[Docket Nos. 3060, 5082, 5096, 5094, 6161, 6256; Amdt. 1-7]

PART 1—DEFINITIONS AND ABBREVIATIONS

PART 40—SCHEDULED INTERSTATE AIR CARRIER CERTIFICATION AND OPERATION RULES

PART 41—CERTIFICATION AND OPERATION RULES FOR CERTIFICATED ROUTE AIR CARRIERS ENGAGING IN OVERSEAS AND FOREIGN AIR TRANSPORTATION AND AIR TRANSPORTATION WITHIN HAWAII AND ALASKA

PART 42—AIRCRAFT CERTIFICATION AND OPERATION RULES FOR SUPPLEMENTAL AIR CARRIERS, COMMERCIAL OPERATORS USING LARGE AIRCRAFT, AND CERTIFICATED ROUTE AIR CARRIERS ENGAGING IN CHARTER FLIGHTS OR OTHER SPECIAL SERVICES

PART 121—CERTIFICATION AND OPERATIONS: DOMESTIC, FLAG, AND SUPPLEMENTAL AIR CARRIERS AND COMMERCIAL OPERATORS OF LARGE AIRCRAFT [NEW]

This amendment adds Part 121 to the Federal Aviation Regulations to replace Civil Air Regulations Parts 40, 41, and 42 and certain Special Civil Air Regulations. This amendment completes the Agency recodification program announced in Draft Release 61-25, published in the FEDERAL REGISTER on November 15, 1961 (26 F.R. 10696).

Part 121 was published as a notice of proposed rule making in the FEDERAL REGISTER on August 26, 1964 (29 F.R. 12182) and given further circulation as Notice No. 64-40. As stated in that notice, this Part 121 is basically a consolidation of the rules presently contained in CAR Parts 40, 41, and 42 and is in most cases identical with the proposed recodification of those Parts as issued in separate notices of proposed rule making (proposed Part 121 (CAR 40) published in the FEDERAL REGISTER on May 9, 1964 (29 F.R. 620); proposed Part 123 (CAR 41) published in the FEDERAL REGISTER on January 25, 1964 (29 F.R. 1348); and proposed Part 125 (CAR 42) published in the FEDERAL REGISTER on May 8, 1964 (29 F.R. 6112)).

Comments were received from: the Civil Aeronautics Board; Seaboard World Airlines, Inc.; the Air Line Pilots Association, International; the National Air Carriers Association, Inc.; the Helicopter Association of America; the Air Transport Association of America; and Aerospace Industries Association of America, Inc.

Some of the comments received recommended specific substantive changes to the regulations. Although some of these recommendations appear to be meritorious, they cannot be adopted as a part of the recodification program. The purpose of the program is simply to streamline and clarify present regulatory language and delete obsolete or redundant provisions. To attempt substantive changes, other than relaxatory ones that are completely noncontroversial, would delay the project and be contrary to the ground rules specified for it in Draft Release 61-25. However, all substantive comments received will be retained and will be given careful consideration in future regulatory projects.

Throughout Part 121 there are references to other recodified Federal Aviation Regulations such as the reference in § 121.181(c)(1) to airplanes "certificated under Part 25". In a recodification program, such a reference automatically includes the predecessors to the new parts and therefore it is unnecessary to include a reference to former part numbers. This policy has been followed throughout the recodified regulations. As a consequence, references to Federal Aviation Regulations include their CAR predecessors unless otherwise specifically stated.

Section 121.11 has been rewritten to delete the reference to Part 91 of the Federal Aviation Regulations and also the requirement that certain certificate holders must comply with the ICAO rules when over the high seas. These provisions are deleted since they simply repeat requirements already contained in Part 91 which is applicable to all aircraft, including air carrier aircraft.

One comment stated that the wording of § 121.119(b) would require supplemental air carriers and commercial operators to "prepare forecasts", which is not the intent of CAR § 42.35. Sections 121.101 and 121.119 have been rewritten to make it clear than an air carrier or commercial operator may use forecasts prepared by someone else provided they are prepared from weather reports that meet the stated requirements.

Section 121.189 has been completely rewritten to avoid any implication that the "net takeoff flight path" includes the "minimum distance required for takeoff". Also a new paragraph has been added stating that for the purposes of the section, the terms "takeoff distance, takeoff run, net takeoff flight path, and takeoff path" have the meanings set forth in the rules under which the airplane was certificated. Most of these terms were defined differently in SRs 422, 422A, and 422B and the inclusion of this statement preserves the different definitions for the purposes of this section while avoiding repeating each definition within the section.

Section 121.185(a)(1): Subparagraph (1) of § 121.185(a) has been rewritten to read "The airplane is landed on the most

favorable runway and direction in still air". This is the language presently contained in § 40.77 and is also consistent with § 121.195(b)(1) that is based on the SR 422 series.

Section 121.351 has been rewritten to include a paragraph (b) that reflects paragraph (b) of CAR §§ 41.233 and 42.-233. While the revision note to this section in the notice indicated that it reflected all of §§ 40.233, 41.233, and 42.233, these provisions were inadvertently omitted in the notice of proposed rule making.

Section 121.369(b)(2) has been amended to delete the words "preventive maintenance". This paragraph requires the maintenance manual to include a designation of the items of maintenance and alteration that must undergo "required inspections". Since no "preventive maintenance" item is required to undergo a "required inspection," the term may be deleted here.

Section 121.377 has been amended to limit its applicability to "within the United States, its territories, and possessions". This section is now consistent with the regulations upon which it is based.

Section 121.441(b)(24) has been amended to reflect a part of CAM 40.302-1(q). Subparagraph (24) is based on CAR §§ 40.302(b)(2)(ii), 41.302(b)(2)(ii), and 42.302(b)(2)(ii). It provides that certain flight maneuvers required for the proficiency check may be given in a synthetic trainer but that maneuvers associated with approach procedures for which the lowest minimums are approved must be given in flight. The CAM provision contained a further exception for an air carrier authorized landing minimums based on instrument landing systems and ground control approach. For such a carrier only the maneuvers related to the predominant landing aid on a system wide basis need be given in flight. CAR Parts 41 and 42 before their recent revision contained comparable CAM provisions that were dropped in the revised parts. The Agency believes that this relaxation has worked well in the past and since the deletion of this provision was not based on any Agency finding that safety was involved, that it should be restored.

Section 121.523 reflects the amendment to § 42.322(c) (42.14) published in the FEDERAL REGISTER on December 11, 1964 (29 F.R. 16968).

Section 121.533 (based on § 40.351) has been amended to include a paragraph stating the authority of the pilot in command over other crewmembers during flight time. This paragraph is comparable to the provisions of § 121.535(d) and 121.537(d) which are based on §§ 41.531 and 42.531, respectively. While § 40.531 did not contain this statement as a rule, it was included in the regulation in a note as an interpretation of § 40.531(c).

A new § 121.537 has been added to include the provisions of §§ 40.373, 41.373, and 42.373 related to the closing and locking of the flight crew compartment door during flight. These sections were added to CAR Parts 40, 41, and 42 by amendments 40-45, 41-10, and 42-9, respectively, effective August 6, 1964.

One comment requested that § 121.555 be amended to reflect the deviation authority contained in the .359 sections of CARs 40, 41, and 42. Each of these sections began with the clause "Except when a deviation is necessary in accordance with § 40. (41 or 42) 360, a pilot * * *". The .360 sections contained the emergency situation provisions reflected in § 121.557. Since the emergency provisions authorizing a pilot to deviate from the requirements of the FARs "to the extent required in the interests of safety" apply across the board, it is not necessary to specifically state that deviation authority in § 121.555. In fact, to specifically state the authority in any individual section would raise a question as to the applicability of § 121.557 to other sections where no such statement is contained.

Section 121.647 has been rewritten to state that each person computing fuel requirements shall "consider" certain listed items. "Consider" more closely reflects the requirements of CAR §§ 40.397, 41.397, and 42.397 than did the words "take into account" which were contained in the notice of proposed rule making.

The term "restricted area" used in § 121.649 has been replaced by the phrase "area of local surface visibility restriction". This change was made to avoid any confusion with a "restricted area" as defined in Part 1 and used in Part 73.

A new Subpart W has been added to include the provisions of § 406.19 of the Regulations of the Administrator. That section established crewmember certificates to be issued to crewmembers of United States registered aircraft engaged in international air commerce. The certificates are issued under Annex 9, as amended, to the Convention on International Civil Aviation, to facilitate the entry and clearance of the crewmembers into ICAO contracting States.

Part 121 includes the miscellaneous amendments to CAR Parts 40, 41, and 42 proposed in Notice No. 64-32 published in the FEDERAL REGISTER on May 28, 1964 (29 F.R. 7026). As indicated in that notice, the proposed changes were of a minor substantive nature and would remove unjustified differences in CAR Parts 40, 41, and 42 that would facilitate the recodification of those Parts. With the exception of three items discussed below, the comments received by the Agency either supported the proposed changes or offered no objection thereto.

Section 40.15 (§ 121.73): The amendment to this section requires a domestic air carrier to keep its operations specifications available for inspection at its principal operations office. Section 40.15 currently requires only that the carrier's operating certificate be kept so available. However, the comparable provisions of Parts 41 and 42 include the operations specifications. The Air Transport Association of America (ATA) objected to this proposed amendment on the ground that it would place an unwarranted burden on those air carriers who have separate operations and maintenance bases and who presently keep the appropriate portion of the operations specifications at the appropriate base. The Agency does not agree that this amendment places any additional burden on a carrier. CAR § 40.20 currently requires that "a set of specifications shall be maintained by the air carrier as a separate and complete document." Therefore this amendment would merely require that the separate and complete document required by § 40.20 be kept at the carrier's principal operations office. If the carrier wishes to separate the operations specifications between the maintenance and operations bases, copies of the pertinent portions can easily be furnished by it to each base.

Section 41.302 (§ 121.441): The ATA objected to that part of the proposed amendment to this section that would prohibit a pilot who has unsatisfactorily performed a proficiency check from being used in air carrier operations until he has satisfactorily passed such a check. The ATA contends that this requirement would be burdensome in the case of incomplete checks due to traffic, weather, etc. in which there is insufficient time for additional training and rechecking of the pilot. The Agency realizes that there conceivably could be instances where due to traffic control, weather, or some similar problem, a check could be interrupted and this rule could cause some hardship. However, the Agency feels strongly that a pilot who has failed some part of his proficiency check should not be allowed to return to scheduled flight until he has satisfactorily completed that check. The hardship that could be caused by one of the possibilities discussed above does not, in our opinion, overcome the potential safety hazard that could result if this proposed amendment were withdrawn.

Section 42.396 (§ 121.643): While ATA had no objection to the Agency's proposed amendment to § 42.396, it requested that a relaxatory change be made in this section pertaining to certain charter or off-route flights into Canada. However, since some of these flights are into remote areas of Canada, it is considered that the present fuel requirements should continue to apply to these operations.

Paragraph (c) of § 121.701 has been deleted as proposed in Notice No. 64-48 published in the FEDERAL REGISTER on October 17, 1964 (29 F.R. 14367). Several of the comments received from certain pilots, flight engineers, and aircraft mechanics organizations stated that the posting of the time since last overhaul of the engines in the maintenance log was important to the flight crew. These comments are essentially the same as the comments received from these organizations in connection with Notice No. 63-20 that were discussed in Notice No. 64-48. The Agency had considered these comments before this notice was issued and still believes that this requirement is not necessary and that if a flight crew desires this information it may be obtained from other records.

This amendment adds to Part 1 definitions of "air carrier", "commercial operator", and "show". If additional defi-

nitions prove to be necessary they will be added as needed. It should be noted that all of the definitions, abbreviations, and rules of construction contained in Part 1 apply to Part 121.

This amendment deletes CAR Parts 40, 41, and 42 and Special Civil Air Regulations 422, 422A, 422B, 425C, and 446B.

Other minor changes of a technical nature have been made. They are not substantive and do not impose any burden on regulated persons.

Interested persons have been afforded an opportunity to participate in the making of this regulation, and due consideration has been given to all relevant matter presented. As previously stated this amendment is the final part of the Agency's recodification project begun in 1961. The Agency wishes to thank those persons who submitted comments on this notice and on all other parts of the recodification program. The completion of this program would have been impossible without the constant cooperation of the many aviation associations and individuals interested in aviation who have submitted their comments throughout the program.

In consideration of the foregoing, Chapter I of Title 14 of the Code of Federal Regulations is amended as hereinafter set forth effective April 1, 1965.

1. By amending Part 1 by adding the definitions to § 1.1 as follows:

§ 1.1 General definitions.

* * * * *

"Air carrier" means a person who undertakes directly by lease, or other arrangement, to engage in air transportation.

* * * * *

"Commercial operator" means a person who engages in the carriage by aircraft in air commerce of persons or property as a major enterprise for profit, and not merely incidental to his other business, other than as an air carrier or foreign air carrier or under the authority of Part 375 of this title.

* * * * *

"Show", unless the context otherwise requires, means to show to the satisfaction of the Administrator.

* * * * *

2. By striking out Parts 40, 41, and 42 and Special Civil Air Regulations 422, 422A, 422B, 425C, and 446B.

3. By adding a Part 121 [New] reading as hereinafter set forth:

This amendment is made under the authority of secs. 313(a), 501, 601 through 610, and 1102 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421 through 1430, and 1502).

Issued in Washington, D.C., on December 23, 1964.

N. E. Halaby,
Administrator.

Subpart A—General

Subpart B—Certification Rules for Domestic and Flag Air Carriers

Subpart C—Certification Rules for Supplemental Air Carriers and Commercial Operators

Subpart D—Rules Governing All Certificate Holders Under This Part

Subpart E—Approval of Routes; Domestic and Flag Air Carriers

Subpart F—Approval of Areas and Routes for Supplemental Air Carriers and Commercial Operators

Subpart G—Manual Requirements

Subpart H—Aircraft Requirements

Subpart I—Airplane Performance Operating Limitations

Subpart J—Special Airworthiness Requirements

Authority: The provisions of this Part 121 issued under secs. 313(a), 601, 601 through 610, and 1102, Federal Aviation Act of 1958, 49 U.S.C. 1354(a), 1421 through 1430, and 1502.

Subpart A—General

§ 121.1 Applicability.

(a) Except as prescribed in paragraph (b) of this section, this part prescribes rules governing the certification and operations of the following:

(1) Each air carrier engaging in interstate or overseas air transportation under a certificate of public convenience and necessity or other appropriate economic authority issued by the CAB.

(2) Each air carrier engaging in foreign air transportation under a certificate of public convenience and necessity or other appropriate economic authority issued by the CAB.

(3) Each air carrier covered by subparagraph (1) or (2) of this paragraph when engaging in charter flights or other special service operations.

(4) Each supplemental air carrier when it engages in the carriage of persons or property in air commerce for compensation or hire.

(5) Each commercial operator.

(b) This part does not apply to operations conducted under Part 127, Part 133, or Part 135.

(c) In addition, this part prescribes rules governing—

(1) Each person employed or used by an air carrier or commercial operator in operations under this part, including the maintenance, preventive maintenance and alteration of aircraft; and

(2) Each person who is on board an aircraft being operated under this part.

(d) For the purpose of determining whether a person is a commercial operator under this part, operations are considered to be for compensation or hire when they are a major enterprise for profit and not merely incidental to the person's other business.

(e) For the purpose of this part, "passenger-carrying aircraft" or "passenger-carrying operation" means one carrying any person other than a flight crewmember or other crewmember, company employee, authorized government representative, or person accompanying a shipment.

§ 121.3 Certification requirements: general.

(a) Except as provided in paragraph (b) of this section, no person may engage in scheduled interstate air transportation within the 48 contiguous States or the District of Columbia without, or in violation of, a domestic air carrier operating certificate and appropriate

operations specifications issued under this part. An air carrier holding such a certificate is hereafter in this part referred to as a "domestic air carrier".

(b) The Administrator may authorize any air carrier holding authority to engage in scheduled cargo operations under Title IV of the Federal Aviation Act to conduct those operations under the certification and operation rules applicable to carriers covered by paragraph (e) of this section.

(c) Except as provided in paragraph (d) of this section, no person may engage in scheduled air transportation, other than that described in paragraph (a), without, or in violation of, a flag air carrier operating certificate and appropriate operations specifications issued under this part. An air carrier holding such a certificate is hereafter in this part referred to as a "flag air carrier".

(d) A domestic air carrier may, in the case of segments of routes extending outside the 48 contiguous States and the District of Columbia, be authorized to conduct operations over those route segments under the domestic air carrier certification and operation rules.

(e) No person may engage in air transportation (other than that described in paragraph (a) or (c) of this section) without, or in violation of, a supplemental air carrier certificate and appropriate operations specifications issued under this part. An air carrier holding a supplemental air carrier certificate is hereafter in this part referred to as a "supplemental air carrier".

(f) No person (except a person covered by paragraph (a), (b), (c), (d), or (e) of this section) may engage in the carriage of persons or property for compensation or hire in air commerce without, or in violation of a commercial operator certificate and appropriate operations specifications issued under this part.

(g) A domestic or flag air carrier or an air carrier holding a certificate under Part 127 is not eligible for or required to obtain a separate certificate for operations under paragraph (e) or (f) of this section, but must obtain authority to conduct those operations by appropriate amendments to its operations specifications.

§ 121.5 Charter flights or other special service operation: flag and domestic air carriers.

Each flag or domestic air carrier, or air carrier holding an operating certificate under Part 127 shall conduct the following operations under the rules of this part applicable to supplemental air carriers and commercial operators:

(a) Any charter flight or other special service conducted over routes into airports listed in its operations specifications, unless the air carrier obtains authority from the Administrator to conduct those operations under the rules that would otherwise apply to that air carrier's operations.

(b) Any charter flight or other special service that involves, in whole or in part, off-route operations.

§ 121.7 Intrastate common carriage by commercial operator.

An applicant for a commercial operator certificate, or a commercial operator, who carries or intends to carry passengers for compensation or hire as a common carrier between two points entirely within any State with the frequency set forth in paragraph (a) or (b) of this section shall show that it is able to, and will conduct, those operations under the rules applicable to domestic air carriers or any other rules that the Administrator finds to be necessary to provide an appropriate level of safety for the operation:

(a) Two flights, or one round trip a week on the same day or days of the week for eight or more weeks in any 90 consecutive days.

(b) A total of 36 or more flights or 18 or more round trips in any 90 consecutive days.

§ 121.9 Certain operations of small aircraft.

Upon application, the Administrator may issue operations specifications to an air carrier conducting operations under this part, authorizing it to conduct operations with small aircraft under Part 135 if he finds that safety in air transportation and the public interest allows it. Operations specifications issued under this section contain such operating limitations and requirements as the Administrator finds necessary.

§ 121.11 Additional rules applicable to operations subject to this part: flag air carriers, supplemental air carriers, and commercial operators.

Each flag air carrier, supplemental air carrier, and commercial operator shall while operating an airplane within a foreign country, comply with the air traffic rules of the country concerned and local airport rules, except where any rule of this part is more restrictive and may be followed without violating the rules of that country.

§ 121.13 Rules applicable to helicopter operations: deviation authority.

(a) Each person operating a helicopter under this part shall comply with §§ 121.5, 121.9, 121.11, Subpart C (except holders of certificates under Part 127), Subpart F (except holders of certificates under Part 127), Subpart G, 121.153, 121.155, 121.157(e), 121.163, 121.315, Subpart L, 121.383, 121.385, 121.433, 121.435, 121.437, 121.501, 121.533 through 121.563, 121.567, 121.575, 121.597, 121.599, 121.603, 121.609, 121.611 through 121.617, 121.623 through 121.631, 121.647, 121.653, 121.655, 121.657, 121.659, 121.665, 121.667, and Subpart V.

(b) In addition to the rules of this part listed in paragraph (a) of this section, each person operating a helicopter shall comply with §§ 127.81, 127.83, 127.91, 127.93, 127.101 through 127.117, 127.119, 127.121, 127.123, 127.125, 127.145, 127.151 through 127.161, 127.171 through 127.177, 127.231 through 127.261, and 127.301 through 127.319.

(c) The Administrator may issue operations specifications authorizing a deviation from any specific requirement for helicopter operations if he finds that the deviation provides a substantially equivalent standard of safety.

Subpart B—Certification Rules for Domestic and Flag Air Carriers

§ 121.21 Applicability.

This subpart prescribes certification rules for domestic air carriers and flag air carriers.

§ 121.23 Operations specifications not a part of certificate.

Except for those operations specifications specifying airport and route or route segment authorizations, air carrier operations specifications are not a part of an air carrier's operating certificate.

§ 121.25 Contents of certificate and operations specifications.

(a) Each domestic and flag air carrier operating certificate contains the following:

(1) The air carrier's name.

(2) The airports to and from which it may operate.

(3) The approved routes over which it may operate.

These airports and routes are incorporated into the air carrier operating certificate by reference to the authorized airports and approved routes listed in that air carrier's operations specifications.

(b) Each air carrier's operations specifications contain the following:

(1) The kinds of operations authorized.

(2) The types of airplanes authorized for use.

(3) En route authorizations and limitations.

(4) Airport authorizations.

(5) Airport limitations.

(6) Time limitations, or standards for determining time limitations, for overhauls, inspections, and checks of airframes, engines, propellers, and appliances.

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

(8) Interline equipment interchange requirements, if relevant.

(9) Any other item that the Administrator determines is necessary to cover a particular situation.

§ 121.27 Issue of certificate.

(a) An applicant under this subpart is entitled to an operating certificate if—

(1) He holds a certificate of public convenience and necessity or other appropriate economic authority issued by the Civil Aeronautics Board; and

(2) The Administrator, after investigation, finds that the applicant is properly and adequately equipped and able to conduct a safe operation in accordance with this part and operations specifications issued under this part.

(b) In the case of operations conducted under the rules of this Part applicable to domestic air carriers in small airplanes, or conducted under a temporary authorization issued by the Civil Aeronautics Board, the Administrator issues operations specifications

prescribing appropriate requirements that deviate from the requirements of this part whenever, after investigation, he finds that general standards of safety for such an operation require or allow a deviation from such a requirement for a particular operation or class of operations for which an application for an air carrier operating certificate has been made.

(c) Whenever, after investigation, the Administrator determines that the general standards of safety for flag air carrier operations conducted—

(1) Between points in Alaska; or

(2) Under a temporary authorization issued by the Civil Aeronautics Board; require or allow a deviation from any requirement of this part for a particular operation or class of operations for which an application for an air carrier operating certificate has been made, he issues operations specifications prescribing appropriate requirements that deviate from the requirements of this Part.

§ 121.29 Duration of certificate.

(a) An air carrier operating certificate issued under this subpart is effective until termination of the certificate of public convenience and necessity or other economic authority issued by the Civil Aeronautics Board to the air carrier or until it is surrendered or the Administrator suspends, revokes, or otherwise terminates it.

(b) If the Administrator suspends or revokes such an air carrier operating certificate, the holder of that certificate shall return it to the administrator.

Subpart C—Certification Rules for Supplemental Air Carriers and Commercial Operators

§ 121.41 Applicability.

This subpart prescribes certification rules for supplemental air carriers and commercial operators.

§ 121.43 Operations specifications not a part of certificate.

Operations specifications are not a part of a supplemental air carrier or commercial operator operating certificate.

§ 121.45 Contents of certificate and operations specifications.

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

(1) The holder's name.

(2) A description of the operations authorized.

(3) The date it is issued and the date it terminates.

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

(1) The kinds of operations authorized.

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

(3) En route authorizations and limitations, including areas of operation.

(4) Special airport authorizations.

(5) Special airport limitations.

(6) Time limitations, or standards for determining time limitations, for overhauls, inspections, and checks of airframes, aircraft engines, propellers, and appliances.

(7) Procedures for control of weight and balance of aircraft.

(8) Any other item that the Administrator determines is necessary to cover a particular situation.

§ 121.47 Application for supplemental air carrier and commercial operator certificates.

(a) Each applicant for the original issue or renewal of a supplemental air carrier or commercial operator certificate must submit his application, in a form and manner prescribed by the Administrator, to the FAA Air Carrier District Office in whose area the applicant proposes to establish or has established its principal operations base, at least 60 days before the date of intended operations, or in the case of a renewal application, at least 60 days before the expiration date of the certificate.

(b) Each application submitted under paragraph (a) of this section must contain a signed statement showing the following:

(1) For corporate applicants:

(i) The name and address of each stockholder who owns five percent or more of the total voting stock of the corporation, and if that stockholder is not the sole beneficial owner of the stock, the name and address of each beneficial owner. An individual is considered to own the stock owned, directly or indirectly, by or for his spouse, his children, his grandchildren, or his parents.

(ii) The name and address of each director and each officer, and each person employed or who will be employed in a management position described in § 121.59.

(iii) The name and address of each person directly or indirectly controlling or controlled by the applicant, and each person under direct or indirect control with the applicant.

(2) For non-corporate applicants:

(i) The name and address of each person having a financial interest therein and the nature and extent of that interest.

(ii) The name and address of each person employed or who will be employed in a management position described in § 121.59.

(c) In addition, each applicant for the original issue or renewal of a commercial operator certificate must submit with the application a signed statement showing—

(1) The financial information listed in § 121.49; and

(2) The nature and scope of its intended operation, including the name and address of each person, if any, with whom the applicant has a contract to provide services as a commercial operator and the scope, nature, date, and duration of each of those contracts.

(d) Each applicant for, or holder of, a certificate issued under this subpart, shall notify the Administrator within 10 days after—

(1) A change in any of the persons, or the names and addresses of any of the persons, submitted to the Administrator under paragraph (b) (1) or (2) of this section; or

(2) A change in the financial information submitted to the Administrator under § 121.49 that occurs while the application for the issue or renewal is pending before the FAA and that would make the applicant's financial situation substantially less favorable than originally reported.

§ 121.49 Commercial operator: financial information required.

(a) Each applicant for the original issue or renewal of a commercial operator certificate must submit the following financial information:

(1) A balance sheet that shows assets, liabilities, and net worth, as of a date not more than 60 days before the date of application.

(2) In the case of an application for renewal, a profit and loss statement for a fiscal year ending on a date not more than 60 days before the date of the application, with separation of items relating to applicant's commercial operator activities from his other business activities. The applicant shall submit a listing and brief description of the nature and scope of the commercial operator contracts that gave rise to the operating income shown on the profit and loss statement, including the names of the contracting parties and the date and duration of each contract. However, if the applicant's regular fiscal year for income tax purposes ends on a date more than 60 days before the date of application, the applicant may submit a profit and loss statement covering its normal fiscal year, plus a supplementary profit and loss statement for the period from the end of the regular fiscal year to a date not more than 60 days before the date of application.

(3) An itemization of over-due liabilities showing amounts, names and addresses of creditors, description of indebtedness, and due date of obligations.

(4) An itemization of claims in litigation against the applicant showing the amounts claimed, the name and address of each claimant, and a description of each claim.

(5) A detailed analysis covering the first three months of the proposed operation after the possible issue or renewal of the certificate applied for that shows—

(i) Estimated amount and source of both operating and non-operating revenue, including identification of its existing and anticipated income producing contracts and estimated revenue per mile or hour of operation by aircraft type;

(ii) Estimated amount of operating and non-operating expenses by expense objective classification; and

(iii) Estimated profit or loss.

(6) An estimate of the cash that will be needed during the first three months of the proposed operation after the possible issue or renewal date of the certificate applied for to cover—

(i) Acquisition of property and equipment;

(ii) Retirement of debt;

(iii) Additional working capital;

(iv) Operations (losses); and

(v) Other (explain).

(7) An estimate of the cash that will be available from the following sources during the first three months of the pro-

posed operation after the possible issue or renewal of the certificate applied for that shows—

(i) Sale of property or flight equipment;

(ii) New debt;

(iii) New equity;

(iv) Working capital reduction;

(v) Operations (profits);

(vi) Depreciation and amortization; and

(vii) Other (explain).

(8) Any other financial information the Administrator requires to enable him to determine that the applicant has sufficient financial resources to conduct its operations with the degree of safety required in the public interest.

(b) Each financial statement filed with the FAA under this part must be based on accounts prepared and maintained on an accrual basis in accordance with generally accepted accounting principles applied on a consistent basis, and must contain the name and address of the applicant's public accounting firm, if any.

§ 121.51 Issue of certificate.

