane if not performed properly or if improper parts or materials are used.

(iii) The method of performing required inspections.

(iv) Procedures for the re-inspection of work performed pursuant to previous required inspection findings.

(v) Procedures, standards, and limits necessary for required inspections and acceptance or rejection of the items required to be inspected.

(vi) Instructions to prevent any person who performs any item of work from performing any required inspection of that work; and

(vii) Procedures to ensure that work interruptions do not adversely affect required inspections and to ensure required inspections are properly completed before the airplane is released to service.

(b) In addition, each certificate holder's manual shall contain a suitable system which may include a coded system that provides, for the retention of information, a description (or reference to data acceptable to Chief Commissioner/CEO of the work performed.

20.251 Required inspection personnel.

(a) No person may use any person to perform required inspections unless the person performing the inspection is appropriately certificated, properly trained, qualified, and authorized to do so.

(b) No person may perform a required inspection if that person performed the item of work required to be inspected.

20.253 Maintenance and preventive maintenance training program.

Each certificate holder or person performing maintenance or preventive maintenance functions for it shall have a training program to ensure that each person (including inspection personnel) who determines the adequacy of work done is fully informed about procedures and techniques and new equipment in use and is competent to perform his duties.

20.255 Certificate requirements.

(a) Except for maintenance, preventive maintenance, alterations, and required inspections performed by certificated repair stations acceptable to Chief Commissioner/CEO, each person who is directly in charge of maintenance, preventive maintenance or alteration, and each person performing required inspection must hold an appropriate airman certificate.

(b) For the purposes of this section, a person "directly in charge" is each person assigned to a position in which he is responsible for the work of a shop or station that performs maintenance, preventive maintenance, alterations, or other functions affecting aircraft airworthiness. A person who is "directly in charge" need not physically observe and direct each worker constantly but must be available for consultation and decision on matters requiring instruction or decision from higher authority than that of the persons performing the work.

20.256 - 20. 270 Reserved.

SUBPART- H

Flight Crewmember Flight and Duty Time Limitations and Rest Requirements

20.271 Applicability.

This subpart prescribes flight and duty time limitations and rest requirements for flight crewmembers operating under this part.

20.273 Definition of terms.

For the purposes of this subpart:

Augmented flight crew: A flight crew which includes one or more appropriately qualified relief officers in addition to the basic flight crew.

Basic flight crew: The minimum flight crew required by the aircraft type certificate or the certificating authority.

Boarding gate: The place at which passengers, cargo or flight crewmembers are enplaned for the purpose of flight, or are deplaned after a flight.

Deadhead transportation: Transportation that a certificate holder requires and provides to transport a crewmember between airports.

***Duty period*:** The time during which a crewmember carries out any duty at the direction of his employer.

Flight duty time: A part of a duty period during which a crewmember is required to operate a flight sector or series of flight sectors; it begins when the crewmember reports to an appointed place for flight preparation, includes flight and turnaround time (if applicable) and ends after post flight but no less than 30 minutes after the end of flight time.

Flight time: The time during which a flight crewmember serves at a flight crewmember station as either a pilot, flight engineer, or additional flight engineer, or additional flight crewmember in any operation for a certificate holder, or in other commercial operations. Flight time begins when the aircraft departs the boarding gate for the purpose of flight and ends when the aircraft arrives at a boarding gate.

Relief officer: A flight crewmember who is scheduled to serve with an augmented flight crew and to accumulate flight time in relief of one or more flight crewmembers. The relief officer must be qualified in the type aircraft and position(s) in which he is to provide relief but need not have an ATPL. To relieve a flight engineer, the relief officer must be properly qualified and certificated.

Rest period: A continuous period of time required by this subpart during which a crewmember does not accumulate any duty time. A rest period does not include time spent in deadhead transportation.

20.275 Flight time and duty time limitations: weekly, monthly and yearly.

(a) No certificate holder may schedule a flight crewmember in excess of:

(1) The flight and duty time limitations prescribed in section 20.277.

(2) Thirty five (35) hours in any 7 consecutive days.

(3) Ninety five (95) hours in any calendar month.

(4) Two hundred and sixty (260) hours flight in three month.

(5) Nine hundred (900) hours in any calendar year.

(b) In scheduling a flight crewmember for flight and duty time under this subpart, a certificate holder shall base its computation on the time normally necessary for the performance of the flight or duty involved.

20.277 Flight time and duty time limitations.

(a) No certificate holder may schedule a flight crewmember, and no flight crewmember may serve, in excess of the flight time or duty period limitations set forth in paragraphs (b) and (c) of this section without a rest period.

(b) The limitations for flight crewmembers serving with flight crews consisting of:

(1) Two pilots are 9 hours of flight time and a 13-hours duty period of one sector.

(2) Two pilots and a flight engineer are 11 hours of flight time and a 14-hour duty period for one sector.

(3) An augmented crew as specified in subparagraph (1) above are 10 hours of flight time and a 15-hours duty period.

(4) An augmented crew as specified in subparagraph (2) above are 12 hours of flight time and a 17-hours duty period.

(5) A double crew as specified in subparagraph (1) above are 12 hours flight time and a 17-hours duty period.

(6) A double crew as specified in subparagraph (2) above are 14 hours flight time and a 20-hours duty period.

The duty period will be reduced by one half hour for every extra sector up to maximum of six sectors.

(c) A duty period may be extended up to one half of a rest period provided that an intermediate horizontal rest of no less than 4 hours up to 10 hours is given at the crewmember’s residence or a similar place where sleeping facilities are available.

(d) A flight crewmember may not serve in excess of a flight time or duty period limit if it is apparent that, by the beginning of the flight time, any of the limits in paragraph (a) above will be exceeded by making the flight; nevertheless, in the case of an unforeseen delay the pilot in command shall have the prerogative to extend the flight duty time for his crew by a maximum

of 2 hours should he decide that this can be safely accomplished. In the event of such an extension, a Deviation Report, justifying the decision, shall be submitted to the CARC Flight Safety Directorate.

20.279 Calculation of duty periods.

Each duty hour spent by a crewmember for the purpose of proficiency flight training, test flights, ground simulator training or checks shall be computed as equivalent to two hours.

20.281 Augmented flight crews.

(a) The pilot in command, as designated in the dispatch or flight release, shall remain the pilot in command at all times during the flight.

(b) During operations involving one or more relief officers, either the pilot in command or the second in command, as designated in the dispatch or flight release, shall be at a pilot station at all times.

(c) Each certificate holder shall provide crew bunks or other acceptable rest facility on the airplane equal to the number of relief officers whenever an augmented flight crew is scheduled for flights in excess of 12 hours during a duty period.

20.283 Deadhead transportation.

For the purpose of calculating duty and rest periods the same regulations shall apply to dead-heading and operating crew except that:

(a) A crewmember deadheading to operate a flight shall consider the time he spends in travel as a part of his duty period.

(b) A crewmember who is deadheading after completing a flight shall be considered on duty until the termination of the deadheading period. This total duty period may be extended to 24 hours if the requirements of 20.285(c) are met.

20.285 Rest requirements.

(a) A certificate holder shall provide each flight crewmember with a rest period of not less than 24 hours at least once during every 7 consecutive days. This 24-hour rest period may be provided concurrently with any other rest period required by this subpart. The carrier shall relieve the crewmember of all airline duty during that rest period.

(b) That other period of time during which a flight crewmember, who is otherwise in a rest period, is required by the certificate holder to be available to receive a schedule of duty time is considered part of a rest period.

(c) The rest period required by section 20.277(a), must be equal to the preceding duty period but not less than 10 hours at the crewmember's residence or similar place of rest. Transportation and airport delay time shall not be counted when calculating a rest period. Where there is more than a two-hour difference in local time between the point of departure and final destination the time difference will be added to the rest period.

20.286 thru 20.290 Reserved.

SUBPART- I
Airman and Crewmember Requirements.

20.291 Airman: Limitations on use of services.

(a) No certificate holder may use any person as an airman nor may any person serve as an airman unless that person:

(1) Holds an appropriate current airman certificate issued by the CARC.

(2) Has appropriate current airman and medical certificates in that person's possession while engaged in operations under this part; and

(3) Is otherwise qualified for the operation for which that person is to be used.

(b) Each airman covered by paragraph (a) of this section shall present the certificates for inspection upon the request of Chief Commissioner/CEO.

20.293 Composition or flight crew.

(a) No certificate holder may operate an airplane with less than the minimum flightcrew specified in the type certificate and the Airplane Flight Manual approved for that type airplane and required by this part for the kind of operation being conducted.

(b) In any case in which this part requires the performance of two or more functions for which an airman certificate is necessary, that requirement is not satisfied by having one airman perform multiple functions at the same time.

(c) On each, flight requiring a flight engineer, at least one flight crewmember, other than the flight engineer, must be qualified to provide emergency performance of the flight engineer's functions for the safe completion of the flight if the flight engineer becomes ill or is otherwise incapacitated. A pilot need not hold a flight engineer's certificate to perform the flight engineer's functions in such a situation.

20.295 Flight engineer requirements.

(a) No person may operate an airplane for which a flight engineer is required by the type certification requirements without a flight crewmember holding a current flight engineer certificate.