(a) An applicant for a certificate under this subpart is entitled to the certificate if he is a citizen of the United States and the Administrator, after investigation (including any necessary verification of financial and other information submitted) finds that the applicant—

(1) Holds the economic authority required by the Civil Aeronautics Board, if any;

(2) Is not disqualified under paragraph (b) of this section; and

(3) 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.

(b) The Administrator may deny an application for a certificate under this subpart if he finds—

(1) That an air carrier or commercial operator certificate previously issued to the applicant was revoked;

(2) That a person who was employed in a management position similar to any listed under § 121.59 with (or has exercised control with respect to) any air carrier or commercial operator whose operating certificate has been revoked, will be employed in any of those positions or a similar position (or will be in control of or have a substantial ownership interest in the applicant), and that the person's employment or control contributed materially to the reasons for revoking that certificate; or

(3) In the case of an applicant for a commercial operator certificate, that for financial reasons the applicant is not able to conduct a safe operation.

§ 121.53 Duration of certificate.

(a) A certificate issued under this subpart is effective for one year unless the Administrator sooner suspends, revokes, or otherwise terminates it, or in the case of a supplemental air carrier, upon termination of the economic authority required by the Civil Aeronautics Board, if sooner.

(b) The Administrator may suspend or revoke a certificate under section 609 of the Federal Aviation Act of 1958 and the applicable procedures of Part 13 for any cause that, at the time of suspension or revocation, would have been grounds for denying an application for a certificate.

(c) If the Administrator suspends or revokes a certificate or it is otherwise terminated, the holder of that certificate shall return it to the Administrator.

§ 121.55 Commercial operator: supplemental periodic financial report.

(a) Each holder of a commercial operator certificate shall, within 45 days after his original or renewed certificate has been in effect for four months, submit a signed financial statement to the FAA that shows profit and loss for—

(1) The four-month period after the date the certificate was issued or renewed, as the case may be; and

(2) Any period immediately preceding the date of certificate issue or renewal not covered by the preceding financial statement filed under § 121.47(c)(1).

(b) Each holder shall submit a listing and brief description of the nature and scope of the contracts that gave rise to the operating income shown on the profit and loss statement, including the names of the contracting parties, and the date and duration of each contract. In addition, it shall submit all other information required for original issue of a certificate under § 121.47(c)(1).

§ 121.57 Obtaining waivers and authority for deviations.

(a) The Administrator may, upon application by the supplemental air carrier or commercial operator, authorize deviations from the applicable requirements of this part, by an appropriate amendment to the operations specifications, for military contract or for emergency operations. The Administrator may, at any time, terminate any grant of deviation authority or waiver issued under this section. Each supplemental air carrier and commercial operator authorized deviations under this section shall comply with the terms of the authorization when conducting operations affected thereby.

(b) If, in the case of military contracts, the Department of Defense certifies to the Administrator that an operation is essential to the national defense and requires a requested deviation, and the Administrator finds that the deviation is not based on an economic advantage or convenience to the air carrier or commercial operator or the United States, the Administrator may authorize deviations for—

(1) Operations conducted under a contract with an armed force as the primary contractor; or

(2) Operations conducted for an armed force under a subcontract with a primary contractor.

(c) In emergency conditions the Administrator may authorize deviations for operations if those conditions necessitate the transportation of persons or supplies for the protection of life or property, and he finds that a deviation is necessary for the expeditious conduct of the operation.

(d) The Administrator may, by an appropriate amendment to the operations specifications, waive, in whole or in part, submission of the financial information required from a commercial operator in a renewal application or supplemental periodic financial report if—

(1) Application for the waiver is filed at least 30 days before the information is due; and

(2) The Administrator finds that the submission is not required in the public interest, based on information as to the operator's—

(i) Financial standing;

(ii) Management; and

(iii) Kind of operations.

The filing of an application for a waiver under this paragraph does not automatically extend the time for submitting the required information.

§ 121.59 Management personnel required.

(a) Each applicant for a certificate under this subpart must show that it has enough qualified management personnel to provide the highest degree of safety in its operations and that those personnel are employed on a full-time basis in the following or equivalent positions:

(1) General manager.

(2) Director of operations (who may be the general manager if qualified).

(3) Director of maintenance.

(4) Chief pilot.

(5) Chief inspector.

(b) Upon application by the supplemental air carrier or commercial operator the Administrator may approve different positions or numbers of positions than those listed in paragraph (a) of this section for a particular operation if the air carrier or commercial operator shows that it can perform the operation with the highest degree of safety under the direction of fewer or different categories of management personnel due to—

(1) The kind of operation involved;

(2) The number and type of aircraft used; and

(3) The area of operations.

The title and number of positions so approved are set forth in the operations specifications of the air carrier or commercial operator.

(c) Each supplemental air carrier and commercial operator shall—

(1) Set forth the duties, responsibilities, and authority, of the personnel required by this section, in the general policy section of the air carrier manual or commercial operator manual;

(2) List in the manual the names and addresses of the persons assigned to those positions; and

(3) Within at least 10 days, notify the FAA Air Carrier District Office charged with the overall inspection of the air carrier or commercial operator, of any change made in the assignment of persons to the listed positions.

§ 121.61 Management personnel: qualifications.

(a) No person may serve as director of operations unless he knows the contents of the air carrier's or commercial operator's operations manual and operations specifications, and the provisions of this part necessary to the proper performance of his duties and—

(1) Holds, or has held, an airline transport pilot certificate and has had at least three years of experience as pilot in command of a large aircraft; or

(2) Has had at least three years of experience as director of operations, of an operation using large aircraft, or a position of comparable responsibility.

(b) No person may serve as chief pilot unless he—

(1) Holds a current airline transport pilot certificate with appropriate ratings for the type of aircraft used;

(2) Has had at least three years of experience as a pilot in command of a large aircraft with an air carrier or commercial operator; and

(3) Knows the contents of the air carrier's or commercial operator's manual and operations specifications, and the provisions of this part necessary to the proper performance of his duties.

(c) No person may serve as director of maintenance unless he—

(1) Holds a current mechanic certificate with either an airframe or powerplant rating, and has had at least five years of experience in the maintenance of large aircraft, one year of which must have been in a supervisory capacity; and

(2) Knows the maintenance parts of the air carrier's or commercial operator's manual and operations specifications and the applicable maintenance provisions of this part.

(d) No person may serve as chief inspector unless he—

(1) Holds a current mechanic certificate with both airframe and powerplant ratings, and has held these ratings for at least three years;

(2) Has had at least three years of diversified maintenance experience on large aircraft with an air carrier, commercial operator, or certificated repair station, one year of which must have been as a maintenance inspector; and

(3) Knows the maintenance parts of the air carrier's or commercial operator's manual and operations specifications, and the applicable maintenance provisions of this part.

Subpart D—Rules Governing All Certificate Holders Under This Part

§ 121.71 Applicability.

This subpart prescribes rules governing all certificate holders under this Part.

§ 121.73 Availability of certificate and operations specifications.

Each certificate holder shall make its operating certificate and operations specifications available for inspection by the Administrator at its principal operations office.

§ 121.75 Use of operations specifications.

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

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

§ 121.77 Amendment of certificate.

(a) The Administrator may amend an operating certificate issued under this Part—

(1) Upon application by the holder, if the Administrator determines that safety in air transportation (or in air commerce, in the case of a commercial operator) and the public interest allows the amendment; or

(2) Under section 609 of the Federal Aviation Act of 1958 (49 U.S.C. 1429) and Part 13 of this chapter, if the Administrator determines that safety in air transportation (or in air commerce, in the case of a commercial operator) and the public interest requires the amendment.

(b) An applicant for an amendment to an operating certificate must file his application with the FAA Air Carrier District Office charged with the overall inspection of his operations at least 15 days before the proposed effective date of that amendment, unless a shorter filing period is allowed by that office.

(c) At any time within 30 days after refusal of the District Office to approve an application for amendment, the holder may petition the Administrator personally to reconsider the refusal.

§ 121.79 Amendment of operations specifications.

(a) The Administrator may amend any operations specifications issued under this Part, except those that are a part of the air carrier operating certificate—

(1) Upon application by the holder, if the Administrator determines that safety in air transportation (or in air commerce, in the case of a commercial operator) and the public interest allows the amendment; or

(2) If the Administrator determines that safety in air transportation (or in air commerce, in the case of a commercial operator) and the public interest requires the amendment.

(b) In the case of an amendment under paragraph (a)(2) of this section, the Administrator notifies the holder, in writing, of the proposed amendment, fixing a reasonable period (but not less than seven days) within which the holder may submit written information, views, and arguments on the amendment. After considering all relevant material presented, the Administrator notifies the holder of any amendment adopted, or rescinds the notice. The amendment becomes effective not less than 30 days after the holder receives notice of it, unless the holder petitions the Administrator personally to reconsider the amendment, in which case its effective date is stayed pending a decision by the Administrator. If the Administrator finds that there is an emergency requiring immediate action with respect to safety in air transportation, that makes the procedure in this paragraph impracticable or contrary to the public interest, he may issue an amendment, effective without stay, on the date the holder receives notice of it. In such a case, the Administrator incorporates the finding, and a brief statement of the reasons for it, in the notice of the amended operations specifications to be adopted.

(c) An applicant must file his application for an amendment of operations specifications with the FAA District Office charged with the overall inspection of its operations at least 15 days before the date that he proposes for the amendment to become effective, unless a shorter filing period is allowed by that office.

(d) Within 30 days after receiving from the District Office a notice of refusal to approve the application, for amendment, the applicant may petition the Administrator personally to reconsider the refusal to amend.

(e) Airport and route authorizations may be amended under § 121.77.

§ 121.81 Inspection authority.

(a) Each certificate holder shall allow the Administrator, at any time or place, to make any inspections or tests to determine its compliance with the Federal Aviation Act of 1958, the Federal Aviation Regulations, its operating certificate and operations specifications, or its eligibility to continue to hold its certificate.

(b) In the case of a supplemental air carrier or commercial operator, these inspections and tests include inspections and tests of financial books and records, except that the Administrator does not exercise this authority with respect to the financial books and records of a supplemental air carrier if the information sought can be obtained from the Civil Aeronautics Board.

§ 121.83 Change of address.

Each certificate holder shall notify the FAA Air Carrier District Office charged with the overall inspection of its operations, in writing, at least 30 days in advance, of any change in the address of its principal business office, its principal operations base, or its principal maintenance base.

Subpart E—Approval of Routes: Domestic and Flag Air Carriers

§ 121.91 Applicability.

This subpart prescribes rules for obtaining approval of routes by domestic or flag air carriers.

§ 121.93 Route requirements: general.

(a) Each domestic or flag air carrier seeking a route approval must show—

(1) That it is able to conduct satisfactory scheduled operations between each regular, provisional, and refueling airport over that route or route segment; and

(2) That the facilities and services required by §§ 121.97 through 121.107 are available and adequate for the proposed operation.

The Administrator approves a route outside of controlled airspace if he determines that traffic density is such that an adequate level of safety can be assured.

(b) Paragraph (a) of this section does not require actual flight over a route or route segment if the air carrier shows that the flight is not essential to safety, considering the availability and adequacy of airports, lighting, maintenance, communication, navigation, fueling,

ground, and airplane radio facilities, and the ability of the personnel to be used in the proposed operation.

§ 121.95 Route width.

(a) Approved routes and route segments over U.S. Federal airways or foreign airways (and advisory routes in the case of flag air carriers) have a width equal to the designated width of those airways or routes. Whenever the Administrator finds it necessary to determine the width of other approved routes, he considers the following:

(1) Terrain clearance.
(2) Minimum en route altitudes.
(3) Ground and airborne navigation aids.
(4) Air traffic density.
(5) ATC procedures.

(b) Any route widths of other approved routes determined by the Administrator are specified in the air carrier's operations specifications.

§ 121.97 Airports.

Each domestic and flag air carrier must show that each route it submits for approval has enough airports that are properly equipped and adequate for the proposed operation, considering such items as size, surface, obstructions, facilities, public protection, lighting, navigational and communications aids, and ATC.

§ 121.99 Communications facilities.

Each domestic and flag air carrier must show that a two-way air/ground radio communication system is available at points that will ensure reliable and rapid communications, under normal operating conditions over the entire route (either direct or via approved point to point circuits) between each airplane and the appropriate dispatch office, and between each airplane and the appropriate air traffic control unit. For all domestic air carrier operations and for flag air carrier operations in the 48 contiguous States and the District of Columbia, the communications systems between each airplane and the dispatch office must be independent of any system operated by the United States.

§ 121.101 Weather reporting facilities.

(a) Each domestic and flag air carrier must show that enough weather reporting services are available along each route to ensure weather reports and forecasts necessary for the operation.

(b) No domestic or flag air carrier may use any weather report to control flight unless—

(1) For operations within the 48 contiguous States and the District of Columbia, it was prepared by the U.S. Weather Bureau or a source approved by the Weather Bureau; or

(2) For operations conducted outside the 48 contiguous States and the District of Columbia, it was prepared by a source approved by the Administrator.

(c) Each domestic or flag air carrier that uses forecasts to control flight movements shall use forecasts prepared from weather reports specified in paragraph (b) of this section.

§ 121.103 En route navigational facilities.

(a) Except as provided in paragraph (b) of this section, each domestic and flag air carrier must show, for each proposed route, that nonvisual ground aids are—

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

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

Except for those aids required for routes to alternate airports, nonvisual ground aids required for approval of routes outside of controlled airspace are listed in the air carrier's operations specifications.

(b) Nonvisual ground aids are not required for—

(1) Day VFR operations that the air carrier shows can be conducted safely by pilotage because of the characteristics of the terrain;

(2) Night VFR operations on routes that the air carrier shows have reliably lighted landmarks adequate for safe operation; and

(3) Operations on route segments where the use of celestial or other specialized means of navigation is approved by the Administrator.

§ 121.105 Servicing and maintenance facilities.

Each domestic and flag air carrier must show that competent personnel and adequate facilities and equipment (including spare parts, supplies, and materials) are available at such points along the air carrier's route as are necessary for the proper servicing, maintenance, and preventive maintenance of airplanes and auxiliary equipment.

§ 121.107 Dispatch centers.

Each domestic and flag air carrier must show that it has enough dispatch centers, adequate for the operations to be conducted, that are located at points necessary to ensure proper operational control of each flight.

Subpart F—Approval of Areas and Routes for Supplemental Air Carriers and Commercial Operators

§ 121.111 Applicability.

This subpart prescribes rules for obtaining approval of areas and routes by supplemental air carriers and commercial operators.

§ 121.113 Area and route requirements: general.

(a) Each supplemental air carrier or commercial operator seeking route and area approval must show—

(1) That it is able to conduct operations within the United States in accordance with subparagraphs (3) and (4) of this paragraph;

(2) That it is able to conduct operations in accordance with the applicable requirements for each area outside the United States for which authorization is requested;

(3) That it is equipped and able to conduct operations over, and use the navigational facilities associated with, the Federal airways, foreign airways, or advisory routes (ADR's) to be used; and

(4) That it will conduct all IFR and night VFR operations over Federal airways, foreign airways, controlled airspace, or advisory routes (ADR's).

(b) Notwithstanding paragraph (a) (4) of this section, the Administrator may approve a route outside of controlled airspace if the supplemental air carrier or commercial operator shows the route is safe for operations and the Administrator finds that traffic density is such that an adequate level of safety can be assured. The air carrier or commercial operator may not use such a route unless it is approved by the Administrator and is listed in the air carrier's or commercial operator's operations specifications.

§ 121.115 Route width.

(a) Routes and route segments over Federal airways, foreign airways, or advisory routes have a width equal to the designated width of those airways or advisory routes. Whenever the Administrator finds it necessary to determine the width of other routes, he considers the following:

(1) Terrain clearance.
(2) Minimum en route altitudes.
(3) Ground and airborne navigation aids.
(4) Air traffic density.
(5) ATC procedures.

(b) Any route widths of other routes determined by the Administrator are specified in the air carrier's or commercial operator's operations specifications.

§ 121.117 Airports.

No supplemental air carrier or commercial operator may use any airport unless it is properly equipped and adequate for the proposed operation, considering such items as size, surface, obstructions, facilities, public protection, lighting, navigational and communications aids, and ATC.

§ 121.119 Weather reporting facilities.

(a) No supplemental air carrier or commercial operator may use any weather report to control flight unless it was prepared and released by the U.S. Weather Bureau or a source approved by the Weather Bureau. For operations outside the U.S., or at U.S. Military airports, where those reports are not available, the air carrier or commercial operator must show that its weather reports are prepared by a source found satisfactory by the Administrator.

(b) Each supplemental air carrier or commercial operator that uses forecasts to control flight movements shall use forecasts prepared from weather reports specified in paragraph (a) of this section.

§ 121.121 En route navigational facilities.

(a) Except as provided in paragraph (b) of this section, no supplemental air carrier or commercial operator 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) Nonvisual ground aids are not required for—

(1) Day VFR operations that can be conducted safely by pilotage because of the characteristics of the terrain;

(2) Night VFR operations on lighted airways or on routes that the Administrator determines have reliable landmarks adequate for safe operation; or

(3) Operations on route segments where the use of celestial or other specialized means of navigation is approved.

(c) Except for those aids required for routes to alternate airports, the nonvisual ground navigational aids that are required for approval of routes outside of controlled airspace are specified in the air carrier's or commercial operator's operations specifications.

§ 121.123 Servicing and maintenance facilities.

Each supplemental air carrier or commercial operator must show that competent personnel and adequate facilities and equipment (including spare parts, supplies, and materials) are available for the proper servicing, maintenance, and preventive maintenance of aircraft and auxiliary equipment.

§ 121.125 Flight following system.

(a) Each supplemental air carrier or commercial operator must show that it has—

(1) An approved flight following system established in accordance with Subpart U of this part and adequate for the proper monitoring of each flight, considering the operations to be conducted; and

(2) Flight following centers located at those points necessary—

(i) To ensure the proper monitoring of the progress of each flight with respect to its departure at the point of origin and arrival at its destination, including intermediate stops and diversions therefrom, and maintenance or mechanical delays encountered at those points or stops; and

(ii) To ensure that the pilot in command is provided with all information necessary for the safety of the flight.

(b) A supplemental air carrier or commercial operator may arrange to have flight following facilities provided by persons other than its employees, but in such a case the air carrier or commercial operator continues to be primarily responsible for operational control of each flight.

(c) A flight following system need not provide for in-flight monitoring by a flight following center.

(d) The supplemental air carrier's or commercial operator's operations specifications specify the flight following system it is authorized to use and the location of the centers.

§ 121.127 Flight following system: requirements.

(a) Each supplemental air carrier or commercial operator using a flight following system must show that—

(1) The system has adequate facilities and personnel to provide the information necessary for the initiation and safe conduct of each flight to—

(i) The flight crew of each aircraft; and

(ii) The persons designated by the air carrier or commercial operator to perform the function of operational control of the aircraft; and

(2) The system has a means of communication by private or available public facilities (such as telephone, telegraph, or radio) to monitor the progress of each flight with respect to its departure at the point of origin and arrival at its destination, including intermediate stops and diversions therefrom, and maintenance or mechanical delays encountered at those points or stops.

(b) The supplemental air carrier or commercial operator must show that the personnel specified in paragraph (a) of this section, and those it designates to perform the function of operational control of the aircraft, are able to perform their required duties.

Subpart G—Manual Requirements

§ 121.131 Applicability.

This subpart prescribes requirements for preparing and maintaining manuals by all certificate holders.

§ 121.133 Preparation.

(a) Each domestic and flag air carrier shall prepare and keep current a manual for the use and guidance of flight and ground operations personnel in conducting its operations.

(b) Each supplemental air carrier and commercial operator shall prepare and keep current a manual for the use and guidance of flight, ground operations, and management personnel in conducting its operations.

§ 121.135 Contents.

(a) Each manual required by § 121.133 must—

(1) Include instructions and information necessary to allow the personnel concerned to perform their duties and responsibilities with a high degree of safety;

(2) Be in a form that is easy to revise;

(3) Have the date of last revision on each page concerned; and

(4) Not be contrary to any applicable Federal regulation and, in the case of a flag or supplemental air carrier, any applicable foreign regulation, or the certificate holder's operations specifications or operating certificate.

(b) The manual may be in two or more separate parts, containing together all of the following information, but each part must contain that part of the information that is appropriate for each group of personnel:

(1) General policies.

(2) Duties and responsibilities of each crewmember and appropriate members of the ground organization and in the case of supplemental air carriers and commercial operators, management personnel.

(3) Reference to appropriate Federal Aviation Regulations.

(4) Flight dispatching and operational control, including procedures for coordinated dispatch or flight control or flight following procedures, as applicable.

(5) En route flight, navigation, and communication procedures, including procedures for the dispatch or release or continuance of flight if any item of equipment required for the particular type of operation becomes inoperative or unserviceable en route.

(6) For domestic or flag air carriers, appropriate information from the en route operations specifications, including for each approved route the types of aircraft authorized, their crew complement, the type of operation such as VFR, IFR, day, night, etc., and any other pertinent information.

(7) For supplemental air carriers or commercial operators, appropriate information from the operations specifications, including the area of operations authorized, the types of aircraft authorized, their crew complement, the type of operation such as VFR, IFR, day, night, etc., and any other pertinent information.

(8) Appropriate information from the airport operations specifications, including for each airport—

(i) Its location (domestic and flag air carrier operations only);

(ii) Its designation (regular, alternate, provisional, etc.) (domestic and flag air carrier operations only);

(iii) The types of aircraft authorized (domestic and flag air carrier operations only);

(iv) Instrument approach procedures;

(v) Landing and takeoff minimums; and

(vi) Any other pertinent information.

(9) Takeoff, en route, and landing weight limitations.

(10) Procedures for familiarizing passengers with the use of emergency equipment, during flight.

(11) Emergency equipment and procedures.

(12) The method of designating succession of command of flight crewmembers.

(13) Procedures for determining the usability of landing and takeoff areas, and for disseminating pertinent information thereon to operations personnel.

(14) Procedures for operating in periods of ice, hail, thunderstorms, turbulence, or any potentially hazardous meteorological condition.

(15) Airman training programs, including appropriate ground, flight, and emergency phases.

(16) Instructions and procedures for maintenance, preventive maintenance, and servicing.

(17) Time limitations, or standards for determining time limitations, for

overhauls, inspections, and checks of airframes, engines, propellers, and appliances.

(18) Procedures for refueling aircraft, eliminating fuel contamination, protection from fire (including electrostatic protection), and supervising and protecting passengers during refueling.

(19) Airworthiness inspections, including instructions covering procedures, standards, responsibilities, and authority of inspection personnel.

(20) Methods and procedures for maintaining the aircraft weight and center of gravity within approved limits.

(21) Where applicable, pilot and dispatcher route and airport qualification procedures.

(22) Accident notification procedures.

(23) Other information or instructions relating to safety.

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

§ 121.137 Distribution.

(a) Each certificate holder shall furnish copies of the manual required by § 121.133 (and the changes and additions thereto) or appropriate parts of the manual to—

(1) Its appropriate ground operations and maintenance personnel;

(2) Crewmembers; and

(3) Representatives of the Administrator assigned to it.

(b) Each person to whom a manual or appropriate parts of it are furnished under paragraph (a) of this section shall keep it up to date with the changes and additions furnished to him.

§ 121.139 Requirement for manual aboard aircraft: supplemental air carriers and commercial operators.

(a) Except as provided in paragraph (b) of this section, each supplemental air carrier and commercial operator shall carry appropriate parts of the manual on each aircraft when away from the principal base. The appropriate parts must be available for use of ground or flight personnel.

(b) If a supplemental air carrier or commercial operator is able to perform all scheduled maintenance at specified stations where it keeps maintenance parts of the manual, it does not have to carry those parts of the manual aboard the aircraft en route to those stations.

§ 121.141 Aircraft Flight Manual.

(a) Each certificate holder shall keep a current approved Aircraft Flight Manual for each type of transport category aircraft that it operates.

(b) Each certificate holder shall carry an approved Aircraft Flight Manual, or manual required by § 121.133 containing the information required for the Aircraft Flight Manual, in each transport category aircraft. If sections of the required information from the Aircraft Flight Manual are incorporated in the manual required by § 121.133, the holder shall clearly identify the sections as Aircraft Flight Manual requirements.

Subpart H—Aircraft Requirements

§ 121.151 Applicability.

This subpart prescribes aircraft requirements for all certificate holders.

§ 121.153 Aircraft requirements: general.

(a) No certificate holder may operate an aircraft unless that aircraft—

(1) Is registered as a civil aircraft of the United States and carries an appropriate current airworthiness certificate issued under this chapter; and

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

(b) A certificate holder may use an approved weight and balance control system based on average, assumed, or estimated weight to comply with applicable airworthiness requirements and operating limitations.

§ 121.155 Exclusive use requirements: supplemental air carriers and commercial operators.

(a) No supplemental air carrier or commercial operator may use any aircraft unless—

(1) It has exclusive use of the aircraft;

(2) The aircraft is listed in its operations specifications; and

(3) The aircraft is not listed in the operations specifications of any other air carrier or commercial operator.

(b) Within 10 days after a supplemental air carrier or commercial operator ceases to have exclusive use of an aircraft listed in its operations specifications it shall notify the FAA Air Carrier Inspector assigned to its operations, and request an appropriate amendment deleting the aircraft from its operations specifications.

(c) A supplemental air carrier or commercial operator that does not have the exclusive use of at least one aircraft does not meet the requirements of this part, and the Administrator may, in an appropriate case, suspend or revoke the supplemental air carrier's or commercial operator's certificate.

(d) For the purposes of this section, a supplemental air carrier or commercial operator has exclusive use of an aircraft if it has the sole possession, control, and use of it for flight, as owner, or has a written agreement (including arrangements for the performance of required maintenance) giving it that possession, control, and use for at least six months.

§ 121.157 Aircraft certification and equipment requirements.

(a) *Airplanes certificated before July 1, 1942.* No certificate holder may operate an airplane that was type certificated before July 1, 1942, unless—

(1) That airplane meets the requirements of § 121.173(c); or

(2) That airplane and all other airplanes of the same or related type operated by that certificate holder meet the performance requirements of §§ 4a.737–T through 4a.750–T of the Civil Air Regulations as in effect on January 31, 1965; or §§ 25.45 through 25.75 and § 121.173 (a), (b), (d), and (e).

(b) *Airplanes certificated after June 30, 1942.* Except as provided in paragraphs (c) and (d) of this section, no certificate holder may operate an airplane that was type certificated after June 30, 1942, unless it is certificated as a transport category airplane and meets the requirements of § 121.173 (a), (b), (d), and (e).

(c) *C–46 type airplanes: passenger-carrying operations.* No certificate holder may operate a C–46 airplane in passenger-carrying operations unless that airplane is operated in accordance with the operating limitations for transport category airplanes and meets the requirements of paragraph (b) of this section or meets the requirements of Part 4b, as in effect July 20, 1950, and the requirements of § 121.173 (a), (b), (d), and (e), except that—

(1) The requirements of §§ 4b.0 through 4b.19 as in effect May 18, 1954, must be complied with;

(2) The birdproof windshield requirements of § 4b.352 need not be complied with;

(3) The provisions of §§ 4b.480 through 4b.490 (except §§ 4b.484(a)(1) and 4b.487(e)), as in effect May 16, 1953, must be complied with; and

(4) The provisions of subparagraph 4b.484(a)(1), as in effect July 20, 1950, must be complied with.

In determining the takeoff path in accordance with § 4b.116 and the one-engine inoperative climb in accordance with § 4b.120 (a) and (b), the propeller of the inoperative engine may be assumed to be feathered if the airplane is equipped with either an approved means for automatically indicating when the particular engine has failed or an approved means for automatically feathering the propeller of the inoperative engine. The Administrator may authorize deviations from compliance with the requirements of §§ 4b.130 through 4b.190 and Subparts C, D, E, and F of Part 4b (as designated in this paragraph) if he finds that (considering the effect of design changes) compliance is extremely difficult to accomplish and that service experience with the C–46 airplane justifies the deviation.

(d) *C–46 type airplanes: cargo operations.* No certificate holder may use a nontransport category C–46 type airplane in cargo operations unless—

(1) It is certificated at a maximum gross weight that is not greater than 48,000 pounds;

(2) It meets the requirements of §§ 121.199 through 121.205 using the performance data in Appendix C to this part;

(3) Before each flight, each engine contains at least 25 gallons of oil; and

(4) After December 31, 1964—

(i) It is powered by a type and model engine as set forth in Appendix C of this part, when certificated at a maxi-

mum gross takeoff weight greater than 45,000 pounds; and

(ii) It complies with the special airworthiness requirement set forth in §§ 121.213 through 121.287 of this part or in Appendix C of this part.

(e) *Helicopters.* No supplemental air carrier or commercial operator may operate a helicopter unless it is operated, certificated, and equipped in accordance with §§ 127.71 through 127.125.

§ 121.159 Single-engine airplanes prohibited.

Except as provided in § 121.9, no certificate holder may operate a single-engine airplane.

§ 121.161 Airplane limitations: type of route.

(a) Unless otherwise authorized by the Administrator, based on the character of the terrain, the kind of operation, or the performance of the airplane to be used, no domestic or flag air carrier may operate in any operations, and no supplemental air carrier or commercial operator may operate in passenger-carrying operations, a two-engine or three-engine airplane (except a three-engine turbine-powered airplane) over a route that contains a point farther than one hour's flying time (in still air at normal cruising speed with one engine inoperative) from an adequate airport.

(b) No certificate holder may operate a land airplane (other than a DC–3, C–46, CV–340, or CV–440) in an extended overwater operation unless it is certificated or approved as adequate for ditching under the ditching provisions of Part 25 of this chapter.

§ 121.163 Aircraft proving tests.

(a) No domestic or flag air carrier may operate an aircraft not before proven for use in scheduled air carrier operations and no supplemental air carrier or commercial operator may operate an aircraft not before proven for use in air carrier or commercial operator operations unless an aircraft of that type has had, in addition to the aircraft certification tests, at least 100 hours of proving tests under the Administrator's supervision, at least 50 hours of which must have been flown over authorized routes (flag and domestic air carriers) or in en route operations (supplemental air carriers and commercial operators) and at least 10 hours of which must have been flown at night.

(b) A certificate holder may not operate an aircraft of a type that has been proven for use in its class of operations if it has not previously proved that type, or if that aircraft has been materially altered in design, unless—

(1) The aircraft has been tested for at least 50 hours, of which at least 25 hours were over authorized routes; or

(2) The Administrator specifically authorizes deviations because special circumstances of the particular case make a literal observance of the requirements of this paragraph unnecessary.

(c) A supplemental air carrier or commercial operator may operate a helicopter that has not before been proven for use in supplemental air carrier or commercial operator operations if the helicopter has been used extensively in the services of the armed forces and meets the requirements of paragraph (b) of this section.

(d) For the purposes of paragraph (b) of this section, a type of aircraft is considered to be materially altered in design if the alterations include—

(1) The installation of powerplants other than those of a type similar to those with which it is certificated; or

(2) Alterations to the aircraft or its components that materially affect flight characteristics.

(e) No certificate holder may carry passengers in an aircraft during proving tests, except for those needed to make the test and those designated by the Administrator. However, it may carry mail, express, or other cargo, when approved.

Subpart I—Airplane Performance Operating Limitations

§ 121.171 Applicability.

(a) This subpart prescribes airplane performance operating limitations for all certificate holders.

(b) For the purposes of this part, "effective length of the runway", for takeoff means the distance from the end of the runway at which the takeoff is started to the point at which the obstruction clearance plane associated with the other end of the runway intersects the runway centerline. For landing, it means the distance from the point at which the obstruction clearance plane associated with the approach end of the runway intersects the centerline of the runway to the far end thereof.

(c) For the purposes of this subpart, "obstruction clearance plane" means a plane sloping upward from the runway at a slope of 1:20 to the horizontal, and tangent to or clearing all obstructions within a specified area surrounding the runway as shown in a profile view of that area. In the plan view, the centerline of the specified area coincides with the centerline of the runway, beginning at the point where the obstruction clearance plane intersects the centerline of the runway and proceeding to a point at least 1,500 feet from the beginning point. Thereafter the centerline coincides with the takeoff path over the ground for the runway (in the case of takeoffs) or with the instrument approach counterpart (for landings), or, where the applicable one of these paths has not been established, it proceeds consistent with turns of at least 4,000 foot radius until a point is reached beyond which the obstruction clearance plane clears all obstructions. This area extends laterally 200 feet on each side of the centerline at the point where the obstruction clearance plane intersects the runway and continues at this width to the end of the runway; then it increases uniformly to 500 feet on each side of the centerline at a point 1,500 feet from the intersection of the obstruction clearance plane with the runway; thereafter it extends laterally 500 feet on each side of the centerline.

§ 121.173 General.

(a) Each certificate holder operating a reciprocating engine powered transport category airplane shall comply with §§ 121.175 through 121.187.

(b) Each certificate holder operating a turbine engine powered transport category airplane shall comply with applicable provisions of §§ 121.189 through 121.197, except that when it operates a turbo-propeller powered transport category airplane certificated after August 29, 1959, but previously type certificated with the same number of reciprocating engines, it may comply with §§ 121.175 through 121.187.

(c) Each certificate holder operating a large nontransport category airplane shall comply with §§ 121.199 through 121.205 and any determination of compliance must be based only on approved performance data.

(d) The performance data in the Airplane Flight Manual applies in determining compliance with §§ 121.175 through 121.197. Where conditions are different from those on which the performance data is based, compliance is determined by interpolation or by computing the effects of changes in the specific variables, if the results of the interpolation or computations are substantially as accurate as the results of direct tests.

§ 121.177 Transport category airplanes: reciprocating engine powered: takeoff limitations.

(a) No person operating a reciprocating engine powered transport category airplane may takeoff that airplane unless it is possible—

(1) To stop the airplane safely on the runway, as shown by the accelerate stop distance data, at any time during takeoff until reaching critical-engine failure speed;

(2) If the critical engine fails at any time after the airplane reaches critical-engine failure speed V_1, to continue the takeoff and reach a height of 50 feet, as indicated by the takeoff path data, before passing over the end of the runway; and

(3) To clear all obstacles either by at least 50 feet vertically (as shown by the takeoff path data) or 200 feet horizontally within the airport boundaries and 300 feet horizontally beyond the boundaries, without banking before reaching a height of 50 feet (as shown by the takeoff path data) and thereafter without banking more than 15 degrees.

(b) In applying this section, corrections must be made for any runway gradient. To allow for wind effect, takeoff data based on still air may be corrected by taking into account not more than 50 percent of any reported headwind component and not less than 150 percent of any reported tailwind component.

§ 121.179 Transport category airplanes: reciprocating engine powered: en route limitations: all engines operating.

(a) No person operating a reciprocating engine powered transport category airplane may take off that airplane at a weight, allowing for normal consumption

of fuel and oil, that does not allow a rate of climb (in feet per minute), with all engines operating, of at least 6.90 V_{S_0} (that is, the number of feet per minute is obtained by multiplying the number of knots by 6.90) at an altitude of at least 1,000 feet above the highest ground or obstruction within ten miles of each side of the intended track.

(b) This section does not apply to transport category airplanes certificated under Part 4a of the Civil Air Regulations.

§ 121.181 Transport category airplanes: reciprocating engine powered: en route limitations: one engine inoperative.

(a) Except as provided in paragraph (b) of this section, no person operating a reciprocating engine powered transport category airplane may take off that airplane at a weight, allowing for normal consumption of fuel and oil, that does not allow a rate of climb (in feet per minute), with one engine inoperative, of at least $0.079-\frac{0.106}{N}V_{S_0}^2$ (where N is the number of engines installed and V_{S_0} is expressed in knots) at an altitude of at least 1,000 feet above the highest ground or obstruction within 10 miles of each side of the intended track. However, for the purposes of this paragraph the rate of climb for transport category airplanes certificated under Part 4a of the Civil Air Regulations is $0.026\ V_{S_0}^2$.

(b) In place of the requirements of paragraph (a) of this section, a person may, under an approved procedure, operate a reciprocating engine powered transport category airplane, at an all-engines-operating altitude that allows the airplane to continue, after an engine failure, to an alternate airport where a landing can be made in accordance with § 121.187, allowing for normal consumption of fuel and oil. After the assumed failure, the flight path must clear the ground and any obstruction within five miles on each side of the intended track by at least 2,000 feet.

(c) If an approved procedure under paragraph (b) of this section is used, the certificate holder shall comply with the following:

(1) The rate of climb (as prescribed in the Airplane Flight Manual for the appropriate weight and altitude) used in calculating the airplane's flight path shall be diminished by an amount, in feet per minute, equal to $0.079-\frac{0.106}{N}V_{S_0}^2$ (when N is the number of engines installed and V_{S_0} is expressed in knots) for airplanes certificated under Part 25 of this chapter and by $0.026\ V_{S_0}^2$ for airplanes certificated under Part 4a of the Civil Air Regulations.

(2) The all-engines-operating altitude shall be sufficient so that in the event the critical engine becomes inoperative at any point along the route, the flight will be able to proceed to a predetermined alternate airport by use of this procedure. In determining the takeoff weight, the airplane is assumed to pass over the critical obstruction following engine failure at a point no closer to the critical obstruction than the nearest approved radio navigational fix, unless the Administrator approves a procedure established on a different basis upon finding that adequate operational safeguards exist.

(3) The airplane must meet the provisions of paragraph (a) of this section at 1,000 feet above the airport used as an alternate in this procedure.

(4) The procedure must include an approved method of accounting for winds and temperatures that would otherwise adversely affect the flight path.

(5) In complying with this procedure fuel jettisoning is allowed if the certificate holder shows that it has an adequate training program, that proper instructions are given to the flight crew, and all other precautions are taken to insure a safe procedure.

(6) The certificate holder shall specify in the dispatch or flight release an alternate airport that meets the requirements of § 121.625.

§ 121.183 Part 25 transport category airplanes with four or more engines: reciprocating engine powered: en route limitations: two engines inoperative.

(a) No person may operate an airplane certificated under Part 25 and having four or more engines unless—

(1) There is no place along the intended track that is more than 90 minutes (with all engines operating at cruising power) from an airport that meets the requirements of § 121.187; or

(2) It is operated at a weight allowing the airplane, with the two critical engines inoperative, to climb at 0.013 $V_{S_0}^2$ feet per minute (that is, the number of feet per minute is obtained by multiplying the number of knots squared by 0.013) at an altitude of 1,000 feet above the highest ground or obstruction within 10 miles on each side of the intended track, or at an altitude of 5,000 feet, whichever is higher.

(b) For the purposes of paragraph (a)(2) of this section, it is assumed that—

(1) The two engines fail at the point that is most critical with respect to the takeoff weight;

(2) Consumption of fuel and oil is normal with all engines operating up to the point where the two engines fail and with two engines operating beyond that point;

(3) Where the engines are assumed to fail at an altitude above the prescribed minimum altitude, compliance with the prescribed rate of climb at the prescribed minimum altitude need not be shown during the descent from the cruising altitude to the prescribed minimum altitude, if those requirements can be met once the prescribed minimum altitude is reached, and assuming descent to be along a net flight path and the rate of descent to be $0.013\ V_{S_0}^2$ greater than the rate in the approved performance data; and

(4) If fuel jettisoning is provided, the airplane's weight at the point where the two engines fail is considered to be not less than that which would include enough fuel to proceed to an airport meeting the requirements of § 121.187 and to arrive at an altitude of at least 1,000 feet directly over that airport.

§ 121.185 Transport category airplanes: reciprocating engine powered: landing limitations: destination airport.

(a) Except as provided in paragraph (b) of this section no person operating a reciprocating engine powered transport category airplane may take off that airplane, unless its weight on arrival, allowing for normal consumption of fuel and oil in flight, would allow a full stop landing at the intended destination within 60 percent of the effective length of each runway described below from a point 50 feet directly above the intersection of the obstruction clearance plane and the runway. For the purposes of determining the allowable landing weight at the destination airport the following is assumed:

(1) The airplane is landed on the most favorable runway and in the most favorable direction in still air.

(2) The airplane is landed on the most suitable runway considering the probable wind velocity and direction (forecast for the expected time of arrival), the ground handling characteristics of the type of airplane, and other conditions such as landing aids and terrain, and allowing for the effect of the landing path and roll of not more than 50 percent of the headwind component or not less than 150 percent of the tailwind component.

(b) An airplane that would be prohibited from being taken off because it could not meet the requirements of paragraph (a)(2) of this section may be taken off if an alternate airport is specified that meets all of the requirements of this section except that the airplane can accomplish a full stop landing within 70 percent of the effective length of the runway.

§ 121.187 Transport category airplanes: reciprocating engine powered: landing limitations: alternate airport.

No person may list an airport as an alternate airport in a dispatch or flight release unless the airplane (at the weight anticipated at the time of arrival at the airport), based on the assumptions in § 121.185, can be brought to a full stop landing, within 70 percent of the effective length of the runway.

§ 121.189 Transport category airplanes: turbine engine powered; takeoff limitations.

(a) No person operating a turbine engine powered transport category airplane may take off that airplane at a weight greater than that listed in the Airplane Flight Manual for the elevation of the airport and for the ambient temperature existing at takeoff.

(b) No person operating a turbine engine powered transport category airplane certificated after August 26, 1957, but before August 30, 1959 (SR422, 422A), may take off that airplane at a weight greater than that listed in the Airplane Flight Manual for the minimum distances required for takeoff. In the case of an airplane certificated after Se

tember 30, 1958 (SR422A, 422B), the takeoff distance may include a clearway distance but the clearway distance included may not be greater than ½ of the takeoff run.

(c) No person operating a turbine engine powered transport category airplane certificated after August 29, 1959 (SR422B), may take off that airplane at a weight greater than that listed in the Airplane Flight Manual at which compliance with the following may be shown:

(1) The accelerate-stop distance must not exceed the length of the runway plus the length of any stopway.

(2) The takeoff distance must not exceed the length of the runway plus the length of any clearway except that the length of any clearway included must not be greater than one-half the length of the runway.

(3) The takeoff run must not be greater than the length of the runway.

(d) No person operating a turbine engine powered transport category airplane may take off that airplane at a weight greater than that listed in the Airplane Flight Manual—

(1) In the case of an airplane certificated after August 26, 1957, but before October 1, 1958 (SR422), that allows a takeoff path that clears all obstacles either by at least (35+0.01D) feet vertically (D is the distance along the intended flight path from the end of the runway in feet), or by at least 200 feet horizontally within the airport boundaries and by at least 300 feet horizontally after passing the boundaries; or

(2) In the case of an airplane certificated after September 30, 1958 (SR 422A, 422B), that allows a net takeoff flight path that clears all obstacles either by a height of at least 35 feet vertically, or by at least 200 feet horizontally within the airport boundaries and by at least 300 feet horizontally after passing the boundaries.

(e) In Determining maximum weights, minimum distances and flight paths under paragraphs (a) through (d) of this section, correction must be made for the runway to be used, the elevation of the airport, the effective runway gradient, and the ambient temperature and wind component at the time of takeoff.

(f) For the purposes of this section, it is assumed that the airplane is not banked before reaching a height of 50 feet, as shown by the takeoff path or net takeoff flight path data (as appropriate) in the Airplane Flight Manual, and thereafter that the maximum bank is not more than 15 degrees.

(g) For the purposes of this section the terms, "takeoff distance," "takeoff run," "net takeoff flight path" and "takeoff path" have the same meanings as set forth in the rules under which the airplane was certificated.

§ 121.191 Transport category airplanes: turbine engine powered: en route limitations: one engine inoperative.

(a) No person operating a turbine engine powered transport category airplane may take off that airplane at a weight that is greater than that which under the approved, one engine inoperative, en route net flight path data in the Airplane Flight Manual for that airplane) will allow compliance with subparagraph (1) or (2) of this paragraph, based on the ambient temperatures expected en route:

(1) There is a positive slope at an altitude of at least 1,000 feet above all terrain and obstructions within five statute miles on each side of the intended track, and, in addition, if that airplane was certificated after August 29, 1959 (SR 422B) there is a positive slope at 1,500 feet above the airport where the airplane is assumed to land after an engine fails.

(2) The net flight path allows the airplane to continue flight from the cruising altitude to an airport where a landing can be made under § 121.197, clearing all terrain and obstructions within five statute miles of the intended track by at least 2,000 feet vertically and with a positive slope at 1,000 feet above the airport where the airplane lands after an engine fails, or, if that airplane was certificated after September 30, 1958 (SR 422A, 422B), with a positive slope at 1,500 feet above the airport where the airplane lands after an engine fails.

(b) For the purposes of paragraph (a)(2) of this section, it is assumed that—

(1) The engine fails at the most critical point en route;

(2) The airplane passes over the critical obstruction, after engine failure at a point that is no closer to the obstruction than the nearest approved radio navigation fix, unless the Administrator authorizes a different procedure based on adequate operational safeguards;

(3) An approved method is used to allow for adverse winds;

(4) Fuel jettisoning will be allowed if the certificate holder shows that the crew is properly instructed, that the training program is adequate, and that all other precautions are taken to insure a safe procedure;

(5) The alternate airport is specified in the dispatch or flight release and meets the prescribed weather minimums; and

(6) The consumption of fuel and oil after engine failure is the same as the consumption that is allowed for in the approved net flight path data in the Airplane Flight Manual.

§ 121.193 Transport category airplanes: turbine engine powered: en route limitations: two engines inoperative.

(a) *Airplanes certificated after August 26, 1957, but before October 1, 1958* (SR 422). No person may operate a turbine engine powered transport category airplane along an intended route unless he complies with either of the following:

(1) There is no place along the intended track that is more than 90 minutes (with all engines operating at cruising power) from an airport that meets the requirements of § 121.197.

(2) Its weight, according to the two-engine-inoperative, en route, net flight path data in the Airplane Flight Manual, allows the airplane to fly from the point where the two engines are assumed to fail simultaneously to an airport that meets the requirements of § 121.197, with a net flight path (considering the ambient temperature anticipated along the track) having a positive slope at an altitude of at least 1,000 feet above all terrain and obstructions within five miles on each side of the intended track, or at an altitude of 5,000 feet, whichever is higher.

For the purposes of subparagraph (2) of this paragraph, it is assumed that the two engines fail at the most critical point en route, that if fuel jettisoning is provided, the airplane's weight at the point where the engines fail includes enough fuel to continue to the airport and to arrive at an altitude of at least 1,000 feet directly over the airport, and that the fuel and oil consumption after engine failure is the same as the consumption allowed for in the net flight path data in the Airplane Flight Manual.

(b) *Aircraft certificated after September 30, 1958, but before August 30, 1959* (SR 422A). No person may operate a turbine engine powered transport category airplane along an intended route unless he complies with either of the following:

(1) There is no place along the intended track that is more than 90 minutes (with all engines operating at cruising power) from an airport that meets the requirements of § 121.197.

(2) Its weight, according to the two-engine-inoperative, en route, net flight path data in the Airplane Flight Manual, allows the airplane to fly from the point where the two engines are assumed to fail simultaneously to an airport that meets the requirements of § 121.197, with a net flight path (considering the ambient temperatures anticipated along the track) having a positive slope at an altitude of at least 1,000 feet above all terrain and obstructions within 5 miles on each side of the intended track, or at an altitude of 2,000 feet, whichever is higher.

For the purposes of subparagraph (2) of this paragraph, it is assumed that the two engines fail at the most critical point en route, that the airplane's weight at the point where the engines fail includes enough fuel to continue to the airport, to arrive at an altitude of at least 1,500 feet directly over the airport, and thereafter to fly for 15 minutes at cruise power or thrust, or both, and that the consumption of fuel and oil after engine failure is the same as the consumption allowed for in the net flight path data in the Airplane Flight Manual.

(c) *Aircraft certificated after August 29, 1959* (SR 422B). No person may operate a turbine engine powered transport category airplane along an intended route unless he complies with either of the following:

(1) There is no place along the intended track that is more than 90 minutes (with all engines operating at cruising power) from an airport that meets the requirements of § 121.197.

(2) Its weight, according to the two-engine inoperative, en route, net flight path data in the Airplane Flight Manual, allows the airplane to fly from the point where the two engines are assumed to fail simultaneously to an airport that meets the requirements of § 121.197, with the net flight path (considering the ambient temperatures anticipated along

the track) clearing vertically by at least 2,000 feet all terrain and obstructions within five statute miles (4.34 nautical miles) on each side of the intended track. For the purposes of this subparagraph, it is assumed that—

(i) The two engines fail at the most critical point en route;

(ii) The net flight path has a positive slope at 1,500 feet above the airport where the landing is assumed to be made after the engines fail;

(iii) Fuel jettisoning will be approved if the certificate holder shows that the crew is properly instructed, that the training program is adequate, and that all other precautions are taken to ensure a safe procedure;

(iv) The airplane's weight at the point where the two engines are assumed to fail provides enough fuel to continue to the airport, to arrive at an altitude of at least 1,500 feet directly over the airport, and thereafter to fly for 15 minutes at cruise power or thrust, or both; and

(v) The consumption of fuel and oil after the engine failure is the same as the consumption that is allowed for in the net flight path data in the Airplane Flight Manual.

§ 121.195 Transport category airplanes: turbine engine powered: landing limitations: destination airports.

(a) No person operating a turbine engine powered transport category airplane may take off that airplane at such a weight that (allowing for normal consumption of fuel and oil in flight to the destination or alternate airport) the weight of the airplane on arrival would exceed the landing weight set forth in the Airplane Flight Manual for the elevation of the destination or alternate airport and the ambient temperature anticipated at the time of landing.

(b) Except as provided in paragraph (c) of this section, no person operating a turbine engine powered transport category airplane may take off that airplane unless its weight on arrival, allowing for normal consumption of fuel and oil in flight (in accordance with the landing distance set forth in the Airplane Flight Manual for the elevation of the destination airport and the wind conditions anticipated there at the time of landing), would allow a full stop landing at the intended destination airport within 60 percent of the effective length of each runway described below from a point 50 feet above the intersection of the obstruction clearance plane and the runway. For the purpose of determining the allowable landing weight at the destination airport the following is assumed:

(1) The airplane is landed on the most favorable runway and in the most favorable direction, in still air.

(2) The airplane is landed on the most suitable runway considering the probable wind velocity and direction and the ground handling characteristics of the airplane, and considering other conditions such as landing aids and terrain.

(c) An airplane that would be prohibited from being taken off because it could not meet the requirements of paragraph (b)(2) of this section, may be taken off if an alternate airport is specified that meets all the requirements of this section except that the airplane can accomplish a full stop landing within 70 percent of the effective length of the runway.

§ 121.197 Transport category airplanes: turbine engine powered: landing limitations: alternate airports.

No person may list an airport as an alternate airport in a dispatch or flight release for a turbine engine powered transport category airplane unless (based on the assumptions in § 121.195 (b)) that airplane at the weight anticipated at the time of arrival can be brought to a full stop landing within 70 percent of the effective length of the runway from a point 50 feet above the intersection of the obstruction clearance plane and the runway.

§ 121.198 Transport category cargo service airplanes: increased zero fuel and landing weights.

(a) Notwithstanding the applicable structural provisions of the transport category airworthiness regulations but subject to paragraphs (b) through (g) of this section, a certificate holder may operate (for cargo service only) any of the following transport category airplanes (certificated under Part 4b of the Civil Air Regulations effective before March 13, 1956) at increased zero fuel and landing weights—

(1) DC-6A, DC-6B, DC-7B, and DC-7C; and

(2) L1049B, C, D, E, F, G, and H, and the L1649A when modified in accordance with supplemental type certificate SA 4-1402.

(b) The zero fuel weight (maximum weight of the airplane with no disposable fuel and oil) and the structural landing weight may be increased beyond the maximum approved in full compliance with applicable regulations only if the Administrator finds that—

(1) The increase is not likely to reduce seriously the structural strength;

(2) The probability of sudden fatigue failure is not noticeably increased;

(3) The flutter, deformation, and vibration characteristics do not fall below those required by applicable regulations; and

(4) All other applicable weight limitations will be met.

(c) No zero fuel weight may be increased by more than five percent, and the increase in the structural landing weight may not exceed the amount, in pounds, of the increase in zero fuel weight.

(d) Each airplane must be inspected in accordance with the approved special inspection procedures, for operations at increased weights, established and issued by the manufacturer of the type of airplane.

(e) Each airplane operated under this section must be operated in accordance with the passenger-carrying transport category performance operating limitations prescribed in this part.

(f) The Airplane Flight Manual for each airplane operated under this section must be appropriately revised to include the operating limitations and information needed for operation at the increased weights.

(g) Except as provided for the carrying of persons under § 121.583 each airplane operated at an increased weight under this section must, before it is used in passenger service, be inspected under the special inspection procedures for return to passenger service established and issued by the manufacturer and approved by the Administrator.

§ 121.199 Nontransport category airplanes: takeoff limitations.

(a) No person operating a nontransport category airplane may take off that airplane at a weight greater than the weight that would allow the airplane to be brought to a safe stop within the effective length of the runway, from any point during the takeoff before reaching 105 percent of minimum control speed (the minimum speed at which an airplane can be safely controlled in flight after an engine becomes inoperative) or 115 percent of the power off stalling speed in the takeoff configuration, whichever is greater.

(b) For the purposes of this section—

(1) It may be assumed that takeoff power is used on all engines during the acceleration;

(2) Not more than 50 percent of the reported headwind component, or not less than 150 percent of the reported tailwind component, may be taken into account;

(3) The average runway gradient (the difference between the elevations of the endpoints of the runway divided by the total length) must be considered if it is more than one-half of 1 percent; and

(4) It is assumed that the airplane is operating in standard atmosphere.

§ 121.201 Nontransport category airplanes: en route limitations: one engine inoperative.

(a) Except as provided in paragraph (b) of this section, no person operating a nontransport category airplane may take off that airplane at a weight that does not allow a rate of climb of at least 50 feet a minute, with the critical engine inoperative, at an altitude of at least 1,000 feet above the highest obstruction within five miles on each side of the intended track, or 5,000 feet, whichever is higher.

(b) Notwithstanding paragraph (a) of this section, if the Administrator finds that safe operations are not impaired, a person may operate the airplane at an altitude that allows the airplane, in case of engine failure, to clear all obstructions within 5 miles on each side of the intended track by 1,000 feet. If this procedure is used, the rate of descent for the appropriate weight and altitude is assumed to be 50 feet a minute greater than the rate in the approved performance data. Before approving such a procedure, the Administrator considers the following for the route, route segment, or area concerned:

(1) The reliability of wind and weather forecasting.

(2) The location and kinds of navigation aids.

(3) The prevailing weather conditions, particularly the frequency and amount of turbulence normally encountered.

(4) Terrain features.
(5) Air traffic control problems.
(6) Any other operational factors that affect the operation.

(c) For the purposes of this section, it is assumed that—

(1) The critical engine is inoperative;
(2) The propeller of the inoperative engine is in the minimum drag position;
(3) The wing flaps and landing gear are in the most favorable position;
(4) The operating engines are operating at the maximum continuous power available;
(5) The airplane is operating in standard atmosphere; and
(6) The weight of the airplane is progressively reduced by the anticipated consumption of fuel and oil.

§ 121.203 Nontransport category airplanes: landing limitations: destination airport.

(a) No person operating a nontransport category airplane may take off that airplane at a weight that—

(1) Allowing for anticipated consumption of fuel and oil, is greater than the weight that would allow a full stop landing within 60 percent of the effective length of the most suitable runway at the destination airport; and

(2) Is greater than the weight allowable if the landing is to be made on the runway—

(i) With the greatest effective length in still air; and

(ii) Required by the probable wind, taking into account not more than 50 percent of the headwind component or not less than 150 percent of the tailwind component.

(b) For the purposes of this section, it is assumed that—

(1) The airplane passes directly over the intersection of the obstruction clearance plane and the runway at a height of 50 feet in a steady gliding approach at a true indicated airspeed of at least $1.3\,V_{s_0}$;

(2) The landing does not require exceptional pilot skill; and

(3) The airplane is operating in standard atmosphere.

§ 121.205 Nontransport category airplanes: landing limitations: alternate airport.

No person may list an airport as an alternate airport in a dispatch or flight release for a nontransport category airplane unless that airplane (at the weight anticipated at the time of arrival) based on the assumptions contained in § 121.203, can be brought to a full stop landing within 70 percent of the effective length of the runway.

§ 121.207 Provisionally certificated air carrier airplane: operating limitations.

In addition to the limitations in §91.41, the following limitations apply to the operation of provisionally certificated airplane by air carriers:

(a) In addition to crewmembers, each air carrier may carry on such an airplane only those persons who are listed in §121.547(c) or who are specifically authorized by both the air carrier and the Administrator.