(b) No person may serve as a required flight engineer on an airplane unless, within the preceding 6 calendar months, that person has had at least 50 hours of flight time as a flight engineer on that type airplane, or Chief Commissioner/CEO has checked that person on that type airplane and determined that person is familiar and competent with all essential current information and operating procedures.

20.297 Long-range navigation equipment.

(a) No certificate holder may operate an airplane outside Jordan when its position cannot be reliably fixed for a period of more than 1 hour, without:

(1) Two independent, properly functioning, and approved long-range means of navigation which enable a reliable determination to be made of the position of the airplane by each pilot seated at that person's duty station.

(b) Operations where a long-range navigation equipment, is required are specified in the operations specifications of the operator.

20.299 Flight attendants.

(a) For an airplane having a seating capacity of 10 or less passengers, no flight attendant(s) are required except as required in section 20.299(c).

(b) For an airplane having a seating capacity of more than 10 passengers, the certificate holder shall, except as required in section 20.299(c), provide a number of flight attendants equal to no less than 2/3 of the number of exits in the cabin of the airplane (as type certificated).

(c) If, in conducting the emergency evacuation demonstration required under section 20.155(a) or (b), the certificate holder used more flight attendants than is required under paragraph (a) of this section for the maximum seating capacity of an airplane, he may not thereafter, take off that airplane:

(1) In its maximum seating capacity configuration with fewer flight attendants than the number used during the emergency evacuation demonstration; or

(2) In any reduced seating capacity configuration (installed seats) with fewer flight attendants than the number required by paragraph (a) of this section for that seating capacity plus the number of flight attendants used during the emergency evacuation demonstration that were in excess of those required under paragraph (a) of this section.

(d) The number of flight attendants approved under paragraphs (a) and (b) of this section are set forth in the certificate holder's operations specifications.

(e) During takeoff and landing, flight attendants required by this section shall be located as near as practicable to required floor level exits and shall be uniformly distributed throughout the airplane in order to provide the most effective aggress of passengers in event of an emergency evacuation. During taxi, flight attendants required by this section must remain at their duty stations with safety belts and shoulder harnesses fastened except to perform duties related to the safety of the airplane and its occupants.

(f) At stops where passengers remain on board the aircraft, each certificate holder shall provide and maintain on board the aircraft during that stop at least one-half (rounded to the next lower figure in the case of a fraction) of the flight attendants as provided in paragraph (a) of this section or the same number of other personnel qualified in the emergency evacuation procedures for that aircraft as required in 20.279, but never fewer than one such person, provided those personnel are identified to the passengers. These persons shall be uniformly distributed throughout the airplane to provide the most effective egress of passengers in the event of an emergency evacuation. Should there be only one flight attendant on board the aircraft, that person will be located in accordance with the certificate-holder's CARC approved operating procedures. During such stops when the flight attendant complement is fewer than required by section 20.279(a), the certificate holder must ensure that the aircraft engines are shut down and at least one floor-level exit on that aircraft remains open during the stop and that such exit provides for the deplaning of passengers.

20.301 Emergency and emergency evacuation duties.

(a) Each certificate holder, shall, for each type and model of airplane, assign to each category of required crewmember, as appropriate, the necessary functions to be performed in an emergency evacuation. The certificate holder shall show those functions are realistic, can be practically accomplished, and will meet any reasonably anticipated emergency, including the possible incapacitation of individual crewmembers or their inability to reach the passenger cabin because of shifting cargo in combination cargo-passenger airplanes.

(b) The certificate holder shall describe in its manual the functions of each category of required crewmembers under paragraph (a) of this section.

SUBPART- J
Flight Crewmember Requirements

20.311 Pilot-in-command qualifications.

(a) No certificate holder may use any person nor may any person serve, as pilot in command of an airplane unless that person, for an aircraft with a maximum take off weight of:

(1) 170,000 pounds (75,000 kg) or more, holds at least an ATP certificate, an appropriate category, class, and type rating.

(2) Less than 170,000 pounds (75,000 kg) holds a commercial pilot certificate and an instrument rating as well as appropriate aircraft type rating.

20.313 Second-in-command qualifications.

(a) No certificate holder may use any person, nor may any person serve, as a second in command of an airplane unless that person, for an aircraft with a maximum take off weight of:

(1) 170,000 pounds (75,000 kg) or more, holds at least an ATP certificate, an appropriate category, class, and type rating.

(2) Less than 170,000 pounds (75,000 kg) holds at least a commercial pilot certificate with appropriate category and class ratings, and an instrument rating; and

(b) For flight under IFR, meets the recent instrument experience requirements prescribed for a pilot in command in JCAR Part FCL1.

20.315 Pilot qualifications: recent experience.

No certificate holder may use any person, nor may any person serve as a required pilot flight crewmember unless, within the preceding 90 days that person has made at least three takeoffs and landings in the type airplane in which that person is to serve. The takeoffs and landings required by this paragraph may be performed in a visual simulator approved under 20.327 to include takeoff and landing maneuvers.

However, any person who fails to qualify for a 90-consecutive-day period following the date of that person’s last qualification under this paragraph must reestablish recency of experience as provided in paragraph (b) of this section.

(b) A required pilot flight crewmember who has not met the requirements of paragraph (a) of this section may reestablish recency of experience by making at least three takeoffs and landings under the supervision of an authorized check airman, in accordance with the following:

(1) At least one takeoff must be made with a simulated failure of the most critical power-plant.

(2) At least one landing must be made from an ILS approach to the lowest ILS minimums authorized for the certificate holder.

(3) At least one landing must be made to a complete stop.

(c) A required pilot flight crewmember who performs the maneuvers prescribed in paragraph (b) of this section in a visual simulator must:

(1) Have previously logged 100 hours of flight time in the same type airplane in which the pilot is to serve; and

(2) Be observed on the first two landings made in operations under this part by an authorized check airman who acts as pilot in command and occupies a pilot seat. The landings must be made in weather minimums that are not less than those contained in the certificate holder's operations specifications and must be made within 45 days following completion of simulator training.

(d) An authorized check airman who observes the takeoffs and landings prescribed in paragraphs (b) a of this section shall certify that the person being observed is proficient and qualified to perform flight duty in operations under this part, and may require any additional maneuvers that are determined necessary to make this certifying statement.

20.317 Initial and recurrent pilot testing requirements.

(a) No certificate holder may use any person, nor may any person serve as a pilot unless, since the beginning of the 12th calendar month before that service, that person has passed a written or oral test, given by Chief Commissioner/CEO or an authorized check airman on that person's knowledge in the following areas:

(1) The appropriate provisions of JCAR Parts FCL1, 91, and 20 and the operations specifications and the manual of the certificate holder.

(2) For each type of airplane to be flown by the pilot, the airplane powerplant, major components and systems, major appliances, performance and operating limitations, standard and emergency operating procedures, and the contents of the approved Airplane Flight Manual or approved equivalent, as applicable.

(3) For each type of airplane to be flown by the pilot, the method of determining compliance with weight and balance limitations for takeoff, landing, and en route operations.

(4) Navigation and use of air navigation aids appropriate to the operation of pilot authorization, including, when applicable, instrument approach facilities and procedures.

(5) Air traffic control procedures, including IFR procedures when applicable.

(6) Meteorology in general, including the principles of frontal systems, icing, fog, thunderstorms, and windshear, and, if appropriate for the operation of the certificate holder, high altitude weather.

(7) Procedures for avoiding operations in thunderstorms and hail, and for operating in turbulent air or in icing condition; and

(8) New equipment, procedures, or techniques, as appropriate.

(b) No certificate holder may use any person, nor may any person serve, as a pilot in any airplane unless, since the beginning of the 12th calendar month before that service, that person has passed a competency check given by Chief Commissioner/CEO or an authorized check airman in that type of airplane to determine that person's competence in practical skills and techniques in that airplane or type of airplane. The extent of the competency check shall be determined by Chief Commissioner/CEO or authorized check airman conducting the competency check. Competency check may include any of the maneuvers and procedures currently required for the original issuance of the particular pilot certificate required for the operations authorized and appropriate to the category, class, and type of airplane involved. For the purposes of this paragraph, type, as to an airplane, means any one of a group of airplanes determined by Chief Commissioner/CEO to have a similar means of propulsion, the same manufacturer, and no significantly different handling or flight characteristics.

(c) The instrument proficiency check required by section 20.247 may be substituted for the competency check required by this section for the type of airplane used in the check.

(d) For the purposes of this part, competent performance of a procedure or maneuver by a person to be used as a pilot requires that the pilot be the obvious master of the airplane with the successful outcome of the maneuver never in doubt.

(e) Chief Commissioner/CEO or authorized check airman certifies the competency of each pilot who passes the knowledge or flight check in the certificate holder's pilot records.

(f) Portions of a required competency check may be given in an airplane simulator or other appropriate training device, if approved by Chief Commissioner/CEO.

20.319 Initial and recurrent flight attendant crewmember testing requirements.

No certificate holder may use any person, nor may any person serve, as a flight attendant crewmember, unless, since the beginning of the 12th calendar month before that service, the certificate holder has determined by appropriate initial and recurrent testing that the person is knowledgeable and competent in the following areas as appropriate to assigned duties and responsibilities.