(b) Each air carrier shall keep a log of each flight conducted under this section and shall keep accurate and complete records of each inspection made and all maintenance performed on the airplane. The air carrier shall make the log and records made under this section available to the manufacturer and the Administrator.

Subpart J—Special Airworthiness Requirements

§ 121.211 Applicability.

This subpart prescribes special airworthiness requirements for all certificate holders.

§ 121.213 Special airworthiness requirements: general.

(a) Except as provided in paragraph (b) of this section, no air carrier or commercial operator may use an airplane powered by aircraft engines rated at more than 600 horsepower each for maximum continuous operation unless that airplane meets the requirements of §§ 121.215 through 121.283.

(b) If the Administrator determines that, for a particular model of airplane used in cargo service, literal compliance with any requirement under paragraph (a) of this section would be extremely difficult and that compliance would not contribute materially to the objective sought, he may require compliance with only those requirements that are necessary to accomplish the basic objectives of this part.

(c) This section does not apply to any airplane certificated under—

(1) Part 4b of the Civil Air Regulations as in effect after October 31, 1946;
(2) Part 25; or
(3) Special Civil Air Regulation 422, 422A, or 422B.

§ 121.215 Cabin interiors.

(a) Each compartment used by the crew or passengers must meet the requirements of this section.

(b) Materials must be at least flash resistant.

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

(d) Each compartment where smoking is to be allowed must be equipped with self-contained ash trays that are completely removable and other compartments must be placarded against smoking.

(e) 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.

§ 121.217 Internal doors.

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

§ 121.219 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 louvres 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.

§ 121.221 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—

(1) A fire therein would be readily discernible to a member of the crew while at his station; and

(2) 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 stations.

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

(3) It must be lined with fire-resistant material, except that additional service lining 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-extinguishing 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 controlled 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 the safety of the airplane or the occupants. Each Class D 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 flight crew in the crew compartment.

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

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

§ 121.223 Proof of compliance with § 121.221.

Compliance with those provisions of § 121.221 that refer to compartment accessibility, the entry of hazardous quantities of smoke or extinguishing agent into compartments 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.

§ 121.225 Propeller deicing fluid.

If combustible fluid is used for propeller deicing, the certificate holder must comply with § 121.253.

§ 121.227 Pressure cross-feed arrangements.

(a) Pressure cross-feed lines may not pass through parts of the airplane used for carrying persons or cargo unless—

(1) There is a means to allow crewmembers to shut off the supply of fuel to these lines; or

(2) 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.

§ 121.229 Location of fuel tanks.

(a) Fuel tanks must be located in accordance with § 121.255.

(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.

§ 121.231 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 loads due to fuel pressure and accelerated flight conditions.

(b) Lines connected to components of the airplanes 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 hose must be of an acceptable type or proven suitable for the particular application.

§ 121.233 Fuel lines and fittings in designated fire zones.

Fuel lines and fittings in each designated fire zone must comply with § 121.259.

§ 121.235 Fuel valves.

Each fuel valve must—

(a) Comply with § 121.257;

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

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

§ 121.237 Oil lines and fittings in designated fire zones.

Oil line and fittings in each designated fire zone must comply with § 121.259.

§ 121.239 Oil valves.

(a) Each oil valve must—

(1) Comply with § 121.257;

(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 means must not prevent feathering the propeller, unless equivalent safety provisions are incorporated.

§ 121.241 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.

§ 121.243 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 fir hazard in case foaming occurs and so that oil emitted from the line does not impinge upon the pilots' windshield.

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

§ 121.245 Fire walls.

Each engine, auxiliary power unit, fuel-burning heater, or other item of combustion 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.

§ 121.247 Fire-wall construction.

Each fire wall 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 fire wall or shroud sealed with close-fitting fireproof grommets, bushings, or firewall fittings;

(c) Be made of fireproof material; and

(d) Be protected against corrosion.

§ 121.249 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.

§ 121.251 Engine accessory section diaphragm.

Unless equivalent protection can be shown by other means, a diaphragm that complies with § 121.247 must be provided on air-cooled engines to isolate the engine power section and all parts of the exhaust system from the engine accessory compartment.

§ 121.253 Powerplant fire protection.

(a) Designated fire zones must be protected from fire by compliance with §§ 121.255 through 121.261.

(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 contain auxiliary power units, fuel-burning heaters, and other combustion equipment.

§ 121.255 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, and the connections, lines, and controls provide equivalent safety.

(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.

§ 121.257 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 an 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 equivalent safety is provided, and it must be shown that no hazardous amount of flammable fluid will drain into any designated fire zone after a shut off.

(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.

§ 121.259 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 fire-resistant, 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.

§ 121.261 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 § 121.259, if the Administrator finds that the rupture or breakage of any vent or drain line may result in a fire hazard.

§ 121.263 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.

§ 121.265 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.

§ 121.267 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.

§ 121.269 Extinguishing agent container compartment temperature.

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

§ 121.271 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.

§ 121.273 Fire-detector systems.

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

§ 121.275 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 loads to which they may be normally subjected. Fire detectors must be unaffected by exposure to fumes, oil, water, or other fluids that may be present.

§ 121.277 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 compartment of any nacelle.

§ 121.279 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 the rotation need be provided only if the Administrator finds that rotation could jeopardize the safety of the airplane.

§ 121.281 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.

§ 121.283 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.

§ 121.285 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 insure proper weight distribution within the bin must be 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 that 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) Cargo may be carried forward of the foremost seated passengers if carried either in approved cargo 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 tiedown 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.

§ 121.287 Carriage of cargo in cargo compartments.

When cargo is carried in cargo compartments 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 hand fire extinguisher.

§ 121.289 Landing gear: aural warning device.

(a) Except as provided in paragraph (d) of this section, after April 30, 1965, each large landplane must have a landing gear aural warning device that functions continuously:

(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.

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

Subpart K—Instrument and Equipment Requirements

§ 121.301 Applicability.

This subpart prescribes instrument and equipment requirements for all certificate holders.

§ 121.303 Airplane instruments and equipment.

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

(b) Instruments and equipment required by §§ 121.305 through 121.351 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 § 121.627 (b) and (c), no person may take off any airplane unless the following instruments and equipment are in operable condition:

(1) Instruments and equipment required to comply with airworthiness requirements under which the airplane is type certificated and as required by §§ 121.213 through 121.283 and 121.289.

(2) Instruments and equipment specified in §§ 121.305 through 121.321 for all operations, and the instruments and equipment specified in §§ 121.323 through 121.351 for the kind of operation indicated, wherever these items are not already required by subparagraph (1) of this paragraph.

§ 121.305 Flight and navigational equipment.

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

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

(b) A sensitive altimeter.

(c) A sweep-second hand clock.

(d) A free-air temperature indicator.

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

(f) A gyroscopic rate-of-turn indicator combined with a slip-skid indicator (turn-and-bank indicator).

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

(h) A magnetic compass.

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

§ 121.307 Engine instruments.

Unless the Administrator allows or requires different instrumentation for turbine 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 flowmeter or fuel mixture indicator for each engine not equipped with an automatic altitude mixture 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.

§ 121.309 Emergency equipment.

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

(b) Each item of emergency equipment—

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

(2) Must be readily accessible to the crew;

(3) Must clearly indicate its method of operation; and

(4) When carried in a compartment or container, must have that compartment or container marked as to contents and 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.

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

(3) 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.

(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) *Means for emergency evacuation.* Each passenger-carrying airplane must have a means to help occupants descend from the airplane through each emergency exit that is more than six feet from the ground with the landing gear extended. At approved floor level emergency exits, this means must be a chute or equivalent device suitable for rapid evacuation of passengers and must be in position during flight time for immediate installation and ready use. This paragraph does not apply if the emergency exit is over a wing and the distance from the lower sill of the exit to the surface of the wing is 36 inches or less. However, this paragraph does not require a means to help the occupants of a passenger-carrying DC–3 airplane in descending from the airplane by way of the rear window emergency exit, unless that airplane is operated with more occupants than are specified in § 121.391 for DC–3 airplanes with four exits authorized for passenger use.

(g) *Interior emergency exit markings.* Each passenger-carrying airplane emergency exit, its means of access, and its means of opening, must be conspicuously marked. The identity and location of each emergency exit must be recognizable from a distance equal to the width of the cabin. The location of the emergency exit operating handle and the instructions for opening must be marked on or adjacent to the emergency exit and must be readable from at least 30 inches by a person with normal eyesight.

(h) *Lighting for interior emergency exit markings.* Each passenger-carrying airplane must have a source or sources of light with an energy supply that is independent of the main lighting system for passenger emergency exit markings. Each light must be designed to—

(1) Function automatically in a crash landing, to continue functioning thereafter, and to be manually operable; or

(2) Be manually operable only and to continue functioning after a crash landing.

If a light requires manual operation, it must be turned on before each takeoff and landing. If a light requires arming of the system to function automatically, the system must be armed before each takeoff and landing.

§ 121.311 Seat and safety belts.

(a) No certificate holder 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 over 2 years of age aboard the airplane; and

(2) An approved safety belt for separate use by each person over 2 years of age aboard the airplane, 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 or landing of an airplane, each person on board shall occuppy an approved seat or berth and secure himself with the approved safety belt provided him. However, a person who is 2 years of age or less 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 by more than one adult during takeoff or landing.

§ 121.313 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 requirements of §§ 25.1309, 25.1331, 25.1351(a) and (b)(1) through (4), 25.1353, 25.1355, and 25.1491 (b) 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 the Administrator 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 means for locking all companionway doors that separate passenger compartments from flight crew compartments.

(g) 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.

(h) 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.

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

§ 121.315 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 flight crew shall follow them when operating the aircraft.

§ 121.317 Passenger information.

(a) No person may operate an airplane unless it is equipped with signs that are visible to passengers and cabin attendants to notify them when smoking is prohibited and when safety belts should be fastened. The signs 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 passenger or cabin attendant may smoke while the no smoking sign is lighted and each passenger shall fasten his seat belt and keep it fastened while the seat belt sign is lighted.

§ 121.319 Exterior exits and evacuation markings.

No person may operate an airplane unless the exterior surfaces of the airplane are marked to clearly identify each required emergency exit. If the exits are operable from the outside, the markings must consist of or include information indicating the method of opening.

§ 121.321 Shoulder harness.

No person may operate a transport category airplane that was certificated after January 1, 1958, unless it is equipped with a shoulder harness at the pilot in command station, the second in command station, and the flight engineer station.

§ 121.323 Instruments 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 §§ 121.305 through 121.321:

(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 crewmembers' 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 nondimming instrument lights are satisfactory.

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

(f) A sensitive altimeter.

§ 121.325 Instruments and equipment for operations under IFR or over-the-top.

No person may operate an airplane under IFR or over-the-top conditions unless it is equipped with the following instruments and equipment, in addition to those required by §§ 121.305 through 121.321:

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

(b) A sensitive altimeter.

(c) Instrument lights providing enough light to make each required instrument, switch, or similar instrument, easily readable and so installed that the 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.

§ 121.327 Supplemental oxygen; reciprocating engine powered airplanes.

(a) *General.* Except where supplemental oxygen is provided in accordance with § 121.331, no person may operate an airplane unless supplemental oxygen is furnished and used as set forth in paragraphs (b) and (c) of this section. The amount of supplemental oxygen required for a particular operation is determined on the basis of flight altitudes and flight duration, consistent with the operation procedures established for each operation and route.

(b) *Crewmembers.* (1) At cabin pressure altitudes above 10,000 feet up to and including 12,000 feet, 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 at those altitudes that is of more than 30 minutes duration.

(2) At cabin pressure altitudes above 12,000 feet, 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 time at those altitudes.

(3) When a flight crewmember 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 deck 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, approved for passenger safety, in accordance with the following:

(1) For flights of more than 30 minutes duration at cabin pressure altitudes above 8,000 feet up to and including 14,000 feet, enough oxygen for 30 minutes for 10 percent of the passengers.

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

(3) For flights at cabin pressure altitudes above 15,000 feet, enough oxygen for each passenger carried during the entire flight at those altitudes.

(d) For the purposes of this subpart "cabin pressure altitude" means the pressure altitude corresponding with the pressure in the cabin of the airplane, and "flight altitude" means the altitude above sea level at which the airplane is operated. For airplanes without pressurized cabins, "cabin pressure altitude" and "flight altitude" mean the same thing.

§ 121.329 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 the airplane will descend 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, up to and including 12,000 feet, 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 at those altitudes that is of more than 30 minutes duration.

(2) At cabin pressure altitudes above 12,000 feet, 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 crewmember 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, up to and including 14,000 feet, 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, up to and includ-

ing 15,000 feet, enough oxygen for that part of the flight at those altitudes for 30 percent of the passengers.

(3) For flights at cabin pressure altitudes above 15,000 feet, enough oxygen for each passenger carried during the entire flight at those altitudes.

§ 121.331 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, 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 on flight deck duty. The oxygen required by § 121.337 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, 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 or less within four minutes.

(2) If the airplane cannot descend to a flight altitude of 14,000 feet 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 15,000 feet, the supply required by § 121.327(c)(3).

(ii) For that part of the flight at flight altitudes above 14,000 feet, up to and including 15,000 feet, the supply required by § 121.327(c)(2).

(iii) For flight at flight altitudes above 8,000 feet up to and including 14,000 feet, 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, up to and including 14,000 feet, and to comply with § 121.327(c) (2) and (3) for flight above 14,000 feet.

(d) For the purposes of this section it is assumed that the cabin pressurization failure occurs at a 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.

§ 121.333 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, the certificate holder shall supply enough oxygen to comply with § 121.329, but not less than a two-hour supply for each flight crewmember on flight deck duty. The oxygen required in the event of cabin pressurization failure by § 121.337 may be included in determining the supply required for flight crewmembers on flight deck duty.

(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 crewmembers 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, sealed, and supplying oxygen, except that the one pilot need not wear and use an oxygen mask while at or below flight level 350 if each flight crewmember on flight deck duty 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 glasses 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, 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 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 within four minutes, or when an 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 pasenger cabin occupants for the entire flight after cabin depressurization, at cabin pressure altitudes above 10,000 feet up to and including 14,000 feet and, as applicable, to allow compliance with § 121.329(c) (2) and (3), 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 § 25.1443(d) must be provided for two percent of the occupants for the entire flight after cabin depressurization at cabin pressure altitudes above 8,000 feet, 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.

§ 121.335 Equipment standards.

(a) *Reciprocating engine powered airplanes.* The oxygen apparatus, the minimum rates of oxygen flow, and the supply of oxygen necessary to comply with § 121.327 must meet the standards established in § 4b.651 of the Civil Air Regulations as in effect on July 20, 1950, except that if the certificate holder shows full compliance with those standards to be impracticable, the Administrator may authorize any change in those standards that he finds will provide an equivalent level of safety.

(b) *Turbine engine powered airplanes.* The oxygen apparatus, the minimum rate of oxygen flow, and the supply of oxygen necessary to comply with §§ 121.329 and 121.333 must meet the standards established in § 4b.651 of the Civil Air Regulations as in effect on September 1, 1958, except that if the certificate holder shows full compliance with those standards to be impracticable, the Administrator may authorize any changes in those standards that he finds will provide an equivalent level of safety.

§ 121.337 Protective breathing equipment for the flight crew.

(a) *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 0° centigrade, 760 mm. Hg.)

(b) *Nonpressurized cabin airplanes: general.* The requirements of paragraph (a) of this section apply to nonpressurized cabin airplanes if the Administrator finds that it is possible to obtain a dangerous concentration of smoke or carbon dioxide or other harmful gases in the flight crew compartments in any attitude of flight that might occur when the airplane is flown in accordance with either normal or emergency procedures.

(c) *Nonpressurized cabin airplanes with built-in carbon dioxide fire extinguisher system in fuselage compartment.* Each certificate holder operating a nonpressurized cabin airplane that has a built-in carbon dioxide fire extinguisher system in a fuselage compartment shall provide protective breathing equipment for the flight crew, except where—

(1) Not more than five pounds of carbon dioxide would be discharged into any compartment in accordance with established fire control procedures; or

(2) The carbon dioxide concentration at each flight crew station has been determined in accordance with § 25.1197 and has been found to be less than three percent by volume (corrected to standard sea-level conditions).

§ 121.339 Equipment for extended overwater operations.

(a) Except where the Administrator, 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, the Administrator allows deviation for a particular extended overwater operation, no person may operate an airplane in extended overwater operations without having on the airplane the following equipment:

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

(2) Enough liferafts (each equipped with an approved survivor locator light) of a rated capacity and buoyancy to accommodate the occupants of the airplane.

(3) Suitable pyrotechnic signaling devices.

(4) One self-buoyant, water-resistant, portable emergency radio signaling device, that is capable of transmission on the appropriate emergency frequency or frequencies, and not dependent upon the airplane power supply.

(b) The required life rafts, life preservers, and signaling devices 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.

§ 121.341 Equipment for operations 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.

§ 121.343 Flight recorders.

(a) No person may operate any of the following airplanes unless it is equipped with an approved flight recorder that records at least time, altitude, air speed, vertical acceleration, and heading:

(1) A large airplane that is certificated for operations above 25,000 feet altitude:

(2) Any large turbine engine powered airplane.

(b) Whenever an approved flight recorder 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) Each certificate holder shall keep the recorded information for at least 60 days and for a longer period upon the request of the Administrator or the Civil Aeronautics Board for a particular flight or series of flights.

§ 121.345 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 §§ 121.347 and 121.349, each system must have an independent antenna installation except that, where rigidly supported nonwire antennas or other antenna installations of equivalent reliability are used, only one antenna is required.

§ 121.347 Radio equipment for operations under VFR over routes navigated by pilotage.

(a) No person may operate an airplane under VFR over routes that can be navigated by pilotage, 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 under VFR over routes than can be navigated by pilotage 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.

§ 121.349 Radio equipment for operations under VFR over routes not navigated by pilotage or for operations under IFR or over-the-top.

(a) No person may operate an airplane under VFR over routes that cannot be navigated by pilotage or for operations conducted under IFR or over-the-top, unless the airplane is equipped with that radio equipment necessary under normal operating conditions to fulfill the functions specified in § 121.347(a) and to receive satisfactorily by 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 or 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-TAC facilities, must be installed on each airplane when operated within the 48 contiguous States and the District of Columbia at and above 24,000 feet MSL and must be installed on each of the following airplanes, regardless of the altitude flown, when operating within the 48 contiguous States and the District of Columbia after the indicated dates.

(1) Turbojet airplanes—June 30, 1963.

(2) Turboprop airplanes—December 31, 1963.

(3) Pressurized reciprocating engine airplanes—June 30, 1964.

(4) Other large airplanes—June 30, 1965.

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

§ 121.351 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 § 121.349 and an independent system that complies with § 121.347(a)(1).

(b) No flag or supplemental air carrier or commercial operator may conduct an operation without the equipment specified in paragraph (a) of this section, if the Administrator finds that equipment to be necessary for search and rescue operations because of the nature of the terrain to be flown over.

§ 121.353 Equipment for operations over uninhabited terrain areas: flag and supplemental air carriers and commercial operators.

Unless it has the following equipment, no flag or supplemental air carrier or commercial operator may conduct an operation over an uninhabited area or any other area that (in its operations specifications) the Administrator specifies requires equipment for search and rescue in case of an emergency:

(a) Suitable pyrotechnic signaling devices.

(b) One self-buoyant, water-resistant, portable emergency radio signaling device capable of transmission on the appropriate emergency frequency or frequencies and not dependent upon the airplane power supply.

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

§ 121.355 Equipment for operations on which specialized means of navigation are required: flag and supplemental air carriers and commercial operators.

No flag or supplemental air carrier or commercial operator may conduct an operation for which specialized means of navigation are required unless it shows that adequate airborne equipment is provided for the specialized navigation authorized for the particular route to be operated.

§ 121.357 Airborne weather radar equipment requirements: passenger-carrying airplanes.

(a) No person may operate any airplane certificated under the transport category rules (except C-46 type airplanes), in passenger-carrying operations, unless approved airborne weather radar equipment has been installed in the airplane.

(b) Each person operating a transport category airplane with approved airborne weather radar installed shall, when using it in passenger operations under this Part, operate it in accordance with the following:

(1) *Dispatch.* No person may dispatch an airplane (or begin the flight of an airplane in the case of an air carrier or commercial operator that does not use a dispatch system) under IFR or night VFR 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 operations manual for such an event.

(c) This section does not apply to airplanes used solely within the State of Hawaii or within the State of Alaska and that part of Canada west of longitude 130 degrees W, between latitude 70 degrees N, and latitude 53 degrees N, or during any cargo only, training, test, or ferry flight.

(d) Notwithstanding any other provision of this chapter, an alternate electrical power supply is not required for airborne weather radar equipment.

§ 121.359 Cockpit voice recorders.

(a) No certificate holder may operate any of the following airplanes after the listed date 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:

(1) Large turbine engine powered airplanes—June 30, 1966.

(2) Large pressurized airplanes with four reciprocating engines—December 31, 1966.

(b) Each certificate holder shall establish a schedule for completion, before the prescribed dates, of the cockpit voice recorder installations required by paragraph (a) of this section. In addition the certificate holder shall identify any airplane specified in paragraph (a) of this section he intends to discontinue using before the prescribed dates.

(c) Each cockpit voice recorder must be installed in accordance with the requirements of Part 25 of this chapter.

(d) In complying with this section, an approved cockpit voice recorder having an erasure 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.

(e) In the event of an accident or occurrence requiring immediate notification of the Civil Aeronautics Board under Part 320 of its regulations, the certificate holder shall keep the recorded information for at least 60 days or, if requested by the Administrator or the Board, for a longer period. Information obtained from the record is used to assist in determining the cause of accidents or occurrences in connection with investigations under Part 320. The Administrator does not use the record in any civil penalty or certificate action.

Subpart L—Maintenance, Preventive Maintenance, and Alterations

§ 121.361 Applicability.

This subpart prescribes requirements for maintenance, preventive maintenance, and alterations for all certificate holders.

§ 121.363 Responsibility for airworthiness.

(a) Each certificate holder is primarily responsible for—

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

(2) The performance of the maintenance, preventive maintenance, and alteration of its aircraft, including airframes, aircraft engines, propellers, or appliances, and parts thereof, in accordance with its manual and the regulations of this chapter.

(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.

§ 121.365 Maintenance, preventive maintenance, and alteration organization.

(a) Each certificate holder that performs any of its maintenance (other than required inspections), preventive maintenance, or alterations, and each person with whom it arranges for the performance of that work must have an organization adequate to perform the work.

(b) Each certificate holder that performs any inspections required by its manual (in this subpart referred to as "required inspections") and each person

with whom it arranges for the performance of that work must have an organization adequate to perform that work.

(c) Each person performing required inspections in addition to other maintenance, preventive maintenance, or alterations, shall organize the performance of those functions so as to separate the required inspection functions from the other maintenance, preventive maintenance, and alteration functions. The separation shall be below the level of administrative control at which overall responsibility for the required inspection functions and other maintenance, preventive maintenance, and alteration functions are exercised.

§ 121.367 Maintenance, preventive maintenance, and alterations programs.

Each certificate holder shall have an inspection program and a program covering other maintenance, preventive maintenance, and alterations that ensures that—

(a) Maintenance, preventive maintenance, and alterations performed by it, or by other persons, are performed in accordance with the certificate holder's manual;

(b) Competent personnel and adequate facilities and equipment are provided for the proper performance of maintenance, preventive maintenance, and alterations; and

(c) Each aircraft released to service is airworthy and has been properly maintained for operation in air transportation.

§ 121.369 Manual requirements.

(a) The certificate holder shall put in its manual a chart or description of the certificate holder's organization required by § 121.365 and a list of persons with whom it has arranged for the performance of any of its required inspections, other maintenance, preventive maintenance, or alterations, including a general description of that work.

(b) The certificate holder's manual must contain the programs required by §121.367 that must be followed in performing maintenance, preventive maintenance, and alterations of that certificate holder's airplanes, including airframes, aircraft engines, propellers, appliances, and parts thereof, and must include at least the following:

(1) The method of performing routine and nonroutine maintenance (other than required inspections), preventive maintenance, and alterations.

(2) A 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 aircraft, if not performed properly or if improper parts or materials are used.

(3) The method of performing required inspections and a designation by occupational title of personnel authorized to perform each required inspection.

(4) Procedures for the reinspection of work performed pursuant to previous required inspection findings ("buy-back procedures").

(5) Procedures, standards, and limits necessary for required inspections and acceptance or rejection of the items required to be inspected and for periodic inspection and calibration of precision tools, measuring devices, and test equipment.

(6) Procedures to ensure that all required inspections are performed.

(7) Instructions to prevent any person who performs any item of work from performing any required inspection of that work.

(8) Instructions and procedures to prevent any decision of an inspector, regarding any required inspection from being countermanded by persons other than supervisory personnel of the inspection unit, or a person at that level of administrative control that has overall responsibility for the management of both the required inspection functions and the other maintenance, preventive maintenance, and alterations functions.

(9) Procedures to ensure that required inspections, other maintenance, preventive maintenance, and alterations that are not completed as a result of shift changes or similar work interruptions are properly completed before the aircraft is released to service.

§ 121.371 Required inspection personnel.

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

(b) No person may allow any person to perform a required inspection unless, at that time, the person performing that inspection is under the supervision and control of an inspection unit.

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

(d) Each certificate holder shall maintain, or shall determine that each person with whom it arranges to perform its required inspections maintains, a current listing of persons who have been trained, qualified, and authorized to conduct required inspections. The persons must be identified by name, occupational title, and the inspections that they are authorized to perform. The certificate holder (or person with whom it arranges to perform its required inspections) shall give written information to each person so authorized describing the extent of his responsibilities, authorities, and inspectional limitations. The list shall be made available for inspection by the Administrator upon request.

§ 121.373 Continuing analysis and surveillance.

(a) Each certificate holder shall establish and maintain a system for the continuing analysis and surveillance of the performance and effectiveness of its inspection program and the program covering other maintenance, preventive maintenance, and alterations and for the correction of any deficiency in those programs, regardless of whether those programs are carried out by the certificate holder or by another person.

(b) Whenever the Administrator finds that either or both of the programs described in paragraph (a) of this paragraph does not contain adequate procedures and standards to meet the requirements of this Part, the certificate holder shall, after notification by the Administrator, make any changes in those programs that are necessary to meet those requirements.

(c) A certificate holder may petition the Administrator to reconsider the notice to make a change in a program. The petition must be filed with the FAA Air Carrier District Office charged with the overall inspection of the certificate holder's operations within 30 days after the certificate holder receives the notice. Except in the case of an emergency requiring immediate action in the interest of safety, the filing of the petition stays the notice pending a decision by the Administrator.

§ 121.375 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.

§ 121.377 Maintenance and preventive maintenance personnel duty time limitations.

Within the United States, each certificate holder (or person performing maintenance or preventive maintenance functions for it) shall relieve each person performing maintenance or preventive maintenance from duty for a period of at least 24 consecutive hours during any seven consecutive days, or the equivalent thereof within any one calendar month.

§ 121.378 Certificate requirements.

(a) Each person who is directly in charge of maintenance, preventive maintenance, or alteration, and each person performing required inspections 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.

§ 121.379 Authority to perform and approve maintenance, preventive maintenance and alterations.

(a) A certificate holder may perform maintenance, preventive maintenance, and alterations as provided in its continuous airworthiness maintenance program and its maintenance manual. In addition, an air carrier may perform these functions for another air carrier

as provided in the continuous airworthiness maintenance program and maintenance manual of the other air carrier.

(b) A certificate holder may approve any aircraft, airframe, aircraft engine, propeller, or appliance for return to service after maintenance, preventive maintenance, or alterations that it performed under paragraph (a) of this section. However, in the case of a major repair or major alteration, the work must have been done in accordance with technical data approved by the Administrator.

Subpart M—Airman and Crewmember Requirements

§ 121.381 Applicability.

This subpart prescribes airman and crewmember requirements for all certificate holders.

§ 121.383 Airman: limitations on use of services.

(a) No certificate holder may use a person as an airman unless that person—

(1) Holds an appropriate current airman certificate issued by the FAA;

(2) Has any required appropriate current airman and medical certificates in his possession while engaged in operations under this part; and

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

(b) Each airman covered by paragraph (a)(2) of this section shall present either or both certificates for inspection upon the request of the Administrator.

(c) No certificate holder may use the services of any person as a pilot on an airplane engaged in operations under this part if that person has reached his 60th birthday. No person may serve as a pilot on an airplane engaged in operations under this part if that person has reached his 60th birthday.

§ 121.385 Composition of flight crew.

(a) No certificate holder may operate an aircraft with less than the minimum flight crew in the airworthiness certificate or the aircraft Flight Manual approved for that type aircraft 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 the performance of multiple functions at the same time by one airman.

(c) The following minimum pilot crews apply:

(1) *Domestic air carriers.* If a domestic air carrier is authorized to operate under IFR, or if it operates large aircraft, the minimum pilot crew is two pilots and the air carrier shall designate one pilot as pilot in command and the other second in command.

(2) *Flag air carriers.* If a flag air carrier is authorized to operate under IFR, or if it operates large aircraft, the minimum pilot crew is two pilots.

(3) *Supplemental air carriers and commercial operators.* If a supplemental air carrier or commercial operator is authorized to operate helicopters under IFR, or if it operates large aircraft, the minimum pilot crew is two pilots and the supplemental air carrier or commercial operator shall designate one pilot as pilot in command and the other second in command.

(d) 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.

§ 121.387 Flight engineer.

(a) No certificate holder may operate an airplane having a maximum certificated takeoff weight of more than 80,000 pounds without a flight crewmember holding a current flight engineer certificate.

(b) Such a flight crewmember is also required on each four-engine airplane having a maximum certificated takeoff weight of more than 30,000 pounds, if the Administrator determines that the design of the airplane or the kind of operation requires a flight engineer for safe operation.

§ 121.389 Flight navigator: flag and supplemental air carriers and commercial operators.

(a) No flag or supplemental air carrier or commercial operator may operate an airplane over any area, route, or route segment that is outside the 48 contiguous States and the District of Columbia, without a flight crewmember holding a current flight navigator certificate, whenever the Administrator determines that celestial navigation is necessary or other specialized means of navigation necessary to obtain a reliable fix for the safety of the flight cannot be adequately accomplished from the pilot station for a period of more than one hour. However, the Administrator may also require a certificated flight navigator when those specialized means of navigation are necessary for one hour or less. In making that determination the Administrator considers—

(1) The speed of the airplane;

(2) Normal weather conditions en route;

(3) Extent of air traffic control;

(4) Traffic congestion;

(5) Area of land at destination;

(6) Fuel requirements;

(7) Fuel available for return to point of departure or alternates; and

(8) Predication of flight upon operation beyond the point-of-no-return.

(b) The areas, routes, or route segments over which a navigator is required are specified in the operations specifications of the air carrier or commercial operator.

§ 121.391 Flight attendants: domestic air carriers.

Each domestic air carrier conducting a passenger operation shall provide at least one flight attendant on each airplane with a capacity of more than nine passengers.

§ 121.393 Flight attendants: flag and supplemental air carriers and commercial operators.

(a) Except as provided in paragraph (b) of this section, each flag and supplemental air carrier and each commercial operator conducting a passenger operation shall provide at least the following flight attendants on each airplane used:

(1) For airplanes having a seating capacity of at least 10 but less than 45 passengers—one flight attendant.

(2) For airplanes having a seating capacity of at least 45 but less than 101 passengers—two flight attendants.

(3) For airplanes having a seating capacity of more than 100 passengers—three flight attendants.

(b) Upon application by the air carrier or commercial operator, the Administrator may approve the use of an airplane in a particular operation with less than the number of flight attendants required by paragraph (a) of this section, if the air carrier or commercial operator shows that, based on the following, safety and emergency procedures and functions established under *§ 121.397* for the particular type of airplane and operation can be adequately performed by fewer flight attendants:

(1) Kind of operation.

(2) The number of passenger seats.

(3) The number of compartments.

(4) The number of emergency exits.

(5) Emergency equipment.

(6) The presence of other trained flight crewmembers, not on flight deck duty, whose services may be used in emergencies.

§ 121.395 Aircraft dispatcher: domestic and flag air carriers.

Each domestic and flag air carrier shall provide enough qualified aircraft dispatchers at each dispatch center to ensure proper operational control of each flight.

§ 121.396 Emergency and emergency evacuation duties: domestic air carriers.

(a) Each domestic air carrier shall assign to each required crewmember the necessary functions that he is to perform in an emergency or a situation requiring emergency evacuation. The air carrier shall show that those functions are realistic and can be practically accomplished.

(b) The air carrier shall describe each required crewmember's functions under paragraph (a) of this section in its air carrier manual.

§ 121.397 Emergency and emergency evacuation duties: flag and supplemental air carriers and commercial operators.

(a) Each flag and supplemental air carrier and each commercial operator of airplanes shall assign to each required crewmember the necessary functions that he is to perform in an emergency or a situation requiring emergency evacuation. The air carrier or commercial operator shall assign those functions for each type of airplane that it uses and shall show that those functions are realistic and can be accomplished.

(b) The air carrier or commercial operator shall describe each required crew-

member's functions under paragraph (a) of this section in its manual.

(c) The air carrier or commercial operator shall train each required crewmember in his functions under paragraph (a) of this section during the emergency training part of the approved training program prescribed in § 121.411.

Subpart N—Training Program

§ 121.410 Applicability.

Except where otherwise stated, this subpart prescribes requirements applicable to each certificate holder for establishing and maintaining a training program.

§ 121.411 Establishment.

(a) Each certificate holder shall have an approved training program that assures that each crewmember and each aircraft dispatcher (where required) is adequately trained to perform his assigned duties. Each crewmember and each aircraft dispatcher (where required) must satisfactorily complete the initial training phases before serving in operations under this part.

(b) Each certificate holder shall provide adequate ground and flight training facilities and properly qualified instructors for the training required by this section, and enough check airmen to conduct the flight checks required by this part. Each check airman must hold the airman certificates and ratings that are required for the airman being checked.

(c) The training program for each flight crewmember must consist of appropriate ground and flight training, including proper flight crew coordination and training in emergency procedures. The certificate holder shall standardize procedures for each flight crew function to the extent that each flight crewmember knows the functions for which he is responsible and the relation of those functions to the functions of other flight crewmembers. The initial program must include at least the requirements set forth in §§ 121.413 through 121.423.

(d) The crewmember emergency procedures training program must include at least the requirements set forth in § 121.423.

(e) Each instructor, supervisor, or check airman that is responsible for a particular training or flight check shall certify as to the proficiency of the crewmember or dispatcher concerned after he completes his initial training and after he completes his recurrent training. That certification shall be made a part of the crewmember's or dispatcher's record.

§ 121.413 Ground training: pilots.

(a) The initial ground training that the certificate holder must provide for each pilot before he serves as a flight crewmember must include at least—

(1) Instruction in the appropriate provisions of the certificate holder's operations specifications and of this chapter, especially the operating and dispatcher flight release rules and airplane operating limitations;

(2) Dispatch procedures (domestic and flag air carriers) or flight release procedures (supplemental air carriers and commercial operators) and appropriate contents of the manuals;

(3) Duties and responsibilities of crewmembers;

(4) The type of aircraft to be flown, including a study of the aircraft, engines, major components and systems, performance limitations, standard and emergency operating procedure, and appropriate contents of the approved Aircraft Flight Manual;

(5) Principles and methods for determining weight and balance limitations for takeoff and landing;

(6) Navigation and the use of appropriate navigation aids, including instrument approach facilities and procedures that the certificate holder is authorized to use;

(7) Air traffic control systems and procedures, and pertinent ground control letdown procedures;

(8) Enough meteorology to ensure a practical knowledge of the principles of icing, fog, thunderstorms, and frontal systems; and

(9) Procedures for operating in turbulent air, icing, hail, thunderstorm, and other potentially hazardous meteorological conditions.

(b) In addition to the training required by paragraph (a) of this section, each flag and supplemental air carrier and each commercial operator shall provide training in communications procedures and communications equipment failure procedures.

(c) Each certificate holder shall provide the following for each pilot:

(1) Any additional ground training necessary to ensure qualifications in new equipment, procedures, or techniques.

(2) Checks (and, in the case of flag air carriers, supplemental air carriers, and commercial operators, recurrent ground training) at least once each twelve months to ensure his continued proficiency in procedures, techniques, and information essential to the satisfactory performance of his duties. A check may be given during the month before or after it is due without affecting its effective date.

§ 121.415 Flight training: pilots.

(a) The initial flight training that the certificate holder must provide for each pilot before he serves as a flight crewmember must include at least—

(1) Takeoffs and landings during day and night in each type of airplane he is to pilot in operations under this Part;

(2) Normal and emergency flight maneuvers in each type of airplane he is to pilot in operations under this Part; and

(3) Flight under simulated instrument conditions.

(b) A pilot qualifying to serve as other than pilot in command or second in command, shall show the Administrator or a check pilot that he is able to take off and land each type of airplane in which he is to serve.

(c) The initial flight training for each pilot qualifying to serve as a pilot in command (and, in the case of a flag or supplemental air carrier or commercial operator, the second in command of an airplane in an operation that requires three or more pilots) must include flight instruction and practice in at least the following maneuvers and procedures:

(1) In each type of airplane to be flown by him in operations under this part, he must perform the following:

(i) In the case of takeoffs at the authorized maximum takeoff weight using maximum takeoff power with a simulated failure of the critical engine. In transport category airplanes the simulated failure must be done as close as possible to the critical engine failure speed V_1 and climb-out must be made as close as possible to the takeoff safety speed V_2, and the pilot shall determine the values for V_1 and V_2.

(ii) If a three-engine or four-engine airplane, flight, including maneuvering to a landing at the authorized maximum landing weight, with the most critical combination of two engines inoperative, or operating at zero thrust, using where appropriate applicable climb speeds set forth in the Airplane Flight Manuals.

(iii) At the authorized maximum landing weight, simulated pull-out from the landing and approach configurations at a safe altitude with the critical engine inoperative or operating at zero thrust.

(2) Flight must be conducted under simulated IFR conditions using each kind of navigation facility and letdown procedure that is used in normal operations. If a particular kind of facility is not available in the training area, the training may be given in a synthetic trainer.

For the purposes of subparagraph (1) of this paragraph, weight and power combinations less than those specified in subdivisions (i), (ii), and (iii) of that subparagraph may be used if the performance capabilities of the airplane under the specified conditions are simulated.

(d) Initial flight training for each pilot qualifying to serve as second in command of an airplane in domestic operations (or second in command of an airplane that requires two pilots in flag or supplemental air carrier or commercial operator operations) must include flight instruction and practice in at least the following maneuvers and procedures:

(1) In each type of airplane to be flown by him in operations under this part, flight training must include—

(i) Assigned flight duties as second in command, including flight emergencies;

(ii) Taxiing;

(iii) Takeoffs and landings;

(iv) Climbs and climbing turns;

(v) Slow flight;

(vi) Approach to stall;

(vii) Engine shutdown and restart;

(viii) Takeoff and landing with simulated engine failure; and

(ix) Flight under simulated IFR conditions, including instrument approach at least down to circling approach minimums and missed approach procedures.

(2) Flight must be conducted under simulated IFR conditions using each kind of navigation facility and letdown procedure that is used in normal operations. Except for those approach procedures for which the lowest minimums are approved, letdown procedures may be given in a synthetic trainer that has the radio

equipment and instruments necessary to simulate other navigational and letdown procedures approved for the certificate holder.

(e) The certificate holder shall give each pilot any additional flight training necessary to insure his qualification for new equipment, procedures, or techniques. At least once each 12 months, as a part of the training program, it shall give him a check (and in the case of a flag or supplemental air carrier or commercial operator, recurrent flight training). A check may be given during the month before or after it is due without affecting its effective date. The purpose of these checks and training is to insure his continued proficiency with respect to procedures, techniques, and information essential to the satisfactory performance of his duties. If the check of a pilot in command or second in command requires actual flight, satisfactory completion of the applicable proficiency checks required by § 121.441 or 121.449 meets the requirements of this section.

§ 121.417 Flight navigator training: flag air carriers.

(a) The training for each flight navigator must include at least the applicable parts of subparagraphs (1) through (4) and (6) through (8) of § 121.413(a).

(b) Before serving as a flight crewmember, each flight navigator must have enough ground and flight training to be proficient in the duties assigned to him by the air carrier. The flight training may be given during scheduled flight in air transportation under the supervision of a qualified flight navigator.

(c) The flag air carrier shall give each flight navigator any additional ground and flight training necessary to ensure his qualification for new equipment, procedures, and techniques. At least once each 12 months, as a part of the training program, it shall give him recurrent ground training and a flight check to ensure his continued proficiency with respect to procedures, techniques, and information essential to the satisfactory performance of his duties. The flight check may be given during scheduled flight in air transportation, or in a synthetic trainer in place of a check in flight.

§ 121.419 Flight navigator training: supplemental air carriers and commercial operators.

(a) The training for each flight navigator must include at least the applicable parts of subparagraphs (1) through (4) and (6) through (8) of § 121.413(a).

(b) Before serving as a flight crewmember, each flight navigator must have enough ground and flight training to be proficient in the duties assigned to him by the air carrier or commercial operator. The flight training may be given during flights subject to this part under the supervision of a qualified flight navigator.

(c) Each supplemental air carrier or commercial operator shall give each flight navigator any additional ground and flight training necessary to ensure his qualification for new equipment, procedures, and techniques. At least once within the preceding 12 months, as a part of the training program, it shall give him recurrent ground training and a flight check to ensure his continued proficiency with respect to procedures, techniques, and information essential to the satisfactory performance of his duties. The flight check may be given during passenger or cargo flights under the supervision of a qualified navigator, or in a synthetic trainer in place of a check in flight. A competence check may be given during the month before or the month after it is due without affecting its effective date.

§ 121.421 Flight engineer training.

(a) The training for each flight engineer must include at least the applicable parts of subparagraphs (1) through (5) of § 121.413(a).

(b) Before serving as a flight crewmember, each flight engineer must have enough flight training to be proficient in the duties assigned to him by the certificate holder. Except for emergency procedures, the flight training may be given during flights subject to the provisions of this part applicable to the certificate holder under the supervision of a qualified flight engineer.

(c) The certificate holder shall give each flight engineer any additional ground and flight training necessary to assure his qualification for new equipment, procedures, and techniques. At least once each 12 months, as a part of the training program, it shall give him a check (and in the case of a flag or supplemental air carrier or commercial operator, recurrent training) to assure his continued proficiency with respect to procedures, techniques, and information essential to the satisfactory performance of his duties. A competence check may be given during the month before or the month after it is due without affecting its effective date.

§ 121.423 Crewmember emergency training.

(a) Each certificate holder shall design its initial training in emergency procedures to give each required crewmember appropriate instruction in emergency procedures, including assignments in an emergency and coordination among crewmembers and appropriate individual instruction in at least the following subjects, as appropriate to the particular crewmember:

(1) Procedures for handling failure of an engine, engines, or other airplane components or systems.

(2) Procedures for handling—

(i) Emergency decompression;

(ii) Fire in the air or on the ground;

(iii) Ditching; and

(iv) Evacuation.

(3) The location of emergency equipment.

(4) The operation of emergency equipment.

(5) The power setting for maximum endurance and maximum range.

(b) The certificate holder shall give each crewmember, at least once each 12 months, a check (and, in the case of a flag or supplemental air carrier or a commercial operator, recurrent training) in the emergency procedures set forth in paragraph (a) of this section).

(c) Synthetic trainers approved to simulate flight operating emergency conditions may be used for training crewmembers in emergency procedures.

(d) The certificate holder shall give instruction, by lectures and films (or other equivalent means approved after demonstration) to each crewmember performing duties on pressurized airplanes operated above 25,000 feet covering at least—

(1) Respiration;

(2) Hypoxia;

(3) Duration of consciousness at altitudes without supplemental oxygen;

(4) Gas expansion;

(5) Gas bubble formation; and

(6) Physical phenomena and incidents of decompression.

(e) The certificate holder shall give each crewmember performing duties on pressurized airplanes operated above 25,000 feet, training and practice in putting on oxygen masks and operating oxygen equipment.

§ 121.425 Aircraft dispatcher training: domestic and flag air carriers.

(a) Each domestic and flag air carrier shall provide a training program for its aircraft dispatchers that includes—

(1) Training in their duties and responsibilities;

(2) Flight operations procedures;

(3) Air traffic control procedures;

(4) Performance of airplanes used;

(5) Navigation aids and facilities; and

(6) Meteorology.

(b) The training program must emphasize emergency procedures, including the alerting of proper governmental, company, and private agencies to give the maximum help to an airplane in distress.

(c) Each aircraft dispatcher shall, before performing duties as an aircraft dispatcher, show the supervisor or ground instructor authorized to certify his proficiency, his knowledge of the following:

(1) Contents of the air carrier operating certificate.

(2) Appropriate provisions of the air carrier's operations specifications, manual, and this chapter.

(3) Characteristics of airplanes used by the carrier.

(4) Cruise control data and cruising speeds for those airplanes.

(5) Maximum authorized airplane loads for the routes and airports used.

(6) Air carrier radio facilities.

(7) Characteristics and limitations of each kind of radio and navigation facility used.

(8) Effect of weather conditions on airplane radio reception.

(9) Airports used and the terrain en route.

(10) Prevailing weather phenomena.

(11) Sources of weather information available.

(12) Pertinent air traffic control procedures.

(13) Emergency procedures.

(d) The air carrier shall give each dispatcher any additional training necessary to assure his qualification for new equipment, procedures, and techniques. At least once each 12 months, as a part

of the training program, it shall give him a check (and, in the case of a flag or supplemental air carrier or a commercial operator, recurrent training) to assure his continued competence with respect to the procedures, techniques, and information essential to his duties.

Subpart O—Flight Crewmember Qualifications

§ 121.431 Applicability.

This subpart prescribes flight crewmember qualifications for all certificate holders except where otherwise specified.

§ 121.433 General.

(a) No certificate holder may use a flight crewmember, and none of its flight crewmembers may perform duties under his airman certificate, unless he meets the appropriate requirements of §§ 121.411 through 121.423 and §§ 121.439 through 121.453.

(b) When a pilot completes a check required by this subpart, the check airman who is responsible for the particular check shall certify as to the pilot's proficiency. This certification shall be made a part of the pilot's record.

(c) If a flight crewmember who is required to take a check takes that check in the calendar month before, or the calendar month after, the month in which it becomes due, he is considered to have taken it during the month it became due.

§ 121.435 Helicopter operations: Supplemental air carriers and commercial operators.

No supplemental air carrier or commercial operator may use a flight crewmember, and none of its flight crewmembers may perform duties under his airman certificate in helicopter operations, unless that flight crewmember meets the requirements of §§ 127.151 or 127.161 and 127.175 and 127.177.

§ 121.437 Pilot qualification: certificates required.

(a) No pilot may act as pilot in command of an aircraft (or as second in command of an aircraft in a flag or supplemental air carrier or commercial operator operation that requires three or more pilots) unless he holds an airline transport pilot certificate and an appropriate type rating for that aircraft.

(b) Each pilot who acts as a pilot in a capacity other than those specified in paragraph (a) of this section must hold at least a commercial pilot certificate and an instrument rating.

§ 121.439 Pilot qualification: recent experience.

No certificate holder may use a pilot as a pilot in command or second in command in operations under this part unless, within the preceding 90 days, he has made at least three takeoffs and three landings in an airplane of the type in which he is to serve.

§ 121.441 Pilot checks.

(a) *Line check.* No certificate holder may use a pilot as pilot in command of an airplane until he has passed a line check in one of the types of airplanes that he is to fly as follows:

(1) For domestic and flag air carriers the check must—

(i) Be given by an approved check pilot who is qualified on both the route and the airplane; and

(ii) Consist of at least a scheduled flight over a typical part of the air carrier's route to which the pilot is normally assigned.

(2) For supplemental air carriers and commercial operators the check must—

(i) Be given by an approved check pilot who is qualified on the airplane; and

(ii) Consist of at least one flight over a part of a Federal airway, foreign airway, or advisory route over which the pilot may be assigned.

Thereafter, a pilot may not serve as pilot in command unless each 12 months he passes a similar line check. During the flight (that must be long enough for a determination to be made) the check pilot shall determine whether the pilot being checked satisfactorily performs the duties and responsibilities of a pilot in command.

(b) *Proficiency check.* No certificate holder may use a pilot as a pilot in command of an airplane in operations under this part unless he has satisfactorily shown to the Administrator or a check pilot that he is able to pilot and navigate airplanes that he is to fly. Thereafter he may not serve as a pilot in command unless each six months he passes a similar pilot proficiency check. If a pilot serves in more than one airplane type, at least each alternate check must be given in flight in the largest type of airplane in which he serves. The proficiency check must include the following:

(1) Equipment test (oral or written).
(2) Taxiing.
(3) Runup.
(4) Takeoff.
(5) Climb.
(6) Climbing turns.
(7) Steep turns.
(8) Maneuvers at minimum speeds.
(9) Approaches to stalls.
(10) Propeller feathering.
(11) Maneuvers with one or more engine(s) inoperative.
(12) Rapid descent and pullout.
(13) Radio tuning.
(14) Orientation.
(15) Approach procedures.
(16) Missed approach procedures.
(17) Traffic control procedures.
(18) Crosswind landings.
(19) Landing under circling approach conditions.
(20) Takeoffs and landings with engine(s) failure.
(21) Demonstration of pilot judgment.
(22) Emergency procedures.
(23) Flight maneuvers specified in § 121.415(c)(1), except that the simulated engine failure during takeoff need not be at speed V_1 or at the actual or simulated maximum authorized weight.
(24) Approved flight maneuvers under simulated instrument conditions using the navigational facilities and letdown procedures normally used by the pilot except that maneuvers other than those associated with approach procedures for which the lowest minimums are approved may be given in a synthetic trainer. However, where a certificate holder is authorized landing minimums based on instrument landing systems and ground control approach, only maneuvers associated with the predominant landing aid on a system-wide basis need be given in flight. A synthetic trainer used under this subparagraph must contain the radio equipment and instruments necessary to simulate the appropriate navigational and letdown procedures.

An equipment test given to an airman in the certificate holders ground school within the preceding six months may be accepted as equal to the test required by subparagraph (1) of this paragraph, in the discretion of the check pilot.

(c) If, in the judgment of the check pilot, the pilot being checked performs any of the items listed in paragraph (b) of this section in an unsatisfactory manner, the check pilot may give additional training to the pilot during the course of the proficiency check. If the pilot being checked is unable to demonstrate satisfactory performance to the check pilot, the certificate holder may not use him in operations under this part until he has satisfactorily shown his proficiency.

(d) *Use of flight simulator.* After the first proficiency check, the satisfactory completion of an approved training course in an approved airplane simulator may be substituted at alternate six-month intervals for the proficiency check required by paragraph (b) of this section, if the simulator meets the requirements of Appendix B of this part and—

(1) The simulator is maintained at the same level as required for initial approval;

(2) A functional preflight check of the simulator is performed each day before beginning simulator flight training or proficiency checks;

(3) A daily discrepancy log is kept and an entry of each discrepancy is made by the simulator instructor or check airman before the end of each training or check flight; and

(4) If a modification is made to the airplane, a corresponding modification is made to the simulator if necessary for flight crew training or proficiency checks.

The simulator may be used with inoperative instruments or equipment, if they are not applicable to the particular phase of training being given.

(e) Before serving as a pilot in command on any airplane, the pilot must have passed, during the preceding 12 months, either a proficiency check or a line check in that type of airplane.

§ 121.443 Pilot in command qualification: routes and airports: domestic and flag air carriers.

(a) No domestic or flag air carrier may use a pilot as pilot in command until he has qualified, for the route on which he is to serve, in accordance with this section, and the appropriate instructor or check pilot has so certified.

(b) The qualifying pilot shall show that he has adequate knowledge of the following with respect to each route he is to fly:

(1) Weather characteristics.
(2) Navigation facilities.

(3) Communication procedures.
(4) Kinds of terrain and obstruction hazards.
(5) Minimum safe flight levels.
(6) Position reporting points.
(7) Holding procedures.
(8) Pertinent air traffic control procedures.
(9) Congested areas, obstructions, physical layout, and instrument approach procedures for each regular, provisional, or refueling airport that is approved for the route.

Those parts of the requirements of this paragraph relating to holding procedures and instrument approach procedures may be accomplished in a synthetic trainer that contains the radio equipment and instruments necessary to simulate the navigation and letdown procedures approved for the air carrier.

(c) The qualifying pilot shall make an entry as a member of a flight crew at each regular, provisional, and refueling airport into which he is scheduled to fly. The entry must include a landing and a takeoff. The qualifying pilot must occupy a seat in the pilot compartment and must be accompanied by a pilot who is qualified for the airport.

(d) Paragraph (c) of this section does not apply if—

(1) The initial entry is made under VFR weather conditions at the airport involved;

(2) The air carrier shows that the qualification can be made by using approved pictorial means; or

(3) The air carrier notifies the Administrator that it intends to operate at an airport that is near an airport into which the pilot concerned is currently qualified by entry, and the Administrator finds that the pilot is adequately qualified at the new airport, considering at least the pilot's familiarity with the layout, surrounding terrain, location of obstacles, and instrument approach and traffic control procedures at the new airport.

(e) No pilot in command may serve on a route or route segment on which he must navigate by pilotage and fly at or below the level of terrain that is within 25 miles horizontally of the centerline of that route or route segment unless he has made at least two one-way trips over the route or route segment on the flight deck under VFR weather conditions.

§ 121.445 Pilot in command qualification: routes and airports: supplemental air carriers and commercial operators.

(a) Each supplemental air carrier and commercial operator shall establish in its manual a procedure whereby each pilot who has not flown over a route and into an airport within the preceding 60 days will certify on a form provided by the operator that he has studied and knows the subjects listed in paragraph (b) of this section in regard to the routes and airports into which he is to operate.

(b) Each qualifying pilot shall show that he has adequate knowledge of the following:

(1) Weather characteristics appropriate to the seasons.
(2) Navigation facilities.
(3) Communication procedures.
(4) Kinds of terrain and obstruction hazards.
(5) Minimum safe flight levels.
(6) Pertinent air traffic control procedures including terminal area, arrival, departure, and holding and all kinds of instrument approach procedures.
(7) Congested areas, obstruction, and physical layout of each airport in the terminal area in which the pilot will operate.

§ 121.447 Pilot route and airport qualifications for particular trips: Domestic and flag air carriers.

(a) A domestic or flag air carrier may not use a pilot as pilot in command unless, within the preceding 12 months, the pilot has made at least one trip as pilot or other member of a flight crew between terminals into which he is scheduled to fly and has complied with § 121.443(e), if applicable.

(b) To re-establish route and airport qualification after being absent from the route for a period of more than 12 months, a pilot must comply with the appropriate provisions of § 121.443.

§ 121.449 Proficiency checks: second in command.

(a) A certificate holder may not use a pilot as second in command unless he has satisfactorily shown to the Administrator or a check pilot that he is able to pilot and navigate airplanes that he is to fly and to perform his assigned duties. Thereafter, he may not serve as second in command unless each 12 months he satisfactorily completes a similar pilot proficiency check.

(b) If a pilot serves in more than one airplane type, at least each alternate check must be given in flight in the largest type of airplane in which he serves.

(c) The proficiency check must include at least an oral or written equipment test and the procedures and flight maneuvers specified in § 121.415(d)(1) (for domestic air carriers), or in § 121.415(d) (for other certificate holders). The check may be given from either the right or left pilot seat.

(d) After the initial check, satisfactory completion of an approved course of training in an aircraft simulator that meets the requirements of § 121.441(d) may be substituted at alternate 12-month intervals for the checks required by paragraphs (a) and (e) of this section. In addition, satisfactory completion of the proficiency check in accordance with § 121.441 (b), (c), and (d) meets the requirements of this section.

(e) For flag and supplemental air carriers and commercial operators, the proficiency check for the second in command of a required three-pilot crew is that set forth in § 121.441 (b), (c), and (d).

§ 121.451 Flight navigator qualification: flag and supplemental air carriers and commercial operators.

(a) No flag or supplemental air carrier or commercial operator may use a flight navigator unless, within the preceding 12-month period, he has had at least 50 hours of flight time as a flight navigator, or the air carrier or commercial operator or the Administrator has checked him (including a check in flight or in an approved synthetic trainer) and has determined that he is familiar with essential current navigation information pertaining to routes to be flown by him and that he is competent in the operating procedures and navigation equipment to be used.