(a) Authority of the pilot in command.

(b) Passenger handling, including procedures to be followed in handling deranged persons or other persons whose conduct might jeopardize safety.

(c) Crewmember assignments, functions, and responsibilities during ditching and evacuation of persons who may need the assistance of another person to move expeditiously to an exit in an emergency.

(d) Briefing of passengers.

(e) Location and operation of portable fire extinguishers and other items of emergency equipment.

(f) Proper use of cabin equipment and controls.

(g) Location and operation of passenger oxygen equipment.

(h) Location and operation of all normal and emergency exits, including evacuation chutes and escape ropes; and

(i) Seating of persons who may need assistance of another person to move rapidly to an exit in an emergency as prescribed by the certificate holder's operations manual.

20.321 Pilot in command: instrument proficiency check requirements.

(a) No certificate holder may use any person, nor may any person serve, as a pilot in command of an airplane under IFR, unless, since the beginning of the

sixth calendar month before that service, that person has passed an instrument proficiency check and Chief Commissioner/CEO or an authorized check airman has so certified in a letter of competency.

(b) No pilot may use any type of precision instrument approach procedure under IFR unless, since the beginning of the sixth calendar month before that use, the pilot has satisfactorily demonstrated the type of approach procedure. No pilot may use any type of nonprecision approach procedure under IFR unless, since the beginning of the sixth calendar month before that use, the pilot has satisfactorily demonstrated either that type of approach procedure or any other two different types of nonprecision approach procedures. The instrument approach procedure or procedures must include at least one straight-in approach, once circling approach, and one missed approach. Each type of approach procedure demonstrated must be conducted to published minimums for that procedure.

(c) The instrument proficiency check required by paragraph (a) of this section consists of an oral or written test and a flight check under simulated or actual IFR conditions. The written test includes questions or emergency procedures, engine operations, fuel and lubrication system, power settings, stall speeds, best engine-out speed, propeller and supercharge operations, and hydraulic, mechanical, and electrical systems, as appropriate. The flight check includes navigation by instruments, recovery from simulated emergencies, and standard instrument approaches involving navigation facilities which that pilot is to be authorized to use:

(1) For a pilot in command of an airplane, the instrument proficiency check must include the procedures and maneuvers for a commercial pilot certificate with an instrument rating and, if required, for the appropriate type rating.

(2) The instrument proficiency check must be given by an authorized check airman or by Chief Commissioner/CEO.

(d) If the pilot in command is assigned to pilot only one type of airplane, that pilot must take the instrument proficiency check required by paragraph (a) of this section in that type of airplane.

(e) The pilot in command is assigned to pilot more than one type of airplane, that pilot must take the instrument proficiency check required by paragraph (a) of this section in each type of airplane to which that pilot is assigned, in rotation, but not more than one flight check during each period described in paragraph (a) of this section.

(f) Portions of a required flight check may be given in an airplane simulator or other appropriate training device, if approved by Chief Commissioner/CEO.

20.323 Crewmember: tests and checks, grace provisions, accepted standards.

(a) If a crewmember who is required to take a test or a flight check under this part completes the test or flight check in the calendar month before or after the calendar month in which it is required, that crewmember is considered to have completed the test or check in the calendar month in which it is required.

(b) If a pilot being checked under this subpart fails any of the required maneuvers, the person giving the check may give additional training to the pilot during the course of the check, in addition to repeating the maneuvers failed, the person giving the check may require the pilot being checked to repeat any other maneuvers that are necessary to determine the pilot's proficiency. If the pilot being checked is unable to demonstrate satisfactory performance to the person conducting the check, the certificate holder may not use the pilot, nor may the pilot serve, in the capacity for which the pilot is being checked in operations under this part until the pilot has satisfactorily completed the check.

20.325 Check airman authorization: application and issue.

Each certificate holder desiring CARC approval of a check airman shall submit a request in writing to Chief Commissioner/CEO. Chief Commissioner/CEO may issue a letter of authority to each check airman if that airman passes the appropriate oral and flight test. The letter of authority lists the tests and checks in this part that the check airman is qualified to give and the category, class, and type airplane, where appropriate, for which the check airman is qualified.

20.327 Approval of airplane simulators and other training devices.

(a) Airplane simulators and other training devices approved by Chief Commissioner/CEO may be used in checks required in this subpart.

(b) Each airplane simulator and other training device that is used in checks required under this subpart must meet the following requirements:

(1) It must be specifically approved for:

(i) The certificate holder.

(ii) The type airplane and, if applicable, the particular variation within type for which the check is being conducted; and

(iii) The particular maneuver procedure, or crewmember function involved.

(2) It must maintain the performance, functional, and other characteristics that are required for approval.

(3) It must be modified to conform with any modification to the airplane being simulated that changes the performance, functional, or other characteristics required approval.

20.329 - 340 Reserved.

SUBPART- K
Flight Operations

20. 341 Flight crewmembers at controls.

(a) Except as provided in paragraph (b) of this section, each required flight crewmember on flight deck duty must remain at the assigned duty station with seat belt fastened while the airplane is taking off or landing and while it is en route.

(b) A required flight crewmember may leave the assigned station:

(1) If the crewmember's absence is necessary for the performance of duties in connection with the operation of the airplane.

(2) If the crewmember's absence is in connection with physiological needs: or

(3) If the crewmember is taking a rest period and relief is provided:

(i) In the case of the assigned pilot in command, by a pilot qualified to act as pilot-in-command.

(ii) In the case of the assigned second in command, by a pilot qualified to act as second-in-command of that airplane during en route operations. However, the relief pilot need not meet the recent experience requirements of section 20.315.

20.343 Manipulation of controls when carrying passengers.

No pilot in command may allow any person to manipulate the controls of an airplane while carrying passengers during flight, nor may any person manipulate the controls while carrying passengers during flight, unless that person is a qualified pilot of the certificate holder operating at airplane.

20.345 Admission to flight deck (cockpit).

The operator must include in its operations manual an acceptable procedure for controlling access to the flight deck by persons other than the operating flight crew.

20.347 Inspector's credentials: admission to flight deck: forward observer's seat.

(a) An inspector will make advance arrangements for any inspection carried out for a Royal Flight aircraft and/ or crew.

(b) Whenever performing the duties of conducting an inspection, a CARC flight safety inspector designated by Chief Commissioner/CEO, presents his Aviation Safety Inspector's Credential, he must be given free and uninterrupted access to the flight deck of the airplane. However, this paragraph does not limit the emergency authority of the pilot in command to exclude any person from the pilot compartment in the interest of safety.

(c) A forward observer's seat on the flight deck, or forward passenger seat with headset or speaker, must be provided for use by Chief Commissioner/CEO while conducting en route inspections. The suitability of the location of the seat and the headset or speaker for use in conducting en route inspections is determined by approved standards.

20.349 Emergencies.

(a) In an emergency situation that requires immediate decision and action, the pilot in command may take any action considered necessary under the circumstances. In such a case, the pilot in command may deviate from prescribed operations, procedures and methods, weather minimums, and JCAR, to the extent required in the interest of safety.

(b) In an emergency situation arising during flight that requires immediate decision and action by appropriate management personnel in the case of operations conducted with a flight following service and which is known to them, those personnel shall advise the pilot in command of the emergency, shall ascertain the decision of the pilot in command, and shall have the decision recorded. If they cannot communicate with the pilot, they shall declare an emergency and take any action that they consider necessary under the circumstances.

(c) Whenever emergency authority is exercised, the pilot in command or the appropriate management personnel shall keep the appropriate ground radio station fully informed of the progress of the flight. The person declaring the emergency shall send a written report of any deviation, through the pepper channel to Chief Commissioner/CEO within 15 days upon return to the home base.

20.351 Reporting potentially hazardous meteorological conditions and irregularities of ground and navigation facilities.

Whenever the pilot in command encounters a meteorological condition or an irregularity in a ground or navigational facility in flight, the knowledge of

which the pilot in command considers essential to the safety of other flights, the pilot in command shall notify an appropriate ground station as soon as practicable.

20.353 Reporting mechanical irregularities.

The pilot in command shall ensure that all mechanical irregularities occurring during flight are entered in the maintenance log of the airplane at the next place of landing. Before each flight, the pilot in command shall ascertain the status of each irregularity entered in the log at the end of the preceding flight.

20.355 Instrument approach procedures and IFR landing minimums.

No person may make an instrument approach at an airport except in accordance with IFR weather minimums and unless the type of instrument approach procedure to be used is listed in the certificate holder's operations specifications.

20.357 Briefing of passengers before flight.

(a) Before each takeoff, each pilot in command of an airplane carrying passengers shall ensure that all passengers have been orally briefed on:

(1) Smoking.

(2) Use of seat belts.

(3) The placement of seat backs in an upright position before takeoff and landing.

(4) Location and means for opening the passenger entry door and emergency exits.

(5) Location of survival equipment.

(6) If the flight involves extended overwater operation, ditching procedures and the use of required flotation equipment.

(7) If the flight involves operations above 12,000 feet (3600 meters) MSL, the normal and emergency use of oxygen; and

(8) Location and operation of fire extinguishers.