(b) A flag or supplemental air carrier or commercial operator may check a flight navigator during a flight subject to this part, but it may not assign him as a required flight crewmember on that flight.

§ 121.453 Flight engineer qualification.

(a) No certificate holder may use a flight engineer unless, within the preceding six-month period, he has had at least 50 hours of flight time as a flight engineer on the type of airplane in which he is to serve, or the certificate holder or the Administrator has checked him (in a flight other than a flight under this Part) and has determined that he is familiar with all essential current information and operating procedures for the type of airplane to which he is assigned and is competent in that airplane.

(b) If a flight engineer has been previously qualified in the type of airplane in which he is to serve, the certificate holder may give the check in a synthetic trainer approved to simulate the necessary operating conditions in place of the flight check.

Subpart P—Aircraft Dispatcher Qualifications and Duty Time Limitations: Domestic and Flag Air Carriers

§ 121.461 Applicability.

This subpart prescribes the qualifications and duty time limitations for aircraft dispatchers for domestic and flag air carriers.

§ 121.463 Aircraft dispatcher qualifications.

(a) No domestic or flag air carrier may use an aircraft dispatcher unless he meets the requirements in §§ 121.411 and 121.425.

(b) No domestic or flag air carrier may use a dispatcher to dispatch airplanes over any route or route segment unless the air carrier has determined that he is familiar with all essential operating procedures for the entire route and the airplanes to be used. However, a dispatcher who is qualified to dispatch airplanes over part of a route may dispatch airplanes after coordinating with dispatchers who are qualified to dispatch airplanes over the other parts of the route.

(c) No aircraft dispatcher may dispatch airplanes over any area in which he is authorized to exercise dispatch jurisdiction unless, within the preceding 12 months, he has made at least a one-way qualification trip over that area on the flight deck of an airplane. The trip must include entry into as many points as practicable; it is not necessary to make a flight over each route in the area.

§ 121.465 Duty time limitations: Domestic and flag air carriers.

(a) Each domestic and flag air carrier shall establish the daily duty period for

a dispatcher so that it begins at a time that allows him to become thoroughly familiar with existing and anticipated weather conditions along the route before he dispatches any airplane. He shall remain on duty until each airplane dispatched by him has completed its flight, or has gone beyond his jurisdiction, or until he is relieved by another qualified dispatcher.

(b) Except in cases where circumstances or emergency conditions beyond the control of the air carrier require otherwise—

(1) No domestic or flag air carrier may schedule a dispatcher for more than 10 consecutive hours of duty;

(2) If a dispatcher is scheduled for more than 10 hours of duty in 24 consecutive hours, the carrier shall provide him a rest period of at least eight hours at or before the end of 10 hours of duty.

(3) Each dispatcher must be relieved of all duty with the air carrier for at least 24 consecutive hours during any seven consecutive days or the equivalent thereof within any month.

(c) Notwithstanding paragraphs (a) and (b) of this section, a flag air carrier may, if authorized by the Administrator, schedule an aircraft dispatcher at a duty station outside of the 48 contiguous States and the District of Columbia, for more than 10 consecutive hours of duty in a 24-hour period if that aircraft dispatcher is relieved of all duty with the carrier for at least eight hours during each 24-hour period.

Subpart Q—Flight Time Limitations: Domestic Air Carriers

§ 121.470 Applicability.

This subpart prescribes flight time limitations for domestic air carriers.

§ 121.471 Flight time limitations: all flight crewmembers.

(a) No domestic air carrier may schedule any flight crewmember for duty aloft in scheduled air transportation or in other commercial flying if that crewmember's total flight time in all commercial flying will exceed:

(1) 1,000 hours in any year.

(2) 100 hours in any month.

(3) 30 hours in any seven consecutive days.

(b) No domestic air carrier may schedule a flight crewmember for duty aloft for more than eight hours during any 24 consecutive hours without a rest period at or before the end of that eight hours, equal to twice the number of hours of duty aloft since the last rest period, but not less than eight hours. However, in conducting a scheduled transcontinental nonstop flight, an air carrier may schedule a flight crewmember for more than eight but not more than 10 hours of continuous duty aloft without an intervening rest period, if—

(1) The flight is in an airplane with a pressurization system that is operative at the beginning of the flight;

(2) The flight crew consists of at least two pilots and a flight engineer.

(c) Each flight crewmember who has been on duty aloft for more than eight hours during any 24 consecutive hours must be given, upon completion of his assigned flight or series of flights, at least 16 hours of rest before being assigned to any duty with the air carrier.

(d) Each domestic air carrier shall relieve each flight crewmember engaged in scheduled air transportation from all further duty for at least 24 consecutive hours during any seven consecutive days.

(e) No domestic air carrier may assign any flight crewmember to any duty with the air carrier during any required rest period.

(f) Time spent in transportation, not local in character, that an air carrier requires of a flight crewmember and provides to transport the crewmember to an airport at which he is to serve on a flight as a crewmember, or from an airport at which he was relieved from duty to return to his home station, is not considered part of a rest period.

(g) A flight crewmember is not considered to be scheduled for duty in excess of flight time limitations if the flights to which he is assigned are scheduled and normally terminate within the limitations, but due to circumstances beyond the control of the air carrier (such as adverse weather conditions), are not at the time of departure expected to reach their destination within the scheduled time.

Subpart R—Flight Time Limitations: Flag Air Carriers

§ 121.480 Applicability.

This subpart prescribes flight time limitations for flag air carriers.

§ 121.481 Flight time limitations: one or two pilot crews.

(a) A flag air carrier may schedule a pilot to fly in an airplane that has a crew of one or two pilots for eight hours or less during any 24 consecutive hours without a rest period during these eight hours.

(b) If a flag air carrier schedules a pilot to fly more than eight hours during any 24 consecutive hours, it shall give him an intervening rest period, at or before the end of eight scheduled hours of flight duty. This rest period must be at least twice the number of hours flown since the preceding rest period, but not less than eight hours. The air carrier shall relieve that pilot of all duty with it during that rest period.

(c) Each pilot who has flown more than eight hours during 24 consecutive hours must be given at least 18 hours of rest before being assigned to any duty with the air carrier.

(d) No pilot may fly more than 32 hours during any seven consecutive days, and each pilot must be relieved from all duty for at least 24 consecutive hours at least once during any seven consecutive days.

(e) No pilot may fly as a member of a crew more than 100 hours during any one month.

(f) No pilot may fly as a member of a crew more than 1,000 hours during any 12-month period.

§ 121.483 Flight time limitations: two pilots and one additional flight crewmember.

(a) No flag air carrier may schedule a pilot to fly, in an airplane that has a crew of two pilots and at least one additional flight crewmember, for a total of more than 12 hours during any 24 consecutive hours.

(b) If a pilot has flown 20 or more hours during any 48 consecutive hours or 24 or more hours during any 72 consecutive hours, he must be given at least 18 hours of rest before being assigned to any duty with the air carrier. In any case, he must be given at least 24 consecutive hours of rest during any seven consecutive days.

(c) No pilot may fly as a flight crewmember more than—

(1) 120 hours during any 30 consecutive days;

(2) 300 hours during any 90 consecutive days; or

(3) 1,000 hours during any 12-month period.

§ 121.485 Flight time limitations: three or more pilots and an additional flight crewmember.

(a) Each flag air carrier shall schedule its flight hours to provide adequate rest periods on the ground for each pilot who is away from his base and who is a pilot on an airplane that has a crew of three or more pilots and an additional flight crewmember. It shall also provide adequate sleeping quarters on the airplane whenever a pilot is scheduled to fly more than 12 hours during any 24 consecutive hours.

(b) The flag air carrier shall give each pilot, upon return to his base from any flight or series of flights, a rest period that is at least twice the total number of hours he flew since the last rest period at his base. During the rest period required by this paragraph, the air carrier may not require him to perform any duty for it. If the required rest period is more than seven days, that part of the rest period in excess of seven days may be given at any time before the pilot is again scheduled for flight duty on any route.

(c) No pilot may fly as a flight crewmember more than—

(1) 350 hours during any 90 consecutive days; or

(2) 1,000 hours during any 12-month period.

§ 121.487 Flight time limitations: pilots not regularly assigned.

(a) Except as provided in paragraphs (b) through (e) of this section, a pilot who is not regularly assigned as a flight crewmember for an entire month under § 121.483 or 121.485 may not fly more than 100 hours in any 30 consecutive days.

(b) The flight time limitations for a pilot who is scheduled for duty aloft for more than 20 hours in two-pilot crews in any month, or whose assignment in such a crew is interrupted more than once in that month by assignment to a crew consisting of two or more pilots and an additional flight crewmember, are those set forth in § 121.481.

(c) Except for a pilot covered by paragraph (b) of this section, the flight time limitations for a pilot who is scheduled for duty aloft for more than 20 hours in two-pilot and additional flight crewmember crews in any month, or whose

assignment in such a crew is interrupted more than once in that month by assignment to a crew consisting of three pilots and additional flight crewmember, are those set forth in § 121.483.

(d) The flight time limitations for a pilot to whom paragraphs (b) and (c) of this section do not apply and who is scheduled for duty aloft for a total of not more than 20 hours within any month in two-pilot crews (with or without additional flight crewmembers) are those set forth in § 121.485.

(e) The flight time limitations for a pilot assigned to each of two-pilot, two-pilot and additional flight crewmember, and three-pilot and additional flight crewmember crews in a given month, and who is not subject to paragraph (b), (c), or (d) of this section, are those set forth in § 121.483.

§ 121.489 Flight time limitations: other commercial flying.

No pilot that is employed as a pilot by a flag air carrier may do any other commercial flying if that commercial flying plus his flying in air transportation will exceed any flight time limitation in this part.

§ 121.491 Flight time limitations: deadhead transportation.

Time spent in deadhead transportation to or from duty assignment is not considered to be a part of a rest period.

§ 121.493 Flight time limitations: flight engineers and flight navigators.

(a) In any operation in which one flight engineer or flight navigator is required, the flight time limitations in § 121.483 apply to that flight engineer or flight navigator.

(b) In any operation in which more than one flight engineer or flight navigator is required, the flight time limitations in § 121.485 apply to those flight engineers or flight navigators.

Subpart S—Flight Time Limitations: Supplemental Air Carriers and Commercial Operators

§ 121.500 Applicability.

This section prescribes flight time limitations for supplemental air carriers and commercial operators.

§ 121.501 Flight time limitations: helicopters.

No supplemental air carrier or commercial operator may schedule a flight crewmember for duty aloft in helicopter operations subject to this part, or in any other commercial flying, that would exceed the flight time limitations prescribed in § 127.191.

§ 121.503 Flight time limitations: pilots: airplanes.

(a) A supplemental air carrier or commercial operator may schedule a pilot to fly in an airplane for eight hours or less during any 24 consecutive hours without a rest period during those eight hours.

(b) Each pilot who has flown more than eight hours during any 24 consecutive hours must be given at least 16 hours of rest before being assigned to any duty with the air carrier or commercial operator.

(c) Each supplemental air carrier and commercial operator shall relieve each pilot from all duty for at least 24 consecutive hours at least once during any seven consecutive days.

(d) No pilot may fly as a crewmember in air carrier service more than 100 hours during any 30 consecutive days.

(e) No pilot may fly as a crewmember in air carrier service more than 1,000 hours during any calendar year.

(f) Notwithstanding paragraph (a) of this section, an air carrier may, in conducting a transcontinental nonstop flight, schedule a flight crewmember for more than eight but not more than 10 hours of continuous duty aloft without an intervening rest period, if—

(1) The flight is in an airplane with a pressurization system that is operative at the beginning of the flight;

(2) The Flight crew consists of at least two pilots and a flight engineer; and

(3) The air carrier uses, in conducting the operation, an air/ground communication service that is independent of systems operated by the United States, and a dispatch organization, both of which are approved by the Administrator as adequate to serve the terminal points concerned.

§ 121.505 Flight time limitations: two pilot crews: airplanes.

(a) If a supplemental air carrier or commercial operator schedules a pilot to fly more than eight hours during any 24 consecutive hours, it shall give him an intervening rest period at or before the end of eight scheduled hours of flight duty. This rest period must be at least twice the number of hours flown since the preceding rest period, but not less than eight hours. The supplemental air carrier or commercial operator shall relieve that pilot of all duty with it during that rest period.

(b) No pilot of an airplane that has a crew of two pilots may be on duty for more than 16 hours during any 24 consecutive hours.

§ 121.507 Flight time limitations: three pilot crews: airplanes.

(a) No supplemental air carrier or commercial operator may schedule a pilot—

(1) For flight deck duty in an airplane that has a crew of three pilots for more than eight hours in any 24 consecutive hours; or

(2) To be aloft in an airplane that has a crew of three pilot for more than 12 hours in any 24 consecutive hours.

(b) No pilot of an airplane that has a crew of three pilots may be on duty for more than 18 hours in any 24 consecutive hours.

§ 121.509 Flight time limitations: four pilot crews: airplanes.

(a) No supplemental air carrier or commercial operator may schedule a pilot—

(1) For flight deck duty in an airplane that has a crew of four pilots for more than eight hours in any 24 consecutive hours; or

(2) To be aloft in an airplane that has a crew of four pilots for more than 16 hours in any 24 consecutive hours.

(b) No pilot of an airplane that has a crew of four pilots may be on duty for more than 20 hours in any 24 consecutive hours.

§ 121.511 Flight time limitations: flight engineers: airplanes.

(a) In any operation in which one flight engineer is serving the flight time limitations in §§ 121.503 and 121.505 apply to that flight engineer.

(b) In any operation in which more than one flight engineer is serving and the flight crew contains more than two pilots the flight time limitations in § 121.509 apply in place of those in § 121.505.

§ 121.513 Flight time limitations: overseas and international operations: airplanes.

In place of the flight time limitations in §§ 121.503 through 121.511, a supplemental air carrier or commercial operator may elect to comply with the flight time limitations of §§ 121.515 and 121.521 through 121.525 for operations conducted—

(a) Between a place in the 48 contiguous States and the District of Columbia, or Alaska, and any place outside thereof;

(b) Between any two places outside the 48 contiguous States, the District of Columbia, and Alaska; or

(c) Between two places within the State of Alaska or the State of Hawaii.

§ 121.515 Flight time limitations: all airmen: airplanes.

No airman may be aloft as a flight crewmember more than 1,000 hours in any 12-month period.

§ 121.517 Flight time limitations: other commercial flying: airplanes.

No airman who is employed by a supplemental air carrier or commercial operator may do any other commercial flying, if that commercial flying plus his flying in operations under this part will exceed any flight time limitation in this part.

§ 121.519 Flight time limitations: deadhead transportation: airplanes.

Time spent by an airman in deadhead transportation to or from a duty assignment is not considered to be part of any rest period.

§ 121.521 Flight time limitations: crew of two pilots and one additional airman as required.

(a) No supplemental air carrier or commercial operator may schedule an airman to be aloft as a member of the flight crew in an airplane that has a crew of two pilots and at least one additional crewmember for more than 12 hours during any 24 consecutive hours.

(b) If an airman has been aloft as a member of a flight crew for 20 or more hours during any 48 consecutive hours or 24 or more hours during any 72 consecutive hours, he must be given at least 18 hours of rest before being assigned to any duty with the air carrier or commercial operator. In any case, he must be relieved of all duty for at least 24

consecutive hours during any seven consecutive days.

(c) No airman may be aloft as a flight crewmember more than—

(1) 120 hours during any 30 consecutive days; or

(2) 300 hours during any 90 consecutive days.

§ 121.523 Flight time limitations: crew of three or more pilots and additional airmen as required.

(a) No supplemental air carrier or commercial operator may schedule an airman for flight deck duty as a flight engineer, or navigator in a crew of three or more pilots and additional airmen for a total of more than 12 hours during any 24 consecutive hours.

(b) Each supplemental air carrier and commercial operator shall schedule its flight hours to provide adequate rest periods on the ground for each airman who is away from his principal operations base. It shall also provide adequate sleeping quarters on the airplane whenever an airman is scheduled to be aloft as a flight crewmember for more than 12 hours during any 24 consecutive hours.

(c) No supplemental air carrier or commercial operator may schedule any flight crewmember to be on continuous duty for more than 30 hours. Such a crewmember is considered to be on continuous duty from the time he reports for duty until the time he is released from duty for a rest period of at least 10 hours on the ground. If a flight crewmember is on continuous duty for more than 24 hours (whether scheduled or not) duty any scheduled duty period, he must be given at least 16 hours for rest on the ground after completing the last flight scheduled for that scheduled duty period before being assigned any further flight duty.

(d) If a flight crewmember is required to engage in deadhead transportation for more than four hours before beginning flight duty, one half of the time spent in deadhead transportation must be treated as duty time for the purpose of complying with duty time limitations, unless he is given at least 10 hours of rest on the ground before being assigned to flight duty.

(e) Each supplemental air carrier and commercial operator shall give each airman, upon return to his operations base from any flight or series of flights, a rest period that is at least twice the total number of hours he was aloft as a flight crewmember since the last rest period at his base, before assigning him to any further duty. If the required rest period is more than seven days, that part of the rest period that is more than seven days may be given at any time before the pilot is again scheduled for flight duty.

(f) No airman may be aloft as a flight crewmember for more than 350 hours in any 90 consecutive days.

§ 121.525 Flight time limitations: pilots serving in more than one kind of flight crew.

(a) This section applies to each pilot assigned during any 30 consecutive days to more than one type of flight crew.

(b) The flight time limitations for a pilot who is scheduled for duty aloft for more than 20 hours in two-pilot crews in 30 consecutive days, or whose assignment in such a crew is interrupted more than once in any 30 consecutive days by assignment to a crew of two or more pilots and an additional flight crewmember, are those listed in §§ 121.503 through 121.509, as appropriate.

(c) Except for a pilot covered by paragraph (b) of this section, the flight time limitations for a pilot scheduled for duty aloft for more than 20 hours in two-pilot and additional flight crewmember crews in 30 consecutive days or whose assignment in such a crew is interrupted more than once in any 30 consecutive days by assignment to a crew consisting of three pilots and an additional flight crewmember, are those set forth in § 121.521.

(d) The flight time limitations for a pilot to whom paragraphs (b) and (c) of this section do not apply, and who is scheduled for duty aloft for a total of not more than 20 hours within 30 consecutive days in two-pilot crews (with or without additional flight crewmembers) are those set forth in § 121.523.

(e) The flight time limitations for a pilot assigned to each of two-pilot, two-pilot and additional flight crewmember, and three-pilot and additional flight crewmember crews in 30 consecutive days, and who is not subject to paragraph (b), (c), or (d) of this section, are those listed in § 121.523.

Subpart T—Flight Operations

§ 121.531 Applicability.

This subpart prescribes requirements for flight operations applicable to all certificate holders, except where otherwise specified.

§ 121.533 Responsibility for operational control: domestic air carriers.

(a) Each domestic air carrier is responsible for operational control.

(b) The pilot in command and the aircraft dispatcher are jointly responsible for the preflight planning, delay, and dispatch release of a flight in compliance with this chapter and operations specifications.

(c) The aircraft dispatcher is responsible for—

(1) Monitoring the progress of each flight;

(2) Issuing necessary information for the safety of the flight; and

(3) Cancelling or redispatching a flight if, in his opinion or the opinion of the pilot in command, the flight cannot operate or continue to operate safely as planned or released.

(d) Each pilot in command of an aircraft is, during flight time, in command of the aircraft and crew and is responsible for the safety of the passengers, crewmembers, cargo, and airplane.

(e) Each pilot in command has full control and authority in the operation of the aircraft, without limitation, over other crewmembers and their duties during flight time, whether or not he holds valid certificates authorizing him to perform the duties of those crewmembers.

§ 121.535 Responsibility for operational control: flag air carriers.

(a) Each flag air carrier is responsible for operational control.

(b) The pilot in command and the aircraft dispatcher are jointly responsible for the preflight planning, delay, and dispatch release of a flight in compliance with this chapter and operations specifications.

(c) The aircraft dispatcher is responsible for—

(1) Monitoring the progress of each flight;

(2) Issuing necessary instructions and information for the safety of the flight; and

(3) Cancelling or redispatching a flight if, in his opinion or the opinion of the pilot in command, the flight cannot operate or continue to operate safely as planned or released.

(d) Each pilot in command of an aircraft is, during flight time, in command of the aircraft and crew and is responsible for the safety of the passengers, crewmembers, cargo, and airplane.

(e) Each pilot in command has full control and authority in the operation of the aircraft, without limitation, over other crewmembers and their duties during flight time, whether or not he holds valid certificates authorizing him to perform the duties of those crewmembers.

(f) No pilot may operate an aircraft in a careless or reckless manner so as to endanger life or property.

§ 121.537 Responsibility for operational control: supplemental air carriers and commercial operators.

(a) Each supplemental air carrier and commercial operator—

(1) Is responsible for operational control; and

(2) Shall list each person authorized by it to exercise operational control in its operator's manual.

(b) The pilot in command and the director of operations are jointly responsible for the initiation, continuation, diversion, and termination of a flight in compliance with this chapter and the operations specifications. The director of operations may delegate the functions for the initiation, continuation, diversion, and termination of a flight but he may not delegate the responsibility for those functions.

(c) The director of operations is responsible for canceling, diverting, or delaying a flight if in his opinion or the opinion of the pilot in command the flight cannot operate or continue to operate safely as planned or released. The director of operations is responsible for assuring that each flight is monitored with respect to at least the following:

(1) Departure of the flight from the place of origin and arrival at the place of destination, including intermediate stops and any diversions therefrom.

(2) Maintenance and mechanical delays encountered at places of origin and destination and intermediate stops.

(3) Any known conditions that may adversely affect the safety of flight.

(d) Each pilot in command of an aircraft is, during flight time, in command of the aircraft and crew and is responsi-

ble for the safety of the passengers, crewmembers, cargo, and aircraft. The pilot in command has full control and authority in the operation of the aircraft, without limitation, over other crewmembers and their duties during flight time, whether or not he holds valid certificates authorizing him to perform the duties of those crewmembers.

(e) Each pilot in command of an aircraft is responsible for the preflight planning and the operation of the flight in compliance with this chapter and the operations specifications.

(f) No pilot may operate an aircraft in a careless or reckless manner, so as to endanger life or property.

§ 121.539 Operations notices.

Each certificate holder shall notify its appropriate operations personnel of each change in equipment and operating procedures, including each known change in the use of navigation aids, airports, air traffic control procedures and regulations, local airport traffic control rules, and known hazards to flight, including icing and other potentially hazardous meteorological conditions and irregularities in ground and navigation facilities.

§ 121.541 Operations schedules: domestic and flag air carriers.

In establishing flight operations schedules, each domestic and flag air carrier shall allow enough time for the proper servicing of aircraft at intermediate stops, and shall consider the prevailing winds en route and the cruising speed of the type of aircraft used. This cruising speed may not be more than that resulting from the specified cruising output of the engines.

§ 121.543 Flight crewmembers at controls.

Each required flight crewmember on flight deck duty shall remain at his station while the aircraft is taking off or landing, and while it is en route unless the absence of one member is necessary for the performance of duties in connection with the operation of the airplane. Each flight crewmember shall keep his seat belt fastened when at his station.

§ 121.545 Manipulation of controls.

No person may manipulate the flight controls of an aircraft during flight unless he is—

(a) A qualified pilot of the certificate holder operating that aircraft.

(b) An authorized pilot safety representative of the Administrator or of the Civil Aeronautics Board who has the permission of the pilot in command, is qualified in the aircraft, and is checking flight operations; or

(c) A pilot of another certificate holder who has the permission of the pilot in command, is qualified in the aircraft, and is authorized by the certificate holder operating the aircraft.

§ 121.547 Admission to flight deck.

(a) No person may admit any person to the flight deck of an aircraft unless the person being admitted is—

(1) A crewmember;

(2) An FAA air carrier inspector, or an authorized representative of the Civil Aeronautics Board, who is performing official duties;

(3) An employee of the United States, a certificate holder, or an aeronautical enterprise who has the permission of the pilot in command and whose duties are such that admission to the flight deck is necessary or advantageous for safe operations; or

(4) Any person who has the permission of the pilot in command and is specifically authorized by the certificate holder management and by the Administrator.

Subparagraph (2) of this paragraph does not limit the emergency authority of the pilot in command to exclude any person from the flight deck in the interests of safety.

(b) For the purposes of paragraph (a) (3) of this section, employees of the United States who deal responsibly with matters relating to safety and employees of the certificate holder whose efficiency would be increased by familiarity with flight conditions, may be admitted by the certificate holder. However, the certificate holder may not admit employees of traffic, sales, or other departments that are not directly related to flight operations, unless they are eligible under paragraph (a) (4) of this section.

(c) No person may admit any person to the flight deck unless there is a seat available for his use in the passenger compartment, except—

(1) An FAA air carrier inspector or an authorized representative of the Administrator or Civil Aeronautics Board who is checking or observing flight operations;

(2) An air traffic controller who is authorized by the Administrator to observe ATC procedures;

(3) A certificated airman employed by the certificate holder whose duties require an airman certificate;

(4) A certificated airman employed by another certificate holder whose duties with that carrier require an airman certificate and who is authorized by the certificate holder operating the aircraft to make specific trips over a route;

(5) An employee of the certificate holder operating the aircraft whose duty is directly related to the conduct or planning of flight operations or the in-flight monitoring of aircraft equipment or operating procedures, if his presence on the flight deck is necessary to perform his duties and he has been authorized in writing by a responsible supervisor, listed in the Operations Manual as having that authority; and

(6) A technical representative of the manufacturer of the aircraft or its components whose duties are directly related to the in-flight monitoring of aircraft equipment or operating procedures, if his presence on the flight deck is necessary to perform his duties, and he has been authorized in writing by the Administrator and by a responsible supervisor of the operations department of the certificate holder, listed in the Operations Manual as having that authority.

§ 121.548 Air carrier inspector's credentials: admission to pilot's compartment.

Whenever, in performing his duties of conducting an inspection, an inspector of the Federal Aviation Agency presents his credential Form FAA 110A "Air Carrier Inspector's Credential" to the pilot in command of an aircraft operated by an air carrier or commercial operator, he must be given free and uninterrupted access to the pilot's compartment of that aircraft.

§ 121.549 Flying equipment.

(a) The pilot in command shall ensure that appropriate aeronautical charts containing adequate information concerning navigation aids and instrument approach procedures are aboard the aircraft for each flight.

(b) Each crewmember shall, on each flight, have readily available for his use a flashlight that is in good working order.

§ 121.551 Restriction or suspension of operation: domestic and flag air carriers.

When a domestic or flag air carrier knows of conditions, including airport and runway conditions, that are a hazard to safe operations, it shall restrict or suspend operations until those conditions are corrected.

§ 121.553 Restriction or suspension of operation: supplemental air carriers and commercial operators.

When a supplemental air carrier, commercial operator, or pilot in command knows of conditions, including airport and runway conditions, that are a hazard to safe operations, the air carrier, commercial operator, or pilot in command, as the case may be, shall restrict or suspend operations until those conditions are corrected.

§ 121.555 Compliance with approved routes and limitations: domestic and flag air carriers.

No pilot may operate an airplane in scheduled air transportation—

(a) Over any route or route segment unless it is specified in the domestic or flag air carrier's operations specifications; or

(b) Other than in accordance with the limitations in the operations specifications.

§ 121.557 Emergencies: domestic and flag air carriers.

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

(b) In an emergency situation arising during flight that requires immediate decision and action by an aircraft dispatcher, and that is known to him, the aircraft dispatcher shall advise the pilot in command of the emergency, shall ascertain the decision of the pilot in command, and shall have the decision re-

corded. If the aircraft dispatcher cannot communicate with the pilot, he shall declare an emergency and take any action that he considers necessary under the circumstances.

(c) Whenever a pilot in command or dispatcher exercises emergency authority, he shall keep the appropriate ATC facility and dispatch centers fully informed of the progress of the flight. The person declaring the emergency shall send a written report of any deviation through the air carrier's operations manager, to the Administrator. A dispatcher shall send his report within 10 days after the date of the emergency, and a pilot in command shall send his report within 10 days after returning to his home base.

§ 121.559 Emergencies: supplemental air carriers and commercial operators.