(b) Before each takeoff, the pilot in command shall ensure that each person who may need the assistance of another person to move expeditiously to an exit if an emergency occurs and that person's attendant, if any, has received a briefing as to the procedures to be followed if an evacuation occurs. This paragraph does not apply to a person who has been given a briefing before a

previous leg of a flight in the same airplane.

(c) The oral briefing required by paragraph (a) of this section shall be given by the pilot in command or a member of the crew. It shall be supplemented by printed cards for the use of each passenger containing:

(1) A diagram and method of operating the emergency exits; and

(2) Other instruction necessary for the use of emergency equipment on board the airplane.

Each card used must he carried in the airplane for the use of each passenger and must contain information that is appropriate to the airplane on which it is to be used.

(d) The certificate holder shall describe, in its manual the procedure to be followed in the briefing required by paragraph (a) of this section.

(e) If the airplane does not proceed directly over water after takeoff, no part of the briefing required by paragraph (a) (6) must be given before reaching the overwater part of the flight.

20.359 Minimum altitudes for use of autopilot.

(a) Except as provided in paragraphs (b), (c), and (d) of this section, no person may use an autopilot at an altitude above the terrain which is less than 500 feet or less than twice the maximum altitude loss specified in the approved Airplane Flight Manual or equivalent for a malfunction of the autopilot, whichever is higher.

(b) When using an instrument approach facility other than ILS, no person may use an autopilot at an altitude above the terrain that is less than 50 feet below the approved minimum descent altitude for the procedure, or less than twice the maximum loss specified in the approved Airplane Flight Manual or equivalent for a malfunction of the autopilot under approach conditions, whichever is higher.

(c) For ILS approaches when reported weather conditions are less than the basic weather conditions in Part 91.155 of JCAR, no person may use an autopilot with an approach coupler at an altitude above the terrain that is less than 50 feet above the terrain, or the maximum altitude loss specified in the approved Airplane Flight Manual or equivalent for the malfunction of the autopilot with approach coupler, whichever is higher.

(d) Without regard to paragraph (a), (b), or (c) of this section, Chief Commissioner/CEO may issue operations specifications to allow the use, to touchdown, of an approved flight control guidance system with automatic

capability, if:

(1) The system does not contain any altitude loss (above zero) specified in the approved Airplane Flight Manual or equivalent for malfunction of the autopilot with approach coupler; and

(2) Chief Commissioner/CEO finds that the use of the system to touchdown will not otherwise adversely affect the safety standards of this section.

20.360 thru 20.400 Reserved.

SUBPART- L
Flight Release Rules

20.401 Flight release authority.

(a) No pilot may start without authority from the person authorized by the certificate holder to exercise operational control over the flight.

(b) No pilot may start a flight unless he has executed a flight release setting forth the conditions under which the flight will be conducted. The pilot in command will sign the flight release only when he believes the flight can be made safely.

(c) No pilot may continue a flight from an intermediate airport without updating his flight release if the airplane has been on the ground more than six hours.

20.403 Facilities and services.

During a flight, the pilot in command shall obtain any additional available information of meteorological conditions and irregularities of facilities and services that may affect the safety of the flight.

20.405 Airplane equipment.

No person may release an airplane unless it is airworthy and is equipped as prescribed.

20.407 Communication and navigation facilities.

No person may release an airplane over any route or segment unless communication and navigation facilities equal to those required by section 20.31 are in satisfactory operating conditions.

20.409 Dispatch or flight release under VFR.

No person may dispatch or release an aircraft for VFR operation unless the ceiling and visibility en route, as indicated by available weather reports or forecasts, or any combination thereof, are and will remain at or above applicable VFR minimums until the aircraft arrives at the airport or airports specified in the dispatch or flight release.

20.411 Dispatch or flight release under IFR or over the top.

No person may dispatch or release an aircraft for operations under IFR or over-the-top, unless appropriate weather reports or forecasts, or any combination thereof, indicate that the weather conditions will be at or above the authorized minimums at the estimated time of arrival at the airport or airports to which dispatched or released.

20.413 Dispatch or flight release over water.

(a) No person may dispatch or release an aircraft for a flight that involves extended overwater operation unless appropriate weather reports or forecasts or any combination thereof, indicate that the weather conditions will be at or above the authorized minimums at the estimated time of arrival at any airport to which dispatched or released or to any required alternate airport.

(b) Each authorization to conduct extended overwater operations under VFR and each requirement to conduct other overwater operations under IFR will be specified in the certificate holder's operations specifications.

20.415 Alternate airport for departure.

(a) If the weather conditions at the airport of takeoff are below the landing minimums in the certificate holder’s operations specifications for that airport, no person may release an airplane from that airport unless the flight release specifies an alternate airport located within the following distances from the airport of takeoff:

(1) Airplane having two engines. Not more than one hour from the departure airport at normal cruising speed in still air with one engine inoperative.

(2) Airplanes having three or more engines. Not more than two hours from the departure airport at normal cruising speed in still air with one engine inoperative.

20.417 Alternate airport of destination: IFR.

(a) Except as provided in paragraph (b) of this section, each person releasing an airplane for operation under IFR shall list at least one alternate airport for each destination airport in the flight release.

(b) An alternate airport needs not be designated for IFR operations where the airplane carries enough fuel to meet the requirements of sections 20.425 and 20.427 for flights outside of Jordan over routes without an available alternate airport for a particular airport of destination.

(c) For the purposes of paragraph (a) of this section, the weather requirements at the alternate airport must meet the requirements of the operator's operations specifications.

(d) No person may release a flight unless that person lists each required alternate airport in the flight release.

20.419 Alternate airport weather minimums.

No person may list an airport as an alternate airport in the flight release unless the appropriate weather reports or forecasts, or any combination thereof, indicate that the weather conditions will be at or above the alternate weather minimums specified in the certificate holder's operations specifications for that airport when the flight arrives.

20.421 Continuing flight in unsafe conditions.

(a) No pilot in command may allow a flight to continue toward any airport to which it has been released if, in the opinion of the pilot in command, the flight cannot be completed safely, unless, in the opinion of the pilot in command, there is no safer procedure. In that event, continuation toward that airport is an emergency situation.

(b) If any instrument or item of equipment required for the particular operation becomes inoperative en route, the pilot in command shall comply with the approved procedures for such an occurrence as specified in the certificate holder's manual.

(c) The minimum equipment list and procedure for continuing flight beyond a terminal point with equipment required in section 20.163(d) inoperative may be included in the certificate holder's manual if Chief Commissioner/CEO finds that, in a particular situation literal compliance with those equipment requirements is not necessary in the interests of safety.

20.423 Original flight release or amendment of flight release.

(a) A certificate holder may specify any airport authorized for the type of airplane and a destination for the purpose of original release.

(b) No person may allow a flight to continue to an airport to which it has been released unless the weather conditions at an alternate airport that was specified in the flight release are forecast to be at or above the alternate minimums specified in the operations specifications for that airport at the time the airplane would arrive at the alternate airport. However, the flight release may be amended en route to include any alternate airport that is within the fuel range of the airplane as specified in sections 20.319 or 20.321.

(c) No person may change an original destination or alternate airport that is specified in the original flight release to another airport while the airplane is en- rout unless the other airport is authorized for that type of airplane.

(d) Each person who amends a flight release or en route shall record that amendment.

20.425 Fuel supply: nonturbine and turbopropeller-powered airplanes.

(a) Except as provided in paragraph (b) of this section, no person may release for flight or take off a nonturbine or turbopropeller-powered airplane unless, considering the wind and other weather conditions expected, it has enough fuel:

(1) To fly to and land at the airport to which it is released.

(2) Thereafter, to fly to and land at the most distant alternate airport specified in the flight release; and

(3) Thereafter, to fly for 45 minutes at normal cruising fuel consumption.

(b) If the airplane is released for any flight other than from one point in Jordan, it must carry enough fuel to meet the requirements of subparagraphs (1) and (2) of paragraph (a) of this section and thereafter fly for 30 minutes plus 15 percent of the total time required to fly at normal cruising fuel consumption to the airports specified in subparagraphs (1) and (2) of paragraph (a) of this section, or fly for 90 minutes at normal cruising fuel consumption, whichever is less.

(c) No person may release a nonturbine or turbopropeller-powered airplane to an airport for which an alternate is not specified under section 20.331(b) unless it has enough fuel, considering wind and other weather conditions expected, to fly to that airport and thereafter to fly for three hours at normal cruising fuel consumption.

20.427 Fuel supply: turbine-engine powered airplane other than turbopropeller.

(a) Except as provided in paragraph (b) of this section, no person may release for flight or takeoff a turbine-powered airplane (other than a turbopropeller-powered airplane) unless, considering the wind and other weather conditions expected, it has enough fuel:

(1) To fly and land at the airport to which it is released.

(2) Thereafter, to fly to and land at the most distant alternate airports specified in the flight release; and

(3) Thereafter, to fly for 45 minutes at normal cruising fuel consumption.

(b) For any operation outside Jordan, unless authorized by Chief Commissioner/CEO in the operations specification, no person may release for flight or takeoff a turbine-engine powered airplane (other than a turbo-propeller powered airplane) unless, considering wind and other weather conditions expected, it has enough fuel:

(1) To fly and land at the airport to which it is released.

(2) After that, to fly for a period of 6 percent of the total time required to fly from the airport of departure and land at the airport to which it was released.

(3) After that, to fly to and land at the most distant alternate airport specified in the flight release, if an alternate is required; and

(4) After that, to fly for 30 minutes at holding speed at 1,500 feet (450 meters) above the alternate airport (or the destination airport if no alternate is required) under standard temperature conditions.

(c) No person may release a turbine-engine powered airplane (other than a turbopropeller airplane) to an airport for which an alternate is not specified under section 20.311 unless it has enough fuel, considering wind and other weather conditions expected, to fly to that airport and thereafter to fly for at least two hours at normal cruising fuel consumption.

(d) Chief Commissioner/CEO may amend the operations specifications of a certificate holder to require more fuel than any of the minimums states in paragraph (a) or (b) of this section if Chief Commissioner/CEO finds that additional fuel is necessary on a particular rout in the interest of safety.

20.429 Landing weather minimums: IFR.

(a) If the pilot in command of an airplane has not served 100 hours as pilot in

command in the type of airplane being operated, the MDA or DH and visibility landing minimums in the certificate holder's operations specification are increase by 100 feet and one-half mile (or the RVR equivalent). The MDA or DH and visibility minimums need not be increased above those applicable to the airport when used as an alternate airport, but in no event may the landing minimums be less than 300-foot ceiling and 1 mile of visibility.

(b) The 100 hours of pilot-in-command experience required by paragraph (a) of this section may be reduced (not to exceed 30 percent) by substituting one landing in operations under this part in the type of airplane for one required hour of pilot-in-command experience if the pilot has at least 100 hours as pilot-in-command of another type airplane in operations under this part.

(c) Category II minimums, when authorized in the certificate holder's operations specification, do not apply until the pilot in command subject to paragraph (a) of this section meets the requirements of that paragraph in the type of airplane the pilot is operating.

20.431 Takeoff and landing weather minimums: IFR.

(a) Regardless of any clearance from ATC, if the reported weather conditions are less than that specified in the certificate holder's operations specification, no pilot may:

(1) Takeoff an airplane under IFR; or

(2) Except as provided in paragraph (c) of this section, land an airplane under IFR.

(b) Except as provided in paragraph (c) of this section, no pilot may execute an instrument approach procedure if the latest reported visibility is less than the landing minimums specified in the certificate holder's operations specifications.

(c) If a pilot initiates an instrument approach procedure when the latest weather report indicates that the specified visibility minimums exist, and a later weather report indicating below minimum conditions is received after the airplane:

(1) Is on an ILS final approach and has passed the outer marker.

(2) Is on final approach segment using a nonprecision approach procedure, or

(3) Is on Precision Approach final approach and has been turned over to the final approach controller, the approach may be continued and a landing may be made if the pilot in command finds, upon reaching authorized (Missed Approach Point (MAP) or DH, that actual weather

conditions are at least equal to the minimums prescribed in the operations specifications.

20.433 Load manifest.

(a) Each certificate holder is responsible for the training and qualification of a person to be assigned to the preparation and accuracy of a load manifest in duplicate containing information concerning the loading of the airplane. The manifest must be prepared before each takeoff and must include:

(1) The number of passengers.

(2) The total weight of the loaded airplane.

(3) The maximum allowable takeoff and landing weights for that flight.

(4) The center of gravity limits.

(5) The center of gravity of the loaded airplane, except that the actual center of gravity need not be computed if the airplane is loaded according to a loading schedule or other approved method that ensures that the center of gravity of the loaded airplane is within limits according to a loading schedule or other approved method.

(6) The registration number of the airplane.

(7) The origin and destination; and

(8) Show “VVIP plus party”.

(b) The pilot in command of an airplane for which a load manifest must be prepared shall carry a copy of the completed load manifest in the airplane to its destination. The certificate holder shall keep copies of competed load manifests for at least 30 days at its principal operations base, or at another location used by it and approved by Chief Commissioner/CEO.

20.435 thru 20.440 Reserved.

SUBPART- M
Records and Reports

20.441 Crewmember record.

(a) Each certificate holder shall:

(1) Maintain current records of each crewmember that show whether or not that crewmember complies with JCAR (e.g., proficiency checks,

airplane qualifications, any required physical examinations, and flight time records); and

(2) Record each action taken concerning the release from employment or physical or professional disqualification of any flight crewmember and keep the record for at least 6 months thereafter.

(b) Each certificate holder shall maintain the records required by paragraph (a) of this section at its principal operations base, or at another location used by it and approved by Chief Commissioner/CEO.

(c) Computer record systems approved by Chief Commissioner/CEO may be used in complying with the requirements of paragraph (a) of this section.

20.443 Flight release form.

(a) The flight release may be in any form but must contain at least the following information concerning each flight:

(1) Company or organization name.

(2) Make, model, and registration number of the airplane being used.

(3) Date of flight.

(4) Name and duty assignment of each crewmember.

(5) Departure airport, destination airports, alternate airports, and route.

(6) Minimum fuel supply (by weight or volume).

(7) A statement of the type of operation (e.g., IFR, VFR).

(b) The airplane flight release must contain, or have attached to it, weather reports, available weather forecasts, or a combination thereof.

20.445 Disposition or load manifest, flight release, and flight plans.

(a) The pilot in command of an airplane shall carry in the airplane to its destination the original or a signed copy of the:

(1) Load manifest required by section 20.327.

(2) Flight release.

(3) Airworthiness release; and

(4) Flight plan, including route.

(b) If a flight originates at a principal operations base of the certificate holder, it shall retain at that base a signed copy of each document listed in paragraph (a) of this section.

(c) If a flight originates at a place other than the principal operations base of the certificate holder and there is at that place a person to manage the flight departure for the operator who does not depart on the airplane, signed copies of the documents listed in paragraph (a) of this section may be retained at that place for not more than 30 days before being sent to the principal operations base of the certificate holder. However, the documents for a particular flight need not be further retained at that place or be sent to the principal operations base, if the originals or other copies of them have been previously returned to the principal operations base.

(d) The certificate holder shall:

(1) Identify in its operations manual the person having custody of the copies of documents retained in accordance with paragraph (c) of this section; and

(2) Retain at its principal operations base either the original or a copy of the records required by this section for at least 30 days.

20.447 Maintenance log: airplanes.

(a) Each person who takes corrective action or defers action concerning a reported or observed failure or malfunction of an airframe, aircraft engine, propeller, or appliance shall record the action taken in the airplane maintenance log in accordance with Part M of JCAR.

(b) Each certificate holder shall establish a procedure for keeping copies of the airplane maintenance log required by this section in the airplane for access by appropriate personnel and shall include that procedure in the manual required by section 20.205.

20.449 Airworthiness release or maintenance record entry.

(a) No certificate holder may operate an airplane after maintenance, preventive maintenance, or alteration is performed on the airplane unless the person performing that maintenance, preventive maintenance, or alteration prepares or causes to be prepared:

(1) An airworthiness release; or

(2) An entry in the aircraft maintenance records in accordance with the certificate holder's manual.

(b) The airworthiness release or maintenance record entry required by paragraph (a) of this section must:

(1) Be prepared in accordance with the procedures set forth in the certificate holder's manual.

(2) Include a certification that:

(i) The work was performed in accordance with the requirements of the certificate holder's manual.

(ii) All items required to be inspected were inspected by an authorized person who determined that the work was satisfactorily completed.

(iii) No known condition exists that would make the airplane unairworthy; and

(iv) So far as the work performed is concerned, the airplane is in condition for safe operation: and

(3) Be signed by a person authorized in Part M of JCAR to perform maintenance, preventive maintenance, and alteration.

(c) When an airworthiness release form is prepared, the certificate holder must give a copy to the pilot in command and keep a record of it for at least 60 days.
d) Instead of restating each of the conditions of the certification required by paragraph (c) of this section, the certificate holder may state in its manual that the signature of a person authorized in Part M of JCAR constitutes that certification.

APPENDIX- A
Additional Emergency Equipment

(a) Means for emergency evacuation. Each passenger-carrying landplane emergency exit (other than over-the-wing) that is more than 6 feet from the ground with the airplane on the ground and the landing gear extended must have an approved means to assist the occupants in descending to the ground. The assisting means for each passenger emergency exit must be a self-supporting slide or equivalent, and must be designed to meet the following requirements:

(1) It must be automatically deployed and deployment must begin during the interval between the time the exit opening means is actuated from inside the airplane and the time the exit is fully opened. However, each passenger emergency exit which is also a passenger entrance door or a service door must be provided with means to prevent deployment of the assisting means when it is opened from either the inside or the outside under non-emergency conditions for normal use.

(2) It must be automatically erected within 10 seconds after deployment is begun.

(3) It must be of such length after full deployment that the lower end is self-supporting on the ground and provides safe evacuation of occupants to the ground after collapse of one or more legs of the landing gear.

(4) It must have the capability, in 25-knot winds directed from the most critical angle, to deploy and, with the assistance of only one person, to remain usable after full deployment to evacuate occupants safely to the ground.