(a) In an emergency situation that requires immediate decision and action, the pilot in command may take any action that he considers necessary under the circumstances. In such a case, he may deviate from prescribed operations, procedures and methods, weather minimums, and this chapter, to the extent required in the interests 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 air carrier's or commercial operator's director of operations, to the Administrator within 10 days after the flight is completed or, in the case of operations outside the United States, upon return to the home base.

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

(a) Whenever he encounters a meteorological condition or an irregularity in a ground or navigational facility, in flight, the knowledge of which he considers essential to the safety of other flights, the pilot in command shall notify an appropriate ground station as soon as practicable.

(b) The ground radio station that is notified under paragraph (a) of this section shall report the information to the agency directly responsible for operating the facility.

§ 121.563 Reporting mechanical irregularities.

The pilot in command shall enter or have entered in the maintenance log of the airplane each mechanical irregularity that comes to his attention during flight time. Before each flight, he shall ascertain the status of each irregularity entered in the log at the end of the preceding flight.

§ 121.565 Engine inoperative; landing; reporting.

(a) Except as provided in paragraph (b) of this section, whenever an engine of an airplane fails or whenever the rotation of an engine is stopped to prevent possible damage, the pilot in command shall land the airplane at the nearest suitable airport, in point of time, at which a safe landing can be made.

(b) If not more than one engine of an airplane that has three or more engines fails or its rotation is stopped, the pilot in command may proceed to an airport that he selects if, after considering the following, he decides that proceeding to that airport is as safe as landing at the nearest suitable airport:

(1) The nature of the malfunction and the possible mechanical difficulties that may occur if flight is continued.

(2) The altitude, weight, and usable fuel at the time of engine stoppage.

(3) The weather conditions en route and at possible landing points.

(4) The air traffic congestion.

(5) The kind of terrain.

(6) His familiarity with the airport to be used.

(c) The pilot in command shall report each stoppage of engine rotation in flight to the appropriate ground radio station as soon as practicable and shall keep that station fully informed of the progress of the flight.

(d) If the pilot in command lands at an airport other than the nearest suitable airport, in point of time, he shall (upon completing the trip) send a written report, in duplicate, to his operations manager, (or director of operations in the case of a supplemental air carrier or commercial operator) stating his reasons for determining that his selection of an airport, other than the nearest airport, was as safe a course of action as landing at the nearest suitable airport. The operations manager or director of operations shall, within 10 days after the pilot returns to his home base, send a copy of this report with his comments to the FAA Air Carrier District Office charged with the overall inspection of the air carrier's operations.

§ 121.567 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 instrument approach procedures set forth in the certificate holder's operations specifications.

§ 121.569 Equipment interchange: domestic and flag air carriers.

(a) Before operating under an interchange agreement, each domestic and flag air carrier shall show that—

(1) The procedures for the interchange operation conform with this chapter and with safe operating practices;

(2) Required crewmembers and dispatchers meet approved training requirements for the airplanes and equipment to be used and are familiar with the communications and dispatch procedures to be used;

(3) Maintenance personnel meet training requirements for the airplanes and equipment, and are familiar with the maintenance procedures to be used;

(4) Flight crewmembers and dispatchers meet appropriate route and airport qualifications; and

(5) The airplanes to be operated are essentially similar to the airplanes of the air carrier with whom the interchange is effected with respect to the arrangement of flight instruments and the arrangement and motion of controls that are critical to safety unless the Administrator determines that the air carrier has adequate training programs to insure that any potentially hazardous dissimilarities are safely overcome by flight crew familiarization.

(b) Each domestic and flag air carrier shall include the pertinent provisions and procedures involved in the equipment interchange agreement in its manuals.

§ 121.571 Briefing passengers: extended overwater flights.

(a) Each certificate holder operating an airplane in extended overwater operations shall ensure that all passengers are orally briefed on—

(1) The location and operation of emergency exists;

(2) The location and operation of life preservers, including a demonstration of donning and inflating a life preserver; and

(3) The location of life rafts.

(b) The certificate holder shall describe the procedure to be followed in the briefing in its manual.

(c) If the airplane proceeds directly over water after takeoff, the briefing on locations of life preservers and emergency exists must be done before takeoff, and the rest of the briefing must be done as soon as practicable after takeoff.

(d) If the airplane does not proceed directly over water after takeoff, no part of the briefing has to be given before takeoff but the entire briefing must be given before reaching the over water part of the flight.

§ 121.573 Briefing passengers before takeoff: supplemental air carriers and commercial operators.

Before each takeoff, each supplemental air carrier or commercial operator operating an airplane carrying passengers shall ensure that each passenger is orally briefed on—

(a) Smoking;

(b) The use of seat belts;

(c) The location and operation of emergency exits; and

(d) The emergency evacuation procedures to be used in an emergency evacuation of the airplane.

§ 121.575 Alcoholic beverages.

(a) No person may drink any alcoholic beverage aboard an aircraft unless the certificate holder operating the aircraft has served that beverage to him.

(b) No certificate holder may serve any alcoholic beverage to any person aboard any of its aircraft if that person appears to be intoxicated.

(c) No certificate holder may allow any person to board any of its aircraft if that person appears to be intoxicated.

(d) Each certificate holder shall, within five days after the incident, report to the Administrator the refusal of any person to comply with paragraph (a) of this section, or of any disturbance caused by a person who appears to be intoxicated aboard any of its aircraft.

§ 121.579 Minimum altitudes for use of automatic pilot.

(a) *En route operations.* Except as provided in paragraph (b) of this section, no person may use an automatic pilot en route, including climb and descent, at an altitude above the terrain that is less than twice the maximum altitude loss specified in the Airplane Flight Manual for a malfunction of the automatic pilot under cruise conditions, or less than 500 feet, whichever is higher.

(b) *Approaches.* When using an instrument approach facility, no person may use an automatic pilot at an altitude above the terrain that is less than twice the maximum altitude loss specified in the Airplane Flight Manual for a malfunction of the automatic pilot under approach conditions, or less than 50 feet below the approved minimum ceiling for the facility, whichever is higher, except—

(1) When reported weather conditions are less than the basic VFR weather conditions in § 91.105 of this chapter, no person may use an automatic pilot with an approach coupler for ILS approaches at an altitude above the terrain that is less than 50 feet higher than the maximum altitude loss specified in the Airplane Flight Manual for the malfunction of the automatic pilot with approach coupler under approach conditions; and

(2) When reported weather conditions are equal to or better than the basic VFR minimums in § 91.105 of this chapter, no person may use an automatic pilot with an approach coupler for ILS approaches at an altitude above the terrain that is less than the maximum altitude loss specified in the Airplane Flight Manual for the malfunction of the automatic pilot with approach coupler under approach conditions, or 50 feet, whichever is higher.

§ 121.581 Forward observer's seat; en route inspections: air carriers.

(a) Each air carrier shall make available a seat on the flight deck of each airplane, used by it in air transportation, for occupancy by the Administrator while conducting en route inspections. The location and equipment of the seat, with respect to its suitability for use in conducting en route inspections, is determined by the Administrator.

(b) In each airplane that has more than one observer's seat, in addition to the seats required for the crew complement for which the airplane was certificated, the forward observer's seat must be made available to the Administrator.

§ 121.583 Carriage of persons aboard airplane in cargo-only operations all-cargo aircraft.

(a) When authorized by the certificate holder operating the airplane, any of the following persons may be carried aboard an airplane engaged in the carriage of cargo only, without complying with the passenger-carrying or passenger-service airplane requirements of this chapter:

(1) Any person performing a specific duty assignment aboard the airplane in connection with the safety of the flight, the safe carriage of animals, or the safe carriage of radioactive materials as prescribed in §§ 103.1, 103.5, and 103.21 of this chapter.

(2) Any person traveling to or from a duty assignment described in subparagraph (1) of this paragraph, in any case in which the certificate holder finds that other means of transportation are not practicable.

(3) Any person performing duty as a security or honor guard aboard an airplane for shipments made by or under the authority of the United States.

(4) Any military courier, military route supervisor, or flight crewmembers of any military cargo contract air carrier or commercial operator, when operating under a military cargo contract and specifically authorized by the appropriate armed forces.

(5) Any employee of the certificate holder and his dependents when traveling on company business to or from outlying stations not served by adequate regular passenger flights.

(b) Whenever any person covered by paragraph (a)(5) of this section is carried on the airplane, the cargo must be loaded in such a manner that it does not obstruct access to the pilot compartment, or appropriate regular or emergency exits. In addition, for extended overwater flights, or for flights over uninhabited terrain, there must be on the airplane emergency and survival equipment adequate for the particular operation. Procedures for the safe carriage of company employees and their dependents must be incorporated into the air carrier's or commercial operator's operations manual.

(c) The certificate holder must have an approved seat with a safety belt for each person covered by paragraph (a) of this section. The seat must be located so that the occupant is not in any position to interfere with the flight crewmembers in performing their duties.

(d) The pilot in command may authorize any person covered by paragraph (a) of this section to be admitted to the flight deck of the airplane.

§ 121.585 Prohibition against carriage of weapons.

No person may, while aboard an airplane being operated by an air carrier in air transportation, carry on or about his person a deadly or dangerous weapon, either concealed or unconcealed. This paragraph does not apply to—

(a) Officials or employees of a municipality or a State, or of the United States, who are authorized to carry arms; and

(b) Crewmembers and other persons authorized by the air carrier to carry arms.

§ 121.587 Closing and locking of flight crew compartment door.

(a) Except as provided in paragraph (b) of this section, the pilot in command of a large airplane carrying passengers shall ensure that the door separating the flight crew compartment from the passenger compartment is closed and locked during flight.

(b) The provisions of paragraph (a) of this section do not apply—

(1) During takeoff and landing if the crew compartment door is the means of access to a required passenger emergency exit; or

(2) At any time that it is necessary to provide access to the flight crew or passenger compartment, to a crewmember in the performance of his duties or for a person authorized admission to the flight crew compartment under § 121.547.

Subpart U—Dispatching and Flight Release Rules

§ 121.591 Applicability.

This subpart prescribes dispatching rules for domestic and flag air carriers and flight release rules for supplemental air carriers and commercial operators.

§ 121.593 Dispatching authority: domestic air carriers.

Except when an airplane lands at an intermediate airport specified in the original dispatch release and remains there for not more than one hour, no person may start a flight unless an aircraft dispatcher specifically authorizes that flight.

§ 121.595 Dispatching authority: flag air carriers.

(a) No person may start a flight unless an aircraft dispatcher specifically authorizes that flight.

(b) No person may continue a flight from an intermediate airport without redispatch if the airplane has been on the ground more than six hours.

§ 121.597 Flight release authority: supplemental air carriers and commercial operators.

(a) No person may start a flight under a flight following system without specific authority from the person authorized by the operator to exercise operational control over the flight.

(b) No person may start a flight unless the pilot in command has executed a flight release setting forth the conditions under which the flight will be conducted. The pilot in command may sign the flight release only when he and the person authorized by the operator to exercise operational control believe that the flight can be made with safety.

(c) No person may continue a flight from an intermediate airport without a new flight release if the aircraft has been on the ground more than six hours.

§ 121.599 Familiarity with weather conditions.

(a) *Domestic and flag air carriers.* No aircraft dispatcher may release a flight unless he is thoroughly familiar with reported and forecast weather conditions on the route to be flown.

(b) *Supplemental air carriers and commercial operators.* No pilot in command may begin a flight unless he is thoroughly familiar with reported and forecast weather conditions on the route to be flown.

§ 121.601 Aircraft dispatcher information to pilot in command: domestic and flag air carriers.

(a) The aircraft dispatcher shall provide the pilot in command all available current reports or information on airport conditions and irregularities of navigation facilities that may affect the safety of the flight.

(b) During a flight, the aircraft dispatcher shall provide the pilot in command any additional available information of meteorological conditions and irregularities of facilities and services that may affect the safety of the flight.

§ 121.603 Facilities and services: supplemental air carriers and commercial operators.

(a) Before beginning a flight, each pilot in command shall obtain all available current reports or information on airport conditions and irregularities of navigation facilities that may affect the safety of the flight.

(b) 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.

§ 121.605 Airplane equipment.

No person may dispatch or release an airplane unless it is airworthy and is equipped as prescribed in § 121.303.

§ 121.607 Communication and navigation facilities: domestic and flag air carriers.

(a) Except as provided in paragraph (b) of this section for flag air carriers, no person may dispatch an airplane over an approved route or route segment unless the communication and navigation facilities required by §§ 121.99 and 121.103 for the approval of that route or segment are in satisfactory operating condition.

(b) If, because of technical reasons or other reasons beyond the control of a flag air carrier, the facilities required by §§ 121.99 and 121.103 are not available over a route or route segment outside the United States, the air carrier may dispatch an airplane over that route or route segment if the pilot in command and dispatcher find that communication and navigation facilities equal to those required are available and are in satisfactory operating condition.

§ 121.609 Communication and navigation facilities: supplemental air carriers and commercial operators.

No person may release an aircraft over any route or route segment unless communication and navigation facilities equal to those required by § 121.121 are in satisfactory operating condition.

§ 121.611 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.

§ 121.613 Dispatch or flight release under IFR or over the top.

Except as provided in § 121.615, 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 ceilings and visibilities will be at or above the authorized minimums at the estimated time of arrival at the airport or airports to which dispatched or released.

§ 121.615 Dispatch or flight release over water: flag and supplemental air carriers and commercial operators.

(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 ceilings and visibilities 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.

(c) Each flag and supplemental air carrier and commercial operator shall conduct extended overwater operations under IFR unless it shows that operating under IFR is not necessary for safety.

(d) Each flag and supplemental air carrier and commercial operator shall conduct other overwater operations under IFR if the Administrator determines that operation under IFR is necessary for safety.

(e) Each authorization to conduct extended overwater operations under VFR and each requirement to conduct other overwater operations under IFR will be specified in the air carrier's or commercial operator's operations specifications.

§ 121.617 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 dispatch or release an aircraft from that airport unless the dispatch or flight release specifies an alternate airport located within the following distances from the airport of takeoff.

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

(2) *Aircraft 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.

(b) For the purpose of paragraph (a) of this section, the alternate airport weather conditions must meet the requirements of the certificate holder's operations specifications.

(c) No person may dispatch or release an aircraft from an airport unless he lists each required alternate airport in the dispatch or flight release.

§ 121.619 Alternate airport for destination: IFR or over-the-top: domestic air carriers.

(a) No person may dispatch an airplane under IFR or over-the-top unless he lists at least one alternate airport for each destination airport in the dispatch release. When the weather conditions forecast for the destination and first alternate airport are marginal at least one additional alternate must be designated. However, no alternate airport is required if—

(1) For at least two hours before and two hours after the estimated time of arrival, the ceiling at the airport to which the flight is dispatched is forecast to be at least 1,000 feet above the minimum initial approach altitude to that airport; and

(2) The visibility at that airport is forecast to be at least 3 miles.

(b) For the purposes of paragraph (a) of this section, the weather conditions at the alternate airport must meet the requirements of § 121.625.

(c) No person may dispatch a flight unless he lists each required alternate airport in the dispatch release.

§ 121.621 Alternate airport for destination: flag air carriers.

(a) No person may dispatch an airplane under IFR or over-the-top unless he lists at least one alternate airport for each destination airport in the dispatch release, unless—

(1) The flight is scheduled for not more than six hours and the ceiling is forecast to be at least 1,000 feet above the minimum initial approach altitude, and the visibility is forecast to be at least three miles, at the destination airport for two hours before and two hours after the estimated time of arrival; or

(2) The flight is over a route approved without an available alternate airport for a particular destination airport and the airplane has enough fuel to meet the requirements of §§ 121.641(b) or 121.645(b).

(b) For the purposes of paragraph (a) of this section, the weather conditions at the alternate airport must meet the requirements of the air carrier's operations specifications.

(c) No person may dispatch a flight unless he lists each required alternate airport in the dispatch release.

§ 121.623 Alternate airport for destination; IFR or over-the-top: supplemental air carriers and commercial operators.

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

(b) An alternate airport need not be designated for IFR or over-the-top operations where the aircraft carries enough fuel to meet the requirements of §§ 121.643 and 121.645 for flights outside the 48 contiguous States and the District of Columbia 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 air carrier's or commercial operator's operations specifications.

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

§ 121.625 Alternate airport weather minimums.

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

§ 121.627 Continuing flight in unsafe conditions.

(a) No pilot in command may allow a flight to continue toward any airport to which it has been dispatched or released if, in the opinion of the pilot in command or dispatcher (domestic and flag air carriers only), 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 as set forth in § 121.557.

(b) If any instrument or item of equipment required under this chapter 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 procedures for continuing flight beyond a terminal point with equipment required in § 121.303(d) inoperative may be included in the certificate holder's manual if the Administrator finds that, in a particular situation literal compliance with those equipment requirements is not necessary in the interests of safety.

§ 121.629 Operation in icing conditions.

(a) No person may dispatch or release an aircraft, continue to operate an aircraft en route, or land an aircraft when in the opinion of the pilot in command or aircraft dispatcher (domestic and flag air carriers only), icing conditions are expected or met that might adversely affect the safety of the flight.

(b) No person may takeoff an aircraft when frost, snow, or ice is adhering to the wings, control surfaces, or propellers of the aircraft.

§ 121.631 Original dispatch or flight release, redispatch or amendment of dispatch or flight release.

(a) A certificate holder may specify any regular, provisional, or refueling airport, authorized for the type of aircraft, as a destination for the purpose of original dispatch or release.

(b) No person may allow a flight to continue to an airport to which it has been dispatched or released unless the weather conditions at an alternate airport that was specified in the dispatch or flight release are forecast to be at or above the alternate minimums specified in the operations specifications for that airport at the time the aircraft would arrive at the alternate airport. However, the dispatch or flight release may be amended en route to include any alternate airport that is within the fuel range of the aircraft as specified in §§ 121.639 through 121.649.

(c) No person may change an original destination or alternate airport that is specified in the original dispatch or flight release to another airport while the aircraft is en route unless the other airport is authorized for that type of aircraft and the appropriate requirements of §§ 121.593 through 121.659 and 121.173 are met at the time of redispatch or amendment of the flight release.

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

§ 121.633 Dispatch to and from provisional airports: domestic air carriers.

(a) No person may dispatch an airplane to a provisional airport unless that airport meets the requirements of this part applicable to regular airports.

(b) No person may dispatch an airplane from a provisional airport except in accordance with the requirements of this part applicable to dispatch from regular airports.

§ 121.635 Dispatch to and from refueling or provisional airports: flag air carriers.

No person may dispatch an airplane to or from a refueling or provisional airport unless that airport meets the requirements of this part applicable to regular airports.

§ 121.637 Takeoffs from unlisted and alternate airports: domestic and flag air carriers.

(a) No pilot may take off an airplane from an airport that is not listed in the operations specifications unless—

(1) The airport and related facilities are adequate for the operation of the airplane;

(2) He can comply with the applicable airplane operating limitations;

(3) The airplane has been dispatched according to dispatching rules applicable to operation from an approved airport; and

(4) The ceiling and visibility at that airport are equal to or better than the following:

(i) *Airports in the United States.* The ceiling and visibility minimums for takeoff prescribed in Part 97 of this chapter, but not less than 300–1; or where minimums are not prescribed for the airport, 800–2, 900–1½, or 1,000–1.

(ii) *Airports outside the United States.* The ceiling and visibility minimums for takeoff prescribed or approved by the government of the country in which the airport is located, but not less than 300–1; or where minimums are not prescribed or approved for the airport, 800–2, 900–1½, or 1,000–1.

(b) No pilot may take off from an alternate airport unless the ceiling and visibility are at least equal to the minimums prescribed in the air carrier's operations specifications for alternate airports.

§ 121.639 Fuel supply; all operations: domestic air carriers.

No person may dispatch or take off an airplane unless it has enough fuel—

(a) To fly to the airport to which it is dispatched;

(b) Thereafter, to fly to and land at the most distant alternate airport (where required) for the airport to which dispatched; and

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

§ 121.641 Fuel supply; nonturbine and turbo-propeller-powered airplanes: flag air carriers.

(a) No person may dispatch or take off a nonturbine or turbo-propeller-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 dispatched;

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

(3) Thereafter, to 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 this paragraph or to fly for 90 minutes at normal cruising fuel consumption, whichever is less.

(b) No person may dispatch a nonturbine or turbo-propeller-powered airplane to an airport for which an alternate is not specified under § 121.621(a)(2), unless it has enough fuel, considering wind and forecast weather conditions, to fly to that airport and thereafter to fly for three hours at normal cruising fuel consumption.

§ 121.643 Fuel supply: nonturbine and turbo-propeller-powered airplanes: supplemental air carriers and commercial operators.

(a) Except as provided in paragraph (b) of this section, no person may release for flight or takeoff a nonturbine or turbo-propeller-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.

(b) If the airplane is released for any flight other than from one point in the contiguous United States to another point in the contiguous United States, 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 to fly for 90 minutes at normal cruising fuel consumption, whichever is less.

(c) No person may release a nonturbine or turbo-propeller-powered airplane to an airport for which an alternate is not specified under § 121.623(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.

§ 121.645 Fuel supply: turbine-engine-powered airplanes, other than turbo propeller; Flag and supplemental air carriers and commercial operators.

(a) For any flag air carrier operation and for a supplemental air carrier or commercial operator operation outside the 48 contiguous States and the District of Columbia, no person may release for flight or take off a turbine-engine powered airplane (other than a turbo-propeller airplane) unless, considering 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 for a period of 10 percent of the total time required to fly from the airport of departure to, and land at, the airport to which it was released;

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

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

(b) No person may release a turbine-engine powered airplane (other than a turbo-propeller airplane) to an airport for which an alternate is not specified under § 121.621(a)(2) or 121.623(b) 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.

(c) The Administrator may amend the operations specifications of a flag or supplemental air carrier or commercial operator to require more fuel than any of the minimums stated in paragraph (a) or (b) of this section if he finds that additional fuel is necessary on a particular route in the interest of safety.

§ 121.647 Factors for computing fuel required.

Each person computing fuel required for the purposes of this subpart shall consider the following:

(a) Wind and other weather conditions forecast.

(b) Anticipated traffic delays.

(c) One instrument approach and possible missed approach at destination.

(d) Any other conditions that may delay landing of the aircraft.

For the purposes of this section, required fuel is in addition to unusable fuel.

§ 121.649 Takeoff and landing weather minimums: VFR: domestic air carriers.

(a) Except as provided in paragraph (b) of this section, regardless of any clearance from ATC, no pilot may takeoff or land an airplane under VFR when the reported ceiling or visibility is less than the following:

(1) For day operations—1,000-foot ceiling and one-mile visibility.

(2) For night operations—1,000-foot ceiling and two-mile visibility.

(b) Where a local surface restriction to visibility exists (e.g., smoke, dust, blowing snow or sand) the visibility for day and night operations may be reduced to ½ mile, if all turns after takeoff and prior to landing, and all flight beyond one mile from the airport boundary can be accomplished above or outside the area of local surface visibility restriction.

§ 121.651 Takeoff and landing weather minimums: IFR: domestic and flag air carriers.

(a) Regardless of any clearance from ATC, no pilot may take off an airplane under IFR if the ceiling or ground visibility reported by the U.S. Weather Bureau or a source approved by the Weather Bureau is less than that specified for the takeoff airport in Part 97 [New] of this chapter, or in the air carrier's operations specifications for the airport.

(b) Except as provided in paragraphs (c) and (d) of this section, no pilot may execute an instrument approach procedure or land under IFR at an airport if the latest U.S. Weather Bureau Report or a source approved by the Weather Bureau for that airport indicates that the ceiling or visibility is less than that prescribed by the Administrator for landing at that airport.

(c) A pilot may execute an instrument approach procedure if the U.S. Weather Bureau report or a source approved by the Weather Bureau indicates that the ceiling or visibility is less than the approved minimum for landing, if the airport is served by operative ILS and PAR and both are used by the pilot. Thereafter, the pilot may land if the pilot in command finds, upon reaching the authorized minimum landing altitude, that actual weather conditions are at least equal to the prescribed minimums.

(d) If a pilot initiates an instrument approach procedure when the current U.S. Weather Bureau report or a source approved by the Weather Bureau indicates that the prescribed ceiling and 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 using a radio range station or comparable facility, or a final approach fix, has passed the appropriate facility, or a final approach fix, and has reached the authorized minimum landing altitude; or

(3) Is on GCA 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 the authorized landing minimum landing altitude, that actual weather conditions are at least equal to the prescribed minimums.

(e) If the pilot in command of an airplane has not served 100 hours as pilot in command in air carrier or commercial operations in the type of airplane he is operating, the ceiling and visibility landing minimums in the air carrier operations specifications for regular, provisional, or refueling airports are increased by 100 feet and one-half mile, respectively. The ceiling and visibility minimums need not be increased above those applicable to the airport when used as an alternate airport. The sliding scale when authorized in the operations specifications does not apply until the pilot in command has served 100 hours as pilot in command in air carrier or commercial operations in the type of airplane he is operating.

§ 121.653 Takeoff and landing weather minimums: IFR: supplemental air carriers and commercial operators.

(a) Regardless of any clearance from ATC, if the reported ceiling or ground visibility is less than that specified in the supplemental air carrier or commercial operator's operations specifications, no pilot may—

(1) Take off an aircraft under IFR; or

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

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

(c) If a pilot initiates an instrument approach procedure when the latest weather report indicates that the specified ceiling and 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 using a radio range station or comparable facility, has passed the appropriate facility, and has reached the authorized minimum landing altitude; or

(3) Is on PAR 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 the authorized landing minimum altitude, that actual weather conditions are at least equal to the minimums prescribed in the operations specifications.

(d) If the pilot in command of an airplane has not served 100 hours as pilot in command in operations under this part or in the type of aircraft he is operating, the ceiling and visibility landing minimums in the air carrier or commercial operator's operations specifications for airports are increased by 100 feet and one-half mile, respectively. The ceiling

and visibility minimums need not be increased above those applicable to the airport when used as an alternate airport.

§ 121.655 Applicability of reported weather minimums.

In conducting operations under §§ 121.649 through 121.653, the ceiling and visibility values in the main body of the latest weather report control for VFR and IFR takeoffs and landings and for instrument approach procedures on all runways of an airport. However, if the latest weather report, including an oral report from the control tower, contains a visibility value specified as runway visibility or runway visual range for a particular runway of an airport, that specified value controls for VFR and IFR landings and takeoffs and straight-in instrument approaches for that runway.

§ 121.657 Flight altitude rules.

(a) *General.* Notwithstanding § 91.79 or any rule applicable outside the United States, no person may operate an aircraft below the minimums set forth in paragraphs (b) and (c) of this section, except when necessary for takeoff or landing, or except when, after considering the character of the terrain, the quality and quantity of meteorological services, the navigational facilities available, and other flight conditions, the Administrator prescribes other minimums for any route or part of a route where he finds that the safe conduct of the flight requires other altitudes. Outside of the United States the minimums prescribed in this section are controlling unless higher minimums are prescribed in the air carrier or commercial operator's operations specifications or by the foreign country over which the aircraft is operating.

(b) *Day VFR operations.* No domestic air carrier may operate a passenger-carrying aircraft and no flag or supplemental air carrier or commercial operator may operate any aircraft under VFR during the day at an altitude less than 1,000 feet above the surface or less than 1,000 feet from any mountain, hill, or other obstruction to flight.

(c) *Night VFR, IFR, and over-the-top operations.* No person may operate an aircraft under IFR including over-the-top or at night under VFR at an altitude less than 1,000 feet above the highest obstacle within a horizontal distance of five miles from the center of the intended course, or, in designated mountainous areas, less than 2,000 feet above the highest obstacle within a horizontal distance of five miles from the center of the intended course. However, any person operating an aircraft under VFR at night in designated mountainous areas may operate over an approved lighted airway at a minimum altitude of 1,000 feet above such an obstacle. For supplemental air carriers and commercial operators adherence to a flight altitude is not required during the time a flight is operating in accordance with paragraph (d) of this section.

(d) *Day over-the-top operations below minimum en route altitudes: Domestic and supplemental air carriers and commercial operators.* A person may conduct day over-the-top operations in an airplane at flight altitudes lower than the minimum en route IFR altitudes if—

(1) The operation is conducted at least 1,000 feet above the top of lower broken or overcast cloud cover;

(2) The top of the lower cloud cover is generally uniform and level;

(3) Flight visibility is at least five miles; and

(4) The base of any higher broken or overcast cloud cover is generally uniform and level and is at least 1,000 feet above the minimum en route IFR altitude for that route segment.