An assisting means that deploys automatically must be armed during taxiing, takeoffs, and landings. However, if Chief Commissioner/CEO finds that the design of the exit makes compliance impractical, Chief Commissioner/CEO may grant a deviation from the requirement of automatic deployment if the assisting means automatically erects upon deployment and, with respect to required emergency exits, if an emergency evacuation demonstration is conducted in accordance with section 20.155.

(b) Interior emergency exit marking. The following must be complied with for each passenger-carrying airplane:

(1) Each passenger emergency exit, its means of access, and means of opening must be conspicuously marked. The identity and location of each passenger emergency exit must be recognizable from a distance equal to the width of the cabin. The location of each passenger emergency exit must be indicated by a sign visible to occupants approaching along the main passenger aisle. There must be a locating sign:

(i) Above the aisle near each over-the-wing passenger emergency exit, or at another ceiling location if it is more practical because of low headroom;

(ii) Next to each floor level passenger emergency exit, except that one sign may serve two such exits, if they both can be seen readily from that sign; and

(iii) On each bulkhead or divider that prevents fore and aft vision along the passenger cabin, to indicate emergency exits beyond and obscured by it, except that if this is not possible the sign may be placed at another appropriate location.

(2) Each passenger emergency exit marking and each locating sign must meet the following:

(i) The emergency exit marking and each locating sign must be manufactured to meet the interior emergency exit marking requirements under which the airplane was type certificated. On these airplanes, no sign may continue to be used if its luminescence (brightness) decreases to below 250 microlamberts.

(c) Lighting for interior emergency exit markings. Each passenger-carrying airplane must have an emergency lighting system, independent of the main lighting
system. However, sources of general cabin illumination may be common to both the emergency and the main lighting systems if the power supply to the emergency lighting system is independent of the power supply to the main lighting system. The emergency lighting system must:

(1) Illuminate each passenger exit marking and locating sign; and

(2) Provide enough general lighting in the passenger cabin so that the average illumination when measured at 40-inch intervals at seat armrest height, on the centerline of the main passenger aisle, is at least 0.05 foot-candles.

(d) Emergency operation. Except for lights forming part of emergency lighting subsystems for exterior emergency lighting that serve no more than one assist means, are independent of the airplane's main emergency lighting systems, and are automatically activated when the assist means is deployed, each light required by paragraphs (c) and (h) must comply with the following:

(1) Each light must be operable manually and must operate automatically from the independent lighting system:

(i) In a crash landing; or

(ii) Whenever the airplane's normal electric power to the light is interrupted.

(2) Each light must:

(i) Be operable manually from the flightcrew station and from a point in the passenger compartment that is readily accessible to a normal flight attendant seat;

(ii) Have a means to prevent inadvertent operation of the manual controls; and

(iii) When armed or turned on at either station, remain lighted or become lighted upon interruption of the airplane's normal electric power.

Each light must be armed or turned on during taxiing, takeoff, and landing. In showing compliance with this paragraph, a transverse vertical separation of the fuselage need not be considered.

(3) Each light must provide the required level of illumination for at least 10 minutes at the critical ambient conditions after emergency landing.

(e) Emergency exit operating handles.

(1) The location of each passenger emergency exit operating handle and instructions for opening the exit must be shown in accordance with the requirements under which the airplane was type certificated. On these airplanes, no operating handle or operating handle cover may continue to be used if its luminescence (brightness) decreases to below 100 microlamberts.

(f) Emergency exit access. Access to emergency exits must be provided as follows for each passenger-carrying airplane:

(1) Each passageway between individual passenger areas, or leading to a Type I or Type 11 emergency exit, must be unobstructed and at least 20 inches wide.

(2) There must be enough space next to each Type I or Type II emergency exit to allow a crewmember to assist in the evacuation of passengers without reducing the unobstructed width of the passageway below that required in paragraph (f) (1) of this section.

(3) There must be access from the main aisle to each Type III and Type IV exit. The access from the aisle to these exit must not be obstructed by seats, berths, or other protrusions in a manner that would reduce the effectiveness of the exit in addition:

(i) The access must meet the emergency exit access requirements under which the airplane was certificated.

(4) If it is necessary to pass through a passageway between passenger compartments to reach any required emergency exit from any seat in the passenger cabin, the passageway must not be obstructed. However, curtains may be used if they allow free entry through the passageway.

(5) No door may be installed in any partition between passenger compartments.

(6) If it is necessary to pass through a doorway separating the passenger cabin from other areas to reach any required emergency exit from any passenger seat, the door must have a means to latch it in open position, and the door must be latched open during each takeoff and landing. The latching means must be able to withstand the loads imposed upon it when the door is subjected to the ultimate internal forces, relative to the surrounding structure.

(g) Exterior exit markings. Each passenger emergency exit and the means of opening that exit from the outside must be marked on the outside of the airplane. There must be a 2-inch colored band outlining each passenger emergency exit on the side of the fuselage. Each outside marking, including the band, must be readily distinguishable from the surrounding fuselage area by contrast in color. The markings must comply with the following:

(1) If the reflectance of the darker color is 15 percent or less, the reflectance of the lighter color must be at least 45 percent. “Reflectance’ is the ratio of the luminous flux reflected by a body to the luminous flux it receives.

(2) If the reflectance of the darker color is greater than 15 percent, at least a 30 percent difference between its reflectance and the reflectance of the lighter color must be provided.

(3) Exits that are not in the side of the fuselage must have the external means of opening and applicable instructions marked conspicuously in red or, if red is inconspicuous against the background color, in bright chrome yellow and, when the opening means for such an exit is located on only one side of the fuselage, a conspicuous marking to that effect must be provided on the other side.

(h) Exterior emergency lighting and escape route.

(1) Each passenger-carrying airplane must be equipped with exterior lighting that meets the following requirements:

(i) The exterior emergency lighting requirements under which the airplane was type certificated.

(2) Each passenger-carrying airplane must be equipped with a slip-resistant escape route that meets the following requirements:

(i) The slip-resistant escape route requirements under which the airplane was type certificated.

(i) Floor level exits. Each floor level door or exit in the side of the fuselage (other than those leading into a cargo or baggage compartment that is not accessible from the passenger cabin) that is 44 or more inches high and 20 or more inches wide, but not wider than 46 inches, each passenger ventral exit and each tail cone exit must meet the requirements of this section for floor level emergency exits. However, the Chief Commissioner/CEO may grant a deviation from this paragraph if the Chief Commissioner/CEO finds that circumstances make full compliance impractical and that an acceptable level of safety has been achieved.

(j) Additional emergency exits. Approved emergency exits in the passenger compartments that are in excess of the minimum number of required emergency exits must meet all of the applicable provisions of this section except paragraph (f) (1), (2), and (3) and must be readily accessible.

(k) On each large passenger-carrying turbojet-powered airplane, each ventral exit and tail cone exit must be:

(1) Designed and constructed so that it cannot be opened during flight; and

(2) Marked with a placard readable from a distance of 30 inches and installed at a conspicuous location near the means of opening the exit, stating that the exit has been designed and constructed so that it cannot be opened during flight.

APPENDIX -B
Criteria for Demonstration of Emergency Evacuation Procedures under Section 20 .135

(a) Aborted takeoff demonstration.

(1) The demonstration must be conducted either during the dark of the night or during daylight with the dark of the night simulated. If the demonstration is conducted indoors during daylight hours, it must be conducted with each window covered and each door closed to minimize the daylight effect. Illumination on the floor or ground may be used, but it must be kept low and shielded against shining into the airplane's windows or doors.

(2) The airplane must be in a normal ground attitude with landing gear extended.

(3) Stands or ramps may be used for descent from the wing to the ground. Safety equipment such as mats or inverted life rafts may be placed on the ground to protect participants. No other equipment that is not part of the airplane's emergency evacuation equipment may be used to aid the participants in reaching the ground.

(4) The airplane's normal electric power sources must be de-energized.

(5) All emergency equipment for the type of passenger-carrying operation involved must be installed in accordance with the certificate holder's manual.

(6) Each external door and exit and each internal door or curtain must be in position to simulate a normal takeoff.

(7) A representative passenger load of persons in normal health must be used. At least 30 percent must be females. At least 3 percent must be over 60 years of age with a proportionate number of females. At least 5 percent, but more than 10 percent, must be children under 12 years of age, prorated through that age group. Three life-size dolls, not included as part of the total passenger load, must be carried by passengers to simulate live infants 2 years old or younger. Crewmembers, mechanics, and training personnel who maintain or operate the airplane in the normal course of their duties may not be used as passengers.

(8) No passenger may be assigned a specific seat except as Chief Commissioner/CEO may require. Except as required by item (12) of this paragraph, no employee of the certificate holder may be seated next to an emergency exit.

(9) Seat belts and shoulder harnesses (as required) must be fastened.

(10) Before the start of the demonstration, approximately one-half of the total average amount of carry-on baggage, blankets, pillows, and other similar articles must be distributed at several locations in the aisles and emergency exit access ways to create minor obstructions.

(11) The seating density and arrangement of the airplane must be representative of the highest capacity passenger version of that airplane the certificate holder operates or proposes to operate.

(12) Each crewmember must be a member of a regularly scheduled line crew, must be seated in that crewmember's normally assigned seat for takeoff, and must remain in that seat until the signal for commencement of the demonstration is received.

(13) No crewmember or passenger may be given prior knowledge of the emergency exits available for the demonstration.

(14) The certificate holder may not practice, rehearse, or describe the demonstration for the participants nor may any participant have taken part in this type of demonstration within the preceding six months.

(15) The pretakeoff passenger briefing required by section 20.281 may be given in accordance with the certificate holder's manual. The passengers may also be warned to follow directions of crewmembers, but may not be instructed on the procedures to be followed in the demonstration.

(16) If safety equipment as allowed by item (3) of this section is provided, either all passenger and cockpit windows must be blacked out or all of the emergency exits must have safety equipment to prevent disclosure of the available emergency exits.

(17) Not more than 50 percent of the emergency exits in the sides of the fuselage of an airplane that meet all of the requirements applicable to the required emergency exits for that airplane may be used for the demonstration. Exits that are not to be used in the demonstration must have the exit handle deactivated or must be indicated by red lights, tape or other acceptable means, placed outside the exits to indicate fire or other reason that they are unusable. The exits to be used must be representative of all of the emergency exits on the airplane and must be designated by the certificate holder, subject to approval by the Chief Commissioner/CEO. At least one floor level exit must be used.

(18) All evacuees, except those using an over-the-wing exit, must leave the airplane by a means provided as part of the airplane's equipment.

(19) The certificate holder's approved procedures and all of the emergency equipment that is normally available, including slides, ropes, lights, and megaphones, must be fully utilized during the demonstration.

(20) The evacuation time period is completed when the last occupant has evacuated the airplane and is on the ground. Evacuees using stands or ramps allowed by item (3) above are considered to be on the ground when they are on the stand or ramp; provided, that the acceptance rate of the stand or ramp is no greater than the acceptance rate of the means available on the airplane for descent from the wing during an actual crash situation.

(b) Ditching demonstration. The demonstration must assume that daylight hours exist outside the airplane and that all required crewmembers are available for the demonstration.

(1) The certificate holder's manual requires the use of passengers to assist in the launching of liferafts, the needed passengers must be aboard the airplane and participate in the demonstration according to the manual.

(2) A stand must be placed at each emergency exit and wing with the top of the platform at a height simulating the water level of the airplane following a ditching.

(3) After the ditching signal has been received, each evacuee must don a life vest according to the certificate holder's manual.

(4) Each liferaft must be launched and inflated according to the certificate holder's manual and all other required emergency equipment must be placed in rafts.

(5) Each evacuee must enter a liferaft and the crewmembers assigned to each liferaft must indicate the location of emergency equipment aboard the raft and describe its use.

(6) Either the airplane, a mockup of the airplane, or a floating device simulating a passenger compartment must be used:

(i) If a mockup of the airplane is used, it must be a life-size mockup of the interior and representative of the airplane currently used by or proposed to be used by the certificate holder and must contain adequate seats for use of the evacuees. Operation of the emergency exits and the doors must closely simulate that on the airplane. Sufficient wing

area must be installed outside the over-the-wing exits to demonstrate the evacuation.

(ii) If a floating device simulating a passenger compartment is used, it must be representative, to the extent possible, of the passenger compartment of the airplane used in operations. Operation of the emergency exits and the doors must closely simulate operation on the airplane. Sufficient wing area must be installed outside the over-the-wing exits to demonstrate the evacuation. The device must be equipped with the same survival equipment as is installed on the airplane, to accommodate all persons participating in the demonstration.

APPENDIX- C
Ice Protection

If certification with ice protection provisions is desired, compliance with the following must be shown:

(a) The recommended procedures for the use of the ice protection equipment must be set forth in the Airplane Flight Manual.

(b) An analysis must be performed to establish, on the basis of the airplane's operational needs, the adequacy of the ice protection system for the various components of the airplane. In addition, tests of the ice protection system must be conducted to demonstrate that the airplane is capable of operating safely in continuous maximum and intermittent maximum icing conditions.

(c) Compliance with all or portions of this section may be accomplished by reference, where applicable because of similarity of the designs, to analyses and tests performed by the applicant for a type certificated model.

APPENDIX - D
Doppler Radar and Inertial Navigation System R(INS): Request for Evaluation; Equipment and Equipment Installation Training Program; Equipment Accuracy and Reliability; Evaluation Program.

(a) Application.

(1) An applicant for authority to use a Doppler Radar or Inertial Navigation System must submit a request for evaluation of the system to the CARC Flight Safety Directorate with the overall inspection of its operations 30 days prior to the start of evaluation flights.

(2) The application must contain:

(i) A summary of experience with the system showing to the satisfaction of the Chief Commissioner/CEO, a history of the accuracy and reliability of the system proposed to be used.

(ii) A training program curriculum for initial approval.

(iii) A maintenance program for compliance with Subpart L of this part.

(iv) A description of equipment installation.

(v) Proposed revision to the Operations Manual outlining all normal and emergency procedures relative to use of the proposed system, including detailed methods for continuing the navigational function with partial or complete equipment failure, and methods for determining the most accurate system when an unusually large divergence between systems occurs. For the purpose of this appendix, a large divergence is a divergence that results in a track that falls beyond clearance limits.

(vi) Any proposed revisions to the minimum equipment list with adequate justification therefore.

(vii) A list of operations to be conducted using the system, containing an analysis of each with respect to length, magnetic compass reliability, availability of en route aids, and adequacy of gateway and terminal radio facilities to support the system. For the purpose of this appendix, a gateway is a specific navigational fix where use of long range navigation commences or terminates.

(b) Equipment and equipment installation - Inertial Navigation Systems (INS) or Doppler Radar System.

(1) Inertial Navigation and Doppler RADAR Systems must be installed in accordance with applicable airworthiness requirements.

(2) Cockpit arrangement must be visible, and usable by either pilot seated at this duty station.

(3) The equipment must provide, by visual, mechanical, or electrical output signals, indications of the invalidity of output data upon the occurrence of probable failure or malfunctions within the system.

(4) A probable failure or malfunction within the system must not result in loss of the aircraft's required navigation capability.

(5) The alignment, updating, and navigation computer functions of the system must not be invalidated by normal aircraft power interruption and transients.

(6) The system must not be the source or cause of objectionable radio frequency interference, and must not be advertisely affected by radio frequency interference from other aircraft systems.

(7) The approved Airplane Flight Manual, or supplement thereto, must include pertinent material as required to define the normal and emergency operating procedures and applicable operating limitations associated with INS and Doppler performance (such as maximum latitude at which ground alignment capability is provided, or deviations between systems).

(c) Equipment and equipment installation - Inertial Navigation Systems (INS).

(1) If an applicant elects to use an Inertial Navigation system it must be at least a dual system (including navigational computers and reference units). At least two systems must be operational at takeoff. The dual system may consist of either two INS units, or one INS Unit and one Doppler Radar Unit.

(2) Each Inertial Navigation System must incorporate the following:

(i) Valid ground alignment capability at all latitudes appropriate for intended use of the installation.

(ii) A display of alignment status or a ready to navigate light showing completed alignment to the flight crew.

(iii) The present position of the airplane in suitable coordinates.

(iv) Information relative to destinations or waypoint positions:

(A) The information needed to gain and maintain a desired track and to determine deviations from the desired track.

(B) The information needed to determine distance and time to go to the next way-point or destination.

(3) For INS installations that do not have memory or other in-flight alignment means, a separate electrical power source (independent of the main propulsion system) must be provided which can supply, for at least five minutes, enough power (as shown by analysis or as demonstrated in the airplane) to maintain the INS in such condition that its full capability is restored upon the reactivation of the normal electrical supply.

(4) The equipment must provide such visual, mechanical, or electrical output signals as may be required to permit the flight crew to detect probable failures or malfunctions in the system.

(d) Equipment and equipment installation- Doppler Radar Systems.

(1) If an applicant elects to use a Doppler System it must be at least a dual system (including dual antennas or a combined antenna designed for multiple operation), except that:

(i) A single operating transmitter with a standby capable of operation may be used in lieu of two operating transmitters.

(ii) Single heading source information to all installations may be utilized, provided a compass comparator system is installed and operational procedures call for frequent cross-checks of all compass heading indicators by crewmembers.

The dual system may consist of either two Doppler Radar units or one Doppler Radar unit and one INS unit.

(2) At least two systems must be operational at takeoff.

(3) As determined by Chief Commissioner/CEO and specified in the certificate holder’s operations specifications, other navigational aids may be required to update the Doppler Radar for a particular operation. These may include loran, consol, DME, VOR, ADF, ground-based radar, and airborne weather radar. When

these aids are required, the cockpit arrangement must be such that all controls accessible to each pilot seated at his duty station.

(e) Training programs.

The initial training program for Doppler Radar and Inertial Navigation Systems must include the following:

(1) Duties and responsibilities of flight crewmembers, dispatchers, and maintenance personnel.

(2) For pilots, instruction in the following:

(i) Theory and procedures, limitations, detection of malfunctions, preflight and in-flight testing, and cross-checking methods.

(ii) The use of computers, and explanation of all systems, compass limitations at high latitudes, a review of navigation, flight planning and applicable meteorology.

(iii) The methods for updating by means of reliable fixes.

(iv) The actual plotting of fixes.

(3) Abnormal and emergency procedures.

(f) Equipment accuracy and reliability.

(1) Each Inertial Navigation System must meet the following accuracy requirements, as appropriate:

(i) For flights up to 10 hours duration, no greater than 2 nautical miles per hour of circular error on 95 percent of system flights completed is permitted.

(ii) For flights over 10 hours duration, a tolerance of ±20 miles along-track on 95 percent of system flights completed is permitted.

(2) Compass heading information to the Doppler Radar must be maintained to an accuracy of ±1º and total system deviations must not exceed 2º. When free gyro techniques are used, procedures shall be utilized to ensure that an equivalent level of heading accuracy and total system deviation is attained.

(3) Each Doppler Radar system must meet accuracy requirements of ±20 miles cross-track and ±25 miles along-track for 95 percent of the system flights completed. Updating is permitted.
A system that does not meet the requirements of this section will be considered a failed system.

(g) Evaluation program.

(1) Approval by evaluation must be requested as a part of the application for operational approval of a Doppler Radar or Inertial Navigation System.

(2) The applicant must provide sufficient flights which show to the satisfaction of e Chief Commissioner/CEO the applicant's ability to use cockpit navigation in his operation.

(3) Chief Commissioner/CEO bases his evaluation on the following:

(i) Adequacy of operational procedures.

(ii) Operational accuracy and reliability of equipment and feasibility of the system with regard to proposed operations.

(iii) Availability of terminal, gateway, area, and en route ground-based aids, if required, to support the self-contained system.

(iv) Acceptability of cockpit workload.

(v) Adequacy of flight crew qualifications.

(vi) Adequacy of maintenance training and availability of spare parts.

After successful completion of evaluation demonstrations, CARC will issue amended operations specifications and en route night procedures defining and authorizing the new operation. Approval is limited to those operations for which the adequacy of the equipment and the feasibility of cockpit navigation has been satisfactorily demonstrated.

APPENDIX- E
Additional Airworthiness Standards for Equipment Required by this Part

(a) Instrument and equipment approvals. Whenever an instrument, appliance, or other piece of equipment is required to be approved under JCAR, it shall be approved:

(1) Under a Parts Manufactured Approval (PMA); or

(2) Under a Technical Standard Order (TSO); or

(3) In conjunction with Type Certification procedures for a product (TC) (STC); or

(4) In any other manner approved by Chief Commissioner/CEO.

(b) Seats, safety belts, and shoulder harnesses.

(1) Each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of these facilities will not suffer serious injury in an emergency landing.

(2) Each seat and berth must be approved.

(3) Each occupant of a seat that makes more than an 18 angle with the vertical plane containing the airplane centerline, must be protected from head injury by a safety belt and an energy absorbing rest that will support the arms, shoulders, head, and spine, or by a safety belt and shoulder harness that will prevent the head from contacting an injurious object. Each occupant of any other seat must be protected from head injury by a safety belt and, as appropriate to the type, location, and angle of facing of each seat, by one or more of the following:

(i) A shoulder harness that will prevent the head from contacting any injurious object.

(ii) The elimination of any injurious object within striking radius of the head.

(iii) An energy absorbing rest that will support the arms, shoulders, head, and spine.

(4) If the seat backs do not have a firm hand hold, there must be a hand grip or rail along each aisle to enable occupants to steady themselves while using the aisles in moderately rough air.

(5) Each projecting object that would injure persons seated or moving about the airplane in normal flight must be padded.

(6) Cabin flight attendant seats in the passenger compartments must be near required floor level emergency exits, and be equipped with a restraint system consisting of a combined safety belt and shoulder harness unit with a single-point release. There must be means to secure each combined safety belt and shoulder harness, when not in use, to prevent interference with rapid egress in an emergency. In addition:

(i) To the extent possible without compromising their proximity to required floor level emergency exits, flight attendant seats must be located to provide a direct view of the cabin area for which the flight attendant is individually responsible.

(ii) Flight attendants seats must be either forward or rearward facing, with an energy absorbing rest that is designed to support the arms, shoulders, head, and spine.

(iii) Flight attendants seats must be positioned so that when not in use they will not interfere with the use of passageways and exits.

(7) Each flight attendant seat must be located to minimize the probability of its occupant suffering injury by being struck by items dislodged in a galley, or from a stowage compartment or serving cart. All items expected in these locations in service must be considered.

(c) First aid oxygen equipments.

If first-aid oxygen equipment is installed, the minimum mass flow of oxygen to each user may not be less than four liters per minute. However, there may be a means to decrease this flow to not less than two liters per minute at any cabin altitude. The quantity of oxygen required is based upon an average flow rate of three liters per minute per person for whom first-aid oxygen is required.

APPENDIX- F
Installation and Additional Requirements of Cockpit Voice and Flight Data Recorders.

Cockpit voice recorders.

(a) Each cockpit voice recorder required by the operating rules of JCAR must be approved and must be installed so that it will record the following:

(1) Voice communications transmitted from or received in the airplane by radio.

(2) Voice communications of flight crewmembers of the flight deck.

(3) Voice communications of flight crewmembers on the flight deck, using the airplane's interphone system.

(4) Voice or audio signals identifying navigation or approach aids introduced into a headset or speaker.

(5) Voice communications of flight crewmembers using the passenger loudspeaker system, if there is such a system and if the fourth channel is available in accordance with the requirements of paragraph (c)(4)(ii) of this section.

(b) The recording requirements of paragraph (a)(2) of this section must be met by installing a cockpit-mounted area microphone located in the best position for recording voice communications originating at the first and second pilot stations and voice communications of other crewmember on the flight deck when directed to those stations. The microphones must be so located and, if necessary, preamplifiers and filters of the recorder must be so adjusted or supplemented, that the intelligibility of the recorded communications is as high as practicable when recorded under flight cockpit noise conditions and played back. Repeated aural or visual playback of the record may be used in evaluating intelligibility.

(c) Each cockpit voice recorder must be installed so that the part of the communication or audio signals specified in paragraph (a) of this section obtained from each of the following sources is recorded on a separate channel:

(1) For the first channel, from each microphone, headset, or speaker used at the first pilot station.

(2) For the second channel, from each microphone, headset, or speaker used at the second pilot station.

(3) For the third channel, from the cockpit-mounted area microphone.

(4) For the fourth channel, from:

(i) If the stations specified in subdivision (i) of this paragraph are not required or if the signal at such station is picked up by another channel, each microphone flight deck that is used with the passenger loudspeaker system, if its signals are not picked up by another channel.

(d) Each cockpit voice recorder must be installed so that:

(1) It receives its electric power from the bus that provides the maximum reliability for operation of the cockpit voice recorder without jeopardizing service to essential or emergency loads;

(2) There is an automatic means to simultaneously stop the recorder and prevent each erasure feature from functioning within 10 minutes after crash impact; and

(3) There is an aural or visual means for preflight checking of the recorder for proper operation.

(e) The record container must be located and mounted to minimize the probability of rupture of the container as a result of crash impact and consequent heat damage to the record from fire, in meeting this requirement, the record container must be as far aft as practicable, but may not be where aft mounted engines may crush the container during impact. However, it needs not be outside of the pressurized compartment.

(f) If the cockpit voice recorder has a bulk erasure device, the installation must be designed to minimize the probability of inadvertent operation and actuation of the device during crash impact.

Flight Data Recorders

Flight recorders.

(a) Each flight recorder required by the operating rules of JCAR must be installed so that:

(1) It is supplied with airspeed, altitude, and directional data obtained from sources that meet the accuracy requirements of type certification;

(2) The vertical acceleration sensor is rigidly attached, and located longitudinally either within the approved center of gravity limits of the airplane, or at a distance forward or aft of these limits that does not exceed 25 percent of the airplane's mean aerodynamic chord;

(3) It receives its electrical power from the bus that provides the maximum reliability for operation of the flight recorder without jeopardizing service to essential or emergency loads;

(4) There is an aural visual means for preflight checking of the recorder for proper recorder tape movement;

(5) Except for recorders powered solely by the engine-driven electrical generator system, there is an automatic means to simultaneously stop a recorder that has a data erasure feature and prevent each erasure feature from functioning, within 10 minutes after crash impact; and

(6) There is a means to record data from which the time of each radio transmission either to or from ATC can be determined.

(b) Each nonadjustable record container must be located and mounted so as to minimize the probability of container rapture resulting from crash impact and subsequent damage to the record from fire. In meeting this requirement the record container must be located as far aft as practicable, but need not be aft of the pressurized compartment, and may not be where aft-mounted engines may crush the container upon impact.

(c) A correlation must be established between the flight recorder readings of airspeed, altitude, and heading and the corresponding (taking into account correction factors) of the first pilot's instruments. The correlation must cover the airspeed range over which the airplane is to be operated, the range of altitude to which the airplane is limited, and 360 degrees of heading. Correlation may be established on the ground as appropriate.

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