§ 121.659 Initial approach altitude: domestic and supplemental air carriers and commercial operators.

(a) Except as provided in paragraph (b) of this section, when making an initial approach to a radio navigation facility under IFR, no person may descend an aircraft below the pertinent minimum altitude for initial approach (as specified in the instrument approach procedure for that facility) until his arrival over that facility has been definitely established.

(b) When making an initial approach on a flight being conducted under § 121.657(d), no pilot may commence an instrument approach until his arrival over the radio facility has definitely been established. In making an instrument approach under these circumstances no person may descend an aircraft lower than 1,000 feet above the top of the lower cloud or the minimum altitude determined by the Administrator for that part of the IFR approach, whichever is lower.

§ 121.661 Initial approach altitude: flag air carriers.

When making an initial approach to a radio navigation facility under IFR, no person may descend below the pertinent minimum altitude for initial approach (as specified in the instrument approach procedure for that facility) until his arrival over that facility has been definitely established.

§ 121.663 Responsibility for dispatch release: domestic and flag air carriers.

Each domestic and flag air carrier shall prepare a dispatch release for each flight between specified points, based on information furnished by an authorized aircraft dispatcher. The pilot in command and an authorized aircraft dispatcher shall sign the release only if they both believe that the flight can be made with safety. The aircraft dispatcher may delegate authority to sign a release for a particular flight, but he may not delegate his authority to dispatch.

§ 121.665 Load manifest.

Each certificate holder is responsible for the preparation and accuracy of a load manifest form before each takeoff. The form must be prepared and signed for each flight by employees of the certificate holder who have the duty of supervising the loading of aircraft and preparing the load manifest forms or by other qualified persons authorized by the certificate holder.

§ 121.667 Flight plan: VFR and IFR: supplemental air carriers and commercial operators.

(a) No person may take off an aircraft unless the pilot in command has filed a flight plan, containing the appropriate information required by Part 91 [New], with the nearest FAA communication station or appropriate military station or, when operating outside the United States, with other appropriate authority. However, if communications facilities are not readily available, the pilot in command shall file the flight plan as soon as practicable after the aircraft is airborne. A flight plan must continue in effect for all parts of the flight.

(b) When flights are operated into military airports, the arrival or completion notice required by § 91.83 may be filed with the appropriate airport control tower or aeronautical communication facility used for that airport.

Subpart V—Records and Reports

§ 121.681 Applicability.

This subpart prescribes requirements for the preparation and maintenance of records and reports for all certificate holders.

§ 121.683 Crewmember and dispatcher record.

(a) Each certificate holder shall—

(1) Maintain current records of each crewmember, and each aircraft dispatcher (domestic and flag air carriers only), that shows whether or not he complies with this chapter (e.g., proficiency and route checks, airplane and route qualifications, training, 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 or aircraft dispatcher (domestic and flag air carriers only) and keep the record for at least six months thereafter.

(b) Supplemental air carriers and commercial operators: Each supplemental air carrier and commercial operator 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 the Administrator.

§ 121.685 Aircraft record: flag and domestic air carriers.

Each flag and domestic air carrier shall maintain a current list of each aircraft that it operates in scheduled air transportation and shall send a copy of the record and each change to the FAA Air Carrier District Office charged with the overall inspection of its operations. Airplanes of another air carrier operated under an interchange agreement may be incorporated by reference.

§ 121.687 Dispatch release: flag and domestic air carriers.

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

(1) Identification number of the aircraft.
(2) Trip number.
(3) Departure airport, intermediate stops, destination airports, and alternate airports.
(4) A statement of the type of operation (e.g., IFR, VFR).
(5) Minimum fuel supply.

(b) The dispatch release must contain, or have attached to it, weather reports, available weather forecasts, or a combination thereof, for the destination airport, intermediate stops, and alternate airports, that are the latest available at the time the release is signed by the pilot in command and dispatcher. It may include any additional available weather reports or forecasts that the pilot in command or the aircraft dispatcher considers necessary or desirable.

§ 121.689 Flight release form: supplemental air carriers and commercial operators.

(a) Except as provided in paragraph (c) of this section, 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 aircraft being used.
(3) Flight or trip number, and date of flight.
(4) Name of each flight crewmember, flight attendant, and pilot designated as pilot in command.
(5) Departure airport, destination airports, alternate airports, and route.
(6) Minimum fuel supply (in gallons or pounds).
(7) A statement of the type of operation (e.g. IFR, VFR).

(b) The aircraft flight release must contain, or have attached to it, weather reports, available weather forecasts, or a combination thereof, for the destination airport, and alternate airports, that are the latest available at the time the release is signed. It may include any additional available weather reports or forecasts that the pilot in command considers necessary or desirable.

(c) Each flag or domestic air carrier operating under the rules of this part applicable to supplemental air carriers and commercial operators shall comply with the dispatch or flight release forms required for scheduled operations under this subpart.

§ 121.691 Load manifest: domestic and flag air carriers.

The load manifest must contain the following information concerning the loading of an aircraft at takeoff time:

(a) The weight of the aircraft, fuel and oil, cargo (including mail and baggage), and passengers.

(b) The maximum allowable weight for that flight.

(c) The total weight computed under approved procedures.

(d) Evidence that the aircraft is loaded according to an approved schedule that insures that the center of gravity is within approved limits.

§ 121.693 Load manifest: supplemental air carriers and commercial operators.

The load manifest must contain the following information concerning the airplane at takeoff time:

(a) The weight of the aircraft, fuel and oil, cargo and baggage, passengers, and crewmembers.

(b) The maximum allowable weight for that flight that must not exceed the least of the following weights:

(1) Maximum allowable takeoff weight for the runway intended to be used (including corrections for altitude and gradient, and wind and temperature conditions existing at the takeoff time).
(2) Maximum takeoff weight considering anticipated fuel and oil consumption that allows compliance with applicable en route performance limitations.
(3) Maximum takeoff weight considering anticipated fuel and oil consumption that allows compliance with the maximum authorized design landing weight limitations on arrival at the destination airport.
(4) Maximum takeoff weight considering anticipated fuel and oil consumption that allows compliance with landing distance limitations on arrival at the destination and alternate airports.

(c) The total weight computed under approved procedures.

(d) Evidence that the aircraft is loaded according to an approved schedule that insures that the center of gravity is within approved limits.

(e) Names of passengers.

§ 121.695 Disposition of load manifest, dispatch release, and flight plans: domestic and flag air carriers.

(a) The pilot in command of an aircraft shall carry in the airplane to its destination—
(1) A copy of the completed load manifest (or information from it, except information concerning cargo and passenger distribution);
(2) A copy of the dispatch release; and
(3) A copy of the flight plan.

(b) The air carrier shall keep copies of the records required in this section for at least three months.

§ 121.697 Disposition of load manifest, flight release, and flight plans: supplemental air carriers and commercial operators.

(a) The pilot in command of an aircraft shall carry in the airplane to its destination the original or a signed copy of the—
(1) Load manifest;
(2) Flight release;
(3) Airworthiness release;
(4) Pilot route certification; and
(5) Flight plan.

(b) If a flight originates at the principal operations base of the air carrier or commercial operator, 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, the pilot in command (or other person authorized by the carrier or operator) shall, before or immediately after departure of the flight, mail signed copies of the documents listed in paragraph (a) of this section to the principal operations base.

(d) The supplemental air carrier or commercial operator shall keep at its operations base either the original or a copy of the records required in this section for at least six months.

§ 121.699 Maintenance records.

(a) Each certificate holder shall keep, at its principal maintenance base, current records of total time in service, time since last overhaul, and time since last inspection, for each major component of each airframe, aircraft engine, propeller, and, where practicable, appliance.

(b) A certificate holder may discontinue total time in service records if it shows that the service life of component parts is safely controlled by inspection, overhaul, or parts retirement procedures. The Administrator may require the keeping of total time in service records for a part when he finds that other procedures will not safely limit the service life of that part.

(c) An aircraft component, aircraft engine, propeller, or appliance for which complete records required by this section are not available may be placed in service if—
(1) It is of a type for which total time inservice records are not required by paragraph (b) of this section;
(2) Parts that the Administrator or manufacturer limits to a specific total time in service are retired and replaced by new parts; or
(3) It has been properly overhauled or rebuilt and the overhaul or rebuilding is recorded in the maintenance records.

§ 121.701 Maintenance log: aircraft.

(a) Each person who takes action in the case of a reported or observed failure or malfunction of an airframe, engine, propeller, or appliance that is critical to the safety of flight shall make, or have made, a record of that action in the airplane's maintenance log.

(b) Each certificate holder shall have an approved procedure for keeping adequate copies of the record required in paragraph (a) of this section in the airplane in a place readily accessible to each flight crewmember and shall put that procedure in the certificate holder's manual.

§ 121.703 Mechanical reliability reports.

(a) Each certificate holder shall report the occurrence or detection of each failure, malfunction, or defect concerning—
(1) Fires during flight and whether the related fire-warning system functioned properly;
(2) Fires during flight not protected by a related fire-warning system;
(3) False fire warning during flight;
(4) An engine exhaust system that causes damage during flight to the engine, adjacent structure, equipment, or components;
(5) An aircraft component that causes accumulation or circulation of smoke, vapor, or toxic or noxious fumes in the crew compartment or passenger cabin during flight;
(6) Engine shutdown during flight because of flameout;

(7) Engine shutdown during flight when external damage to the engine or airplane structure occurs;

(8) Engine shutdown during flight due to foreign object ingestion or icing;

(9) Engine shutdown during flight of more than one engine;

(10) A propeller feathering system or ability of the system to control overspeed during flight;

(11) A fuel or fuel-dumping system that affects fuel flow or causes hazardous leakage during flight;

(12) A landing gear extension or retraction or opening or closing of landing gear doors during flight;

(13) Brake system components that result in loss of brake actuating force when the airplane is in motion on the ground;

(14) Aircraft structure that requires major repair;

(15) Cracks, permanent deformation, or corrosion of aircraft structures, if more than the maximum acceptable to the manufacturer or the FAA; and

(16) Aircraft components or systems that result in taking emergency actions during flight (except action to shutdown an engine).

(b) For the purpose of this section "during flight" means the period from the moment the aircraft leaves the surface of the earth on takeoff until it touches down on landing.

(c) In addition to the reports required by paragraph (a) of this section, each certificate holder shall report any other failure, malfunction, or defect in an aircraft that occurs or is detected at any time if, in its opinion, that failure, malfunction, or defect has endangered or may endanger the safe operation of an aircraft used by it.

(d) Each certificate holder shall send each report required by this section, in writing, covering each 24-hour period beginning at 0900 hours local time of each day and ending at 0900 hours local time on the next day, to the FAA maintenance inspector assigned to its operations. The report must be delivered to him by 0900 hours local time on the following day. However, a report that is due on Saturday or Sunday may be delivered on the following Monday and one that is due on a holiday may be delivered on the next workday.

(e) The certificate holder shall transmit the reports required by this section in a manner and on a form that is consistent with its system of communication and procedure, and shall include in the [illegible] daily report as much of the following [illegible] is available:

[illegible] type and identification number [illegible] aircraft.

[illegible] the name of the operator.

[illegible] the date, flight number, and stage [illegible] which the incident occurred (e.g., [illegible] takeoff, climb, cruise, descent, [illegible] and inspection).

[illegible] emergency procedure effected [illegible] scheduled landing and emer[illegible]

[illegible] of the failure, mal[illegible]

[illegible] identification of the part and sys[illegible] including available infor[illegible] relating to type designation of the major component and time since overhaul.

(7) Apparent cause of the failure, malfunction, or defect (e.g., wear, crack, design deficiency, or personnel error).

(8) Whether the part was repaired, replaced, sent to the manufacturer, or other action taken.

(9) Whether the aircraft was grounded.

(10) Other pertinent information necessary for more complete identification, determination of seriousness, or corrective action.

(f) Failures, malfunctions, or defects reported under the accident reporting provisions of Part 320 of the regulations of the Civil Aeronautics Board need not be reported under this section.

(g) No person may withhold a report required by this section even though all information required in this section is not available.

(h) When certificate holder gets additional information, including information from the manufacturer or other agency, concerning a report required by this section, it shall expeditiously submit it as a supplement to the first report and reference the date and place of submission of the first report.

§ 121.705 Mechanical interruption summary report.

Each certificate holder shall regularly and promptly send a summary report on the following occurrences to the Administrator:

(a) Each interruption to a scheduled flight, unscheduled change of aircraft en route, or unscheduled stop or diversion from a route, caused by known or suspected mechanical difficulties or malfunctions that are not required to be reported under § 121.703.

(b) The number of engines removed prematurely because of malfunction, failure or defect, listed by make and model and the aircraft type in which it was installed.

(c) The number of propeller featherings in flight, listed by type of propeller and engine and aircraft on which it was installed. Propeller featherings for training, demonstration, or flight check purposes need not be reported.

§ 121.707 Alteration and repair reports.

(a) Each certificate holder shall, promptly upon its completion, prepare a report of each major alteration or major repair of an airframe, aircraft engine, propeller, or appliance of an aircraft operated by it.

(b) The certificate holder shall submit a copy of each report of a major alteration to, and shall keep a copy of each report of a major repair available for inspection by, the representative of the Administrator who is assigned to it.

§ 121.709 Airworthiness release or aircraft log entry.

(a) No certificate holder may operate an aircraft after maintenance, preventive maintenance or alterations are performed on the aircraft unless the certificate holder, or the person with whom the certificate holder arranges for the performance of the maintenance, preventive maintenance, or alterations, prepares or causes to be prepared—

(1) An airworthiness release; or

(2) An appropriate entry in the aircraft log.

(b) The airworthiness release or log 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 aircraft is in condition for safe operation; and

(3) Be signed by an authorized certificated mechanic or repairman except that a certificated repairman may sign the release or entry only for the work for which he is employed and certificated.

(c) When an airworthiness release form is prepared the certificate holder must give a copy to the pilot in command and must keep a record thereof for at least two months.

§ 121.711 Communication records: domestic and flag air carriers.

Each domestic and flag air carrier shall record each en route radio contact between the air carrier and its pilots and shall keep that record for at least 30 days.

§ 121.713 Retention of contracts and amendments: commercial operator.

Each commercial operator shall keep a copy of each written contract under which it provides services as a commercial operator for a period of at least one year after the date of execution of the contract. In the case of an oral contract, it shall keep a memorandum stating its elements, and of any amendments to it, for a period of at least one year after the execution of that contract or change.

Subpart W—Crewmember Certificate; International

§ 121.721 Applicability.

This subpart describes the certificates that are issued to United States citizens who are employed by air carriers or commercial operators as flight crewmembers or crewmembers on United States registered aircraft engaged in international air commerce. The purpose of the certificate is to facilitate the entry and clearance of those crew members into ICAO contracting states. They are issued under Annex 9, as amended, to the Convention on International Civil Aviation.

§ 121.723 Application and issue.

(a) An application for a crewmember certificate is made on Form FAA-2116 "Application for Crewmember Certificate", to the Air Carrier District Office in charge of the air carrier or commer-

cial operator by whom the applicant is employed. The certificate is issued on Form FAA-2116.1 "Crewmember Certificate".

(b) The holder of a certificate issued under this subpart, or the air carrier or commercial operator by whom he is employed, shall surrender the certificate for cancellation at the nearest Air Carrier District Office at the end of the holder's assignment in international air commerce with that carrier or operator.

NOTE: The record keeping and reporting requirements contained herein have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

DISTRIBUTION TABLE

Former section	Revised section
40.1 (less 2d proviso)	121.1
40.1 (2d proviso)	121.3
40.2	121.11
40.5	[1]
40.10	121.3
40.11	121.25
40.12	[2]
40.12-1	[2]
40.13 (less (c))	121.27
40.13(c)	121.3
40.14	121.77
40.15	121.73
40.16	121.29
40.17	[2]
40.18	121.3
40.18-1	[2]
40.18-2	[2]
40.18-3	[2]
40.18-4	[2]
40.19	121.25
40.19-1	[2]
40.19-2	[2]
40.20	121.75
40.21	121.79
40.22	121.81
40.23	121.83
40.30	121.93
40.30-1	[2]
40.30-2	[2]
40.32	121.95
40.33	121.97
40.33-1	[2]
40.34	121.99
40.34-1	[2]
40.35	121.101
40.36	121.103
40.37	121.105
40.37-1	[2]
40.38	121.107
40.50	121.133
40.51	121.135
40.51-1	[2]
40.51-2	[2]
40.52	121.137
40.53	121.141
40.60	121.153
40.61	121.157
40.62 (1st sentence)	121.159
40.62 (less 1st sentence)	121.161
40.63	121.163
40.63-1	[2]
40.70	121.173
40.70-1	[2]
40.70-2	[2]
40.70-3	[2]
40.71	121.175
40.71-1	[2]
40.72	121.177
40.72-1	[2]
40.73	121.179
40.74	121.181
40.75	121.183
40.76	121.173

[1] Transferred to Part 1 [New].
[2] Surplusage.
[3] Not a rule.

DISTRIBUTION TABLE—Continued

Former section	Revised section
40.76-1	[2]
40.77	121.185
40.77-1	[2]
40.78	121.187
40.90	121.176
40.90-1	[2]
40.91	121.199
40.91-1	[2]
40.91-2	[2]
40.92	121.201
40.92-1	[2]
40.93	121.203
40.93-1	[2]
40.93-2	[2]
40.94	121.205
40.94-1	[2]
40.110	121.213
40.111	[2]
40.112	121.215
40.113	121.217
40.114	121.219
40.115	121.221
40.116	121.223
40.117	121.225
40.118	121.227
40.119	121.229
40.120	121.231
40.121	121.233
40.122	121.235
40.123	121.237
40.124	121.239
40.125	121.241
40.126	121.243
40.127	121.245
40.128	121.247
40.129	121.249
40.130	121.251
40.131	121.253
40.132	121.255
40.133	121.257
40.134	121.259
40.135	121.261
40.136	121.263
40.137	121.265
40.138	121.267
40.139	121.269
40.140	121.271
40.141	121.273
40.142	121.275
40.143	121.277
40.150	121.279
40.151	121.281
40.152	121.283
40.153	121.285
40.154	121.287
40.155	121.289
40.170	121.303
40.170-1	[3]
40.170-2	[3]
40.170-3	[3]
40.171	121.305
40.172	121.307
40.172-1	[3]
40.173	121.309
40.173-1	[3]
40.174	121.311
40.175 (less (g))	121.313
40.175(g)	[4]
40.175-1(a)	121.313
40.175-1 (less (a))	[3]
40.176	121.315
40.177	121.317
40.178	121.319
40.179	121.321
40.200	121.323
40.201	121.325
40.202	121.327
40.202-1	[3]
40.202-2	[3]
40.202-3	[3]
40.202-4	[3]
40.202-5	[3]
40.202-6	[3]
40.202-T	121.329
40.203	121.331

[4] Obsolete.

DISTRIBUTION TABLE—Continued

Former section	Revised section
40.203-1	[3]
40.203-2	[3]
40.203-3	[3]
40.203-4	[3]
40.203-T	121.333
40.204	121.335
40.205	121.337
40.205-1	121.337
40.205-2	[3]
40.206	121.339
40.207	121.341
40.208	121.343
40.212	121.359
40.230	121.345
40.230-1	[3]
40.231	121.347
40.232	121.349
40.232-1	[3]
40.233	121.351
40.240	121.361
40.241 (less (a))	121.363
40.241(a)	121.367
40.241-1	[3]
40.242	121.369
40.243	121.371
40.260	121.383
40.261	121.385
40.263	121.387
40.265	121.391
40.266	121.395
40.267	121.396
40.280	121.411
40.281	121.413
40.282	121.415
40.284	121.421
40.286	121.423
40.286-1	[3]
40.288	121.425
40.289(c)	121.411
40.289 (less (c)) (as applicable to pilot ground training)	121.413
40.289 (less (c)) (as applicable to pilot flight training	121.415
40.289 (less (c)) (as applicable to flight engineer training)	121.421
40.289 (less (c)) (as applicable to crewmember emergency training)	121.423
40.289 (less (c)) (as applicable to aircraft dispatcher training)	121.425
40.290	121.411
40.300(a) (portion of 1st sentence)	121.463
40.300(a) (less portion of 1st sentence) and (b)	121.433
40.300 (less 1st sentence of (a) and less (b))	121.437
40.301	121.439
40.302	121.441
40.302-1	[3]
40.302-2	[3]
40.302-3	[3]
40.302-4	[3]
40.303	121.443
40.303-1	[3]
40.304	121.447
40.305	121.449
40.307	121.453
40.307-1	[3]
40.310	121.463
40.320	121.471
40.340	121.465
40.351	121.533
40.352	121.539
40.353	121.541
40.354	121.543
40.355	121.545
40.355-1	[3]
40.356	121.547
40.356-1	[3]
40.357	121.549
40.358	121.551
40.359	121.555
40.360	121.557
40.361	121.561

[2] Surplusage.
[3] Not a rule.
[4] Obsolete.

DISTRIBUTION TABLE—Continued

Former section	Revised section
40.362	121.563
40.363	121.565
40.364	121.567
40.365	121.569
40.370	121.571
40.371	121.575
40.372	121.579
40.373	121.587
40.381	121.593
40.382	121.599
40.383	121.601
40.384	121.605
40.385	121.607
40.386	121.611
40.387	121.613
40.388	121.617
40.389	121.619
40.390	121.625
40.390–1	(1)
40.390–2	(1)
40.390–3	(1)
40.391	121.627
40.391–1	(1)
40.392	121.629
40.393	121.631
40.394	121.633
40.395	121.637
40.396	121.639
40.397	121.647
40.405	121.649
40.405–1	(1)
40.406	121.651
40.406–1	(1)
40.406–2	(1)
40.406–3	(1)
40.407	121.655
40.408	121.657
40.409	121.659
40.411	121.663
40.412	121.665
40.501	121.683
40.501–1	(1)
40.502	121.685
40.503	121.687
40.503–1	(1)
40.504 (less (b))	121.691
40.504(b)	121.695
40.505	121.695
40.506	121.699
40.507	121.701
40.508	121.703
40.509	121.705
40.510	121.707
40.511	121.709
40.511–1	(1)
40.512	121.711
41.1	121.1
41.2	121.11
41.5	(1)
41.10	121.3
41.11	121.25
41.13	121.27
41.13(c)	121.3
41.14	121.77
41.15	121.73
41.16	121.29
41.18(b)	121.3
41.18 (less (b))	121.23
41.19	121.25
41.20	121.75
41.21	121.79
41.22	121.81
41.23	121.83
41.30	121.93
41.32	121.95
41.33	121.97
41.34	121.99
41.35	121.101
41.36	121.103
41.36 (note)	121.103
41.37	121.105
41.38	121.107
41.39	121.133
41.51	121.135
41.52	121.137
41.53	121.141

(1) Transferred to Part 1 [New].

DISTRIBUTION TABLE—Continued

Former section	Revised section
41.60	121.153
41.61	121.157
41.62 (1st sentence)	121.159
41.62 (less 1st sentence)	121.161
41.63	121.163
41.70	121.173
41.71	121.175
41.72	121.177
41.73	121.179
41.74	121.181
41.75	121.183
41.76	121.173
41.77	121.185
41.78	121.187
41.90	121.173
41.91	121.199
41.92	121.201
41.93	121.203
41.94	121.205
41.110	121.213
41.112	121.215
41.113	121.217
41.114	121.219
41.115	121.221
41.116	121.223
41.117	121.225
41.118	121.227
41.119	121.229
41.120	121.231
41.121	121.233
41.122	121.235
41.123	121.237
41.124	121.239
41.125	121.241
41.126	121.243
41.127	121.245
41.128	121.247
41.129	121.249
41.130	131.251
41.131	121.253
41.132	121.255
41.133	121.257
41.134	121.259
41.135	121.261
41.136	121.263
41.137	121.265
41.138	121.267
41.139	121.269
41.140	121.271
41.141	121.273
41.142	121.275
41.143	121.277
41.150	121.279
41.151	121.281
41.153	121.283
41.154	121.285
41.155	121.287
41.170	121.289
41.171	121.303
41.172	121.305
41.173	121.307
41.174	121.309
41.175	121.311
41.176	121.313
41.177	121.315
41.178	121.317
41.179	121.319
41.200	121.321
41.201	121.323
41.202	121.325
41.202–T	121.327
41.203	121.329
41.203–T	121.331
41.204	121.333
41.205	121.335
41.206	121.337
41.207	121.339
41.208	121.341
41.209	121.343
41.210	121.345
41.212	121.349
41.220	121.345
41.221	121.347
41.222	121.349
41.223	121.351
41.240	121.361

DISTRIBUTION TABLE—Continued

Former section	Revised section
41.241(a) (1st sentence)	121.367
41.241 (less 1st sentence of (a))	121.365
41.242	121.369
41.243	121.371
41.260	121.383
41.261	121.385
41.262	121.389
41.263	121.387
41.265	121.393
41.266	121.395
41.267	121.397
41.280	121.411
41.281	121.413
41.282	121.415
41.283	121.417
41.284	121.421
41.285	121.423
41.286	121.425
41.300(a) (portion of 1st sentence)	121.463
41.300(a) (less portion of 1st sentence) and (b)	121.493
41.300 (less 1st sentence of (a) and (b))	121.487
41.301	121.489
41.302	121.441
41.303	121.443
41.304	121.447
41.305	121.449
41.306	121.451
41.307	121.453
41.310	121.463
41.320	121.481
41.321	121.483
41.322	121.485
41.323	121.487
41.324	121.491
41.325	121.489
41.326	121.493
41.327	121.493
41.340	121.465
41.351	121.535
41.352	121.539
41.353	121.541
41.354	121.543
41.355	121.545
41.356	121.547
41.357	121.549
41.358	121.551
41.359	121.555
41.360	121.557
41.361	121.561
41.362	121.563
41.363	121.565
41.364	121.567
41.365	121.569
41.370	121.571
41.371	121.575
41.372	121.579
41.373	121.587
41.381	121.595
41.382	121.599
41.383	121.601
41.384	121.605
41.385	121.607
41.386	121.611
41.387(a) (1st 56 words)	121.613
41.387 (less (a) 1st 56 words)	121.615
41.388	121.617
41.389	121.631
41.390	121.625
41.391	121.627
41.392	121.629
41.393	121.631
41.394	121.635
41.395	121.637
41.396(a)	121.641
41.396 (less (a))	121.645
41.397	121.647
41.406	121.651
41.407	121.655
41.408	121.657
41.409	121.661
41.410	121.663
41.411	121.665
41.501	121.683
41.502	121.685
41.503	121.687

DISTRIBUTION TABLE—Continued

Former section	Revised section
41.504(b)	121.665
41.504 (less (b))	121.691
41.505	121.695
41.506	121.699
41.507	121.701
41.508	121.703
41.509	121.705
41.510	121.707
41.511	121.709
41.512	121.711
42.1(a)(4)	121.7
42.1 (less (a)(4))	121.1
42.2	121.7
42.5	(1)
42.10	121.3
42.11	121.45
42.12	121.47
42.13	121.49
42.14	121.51
42.15	121.55
42.16	121.77
42.17	121.73
42.17a	121.53
42.18(b)	121.3
42.18 (less (b))	121.43
42.19	121.45
42.20	121.75
42.21	121.79
42.22	121.81
42.23	121.83
42.24(c)	121.3
42.24 (less (c))	121.5
42.25	121.57
42.26	121.13
42.27	121.59
42.28	121.61
42.29	121.9
42.30	121.113
42.31	121.115
42.33	121.117
42.35	121.119
42.36	121.121
42.37	121.123
42.38	121.125
42.39	121.127
42.50	121.133
42.51	121.135
42.52(b)	121.139
42.52 (less (b))	121.137
42.53	121.141
42.60(c)–(f)	121.155
42.60 (less (c)–(f))	121.153
42.61	121.157
42.62 (1st sentence)	121.159
42.62 (less 1st sentence)	121.161
42.63	121.163
42.70	121.173
42.71	121.175
42.72	121.177
42.73	121.179
42.74	121.181
42.75	121.183
42.76	121.173
42.77	121.185
42.78	121.187
42.90	121.173
42.91	121.199
42.92	121.201
42.93	121.203
42.94	121.205
42.110	121.213
42.111	(2)
42.112	121.215
42.113	121.217
42.114	121.219
42.115	121.221
42.116	121.223
42.117	121.225
42.118	121.227
42.119	121.229
42.120	121.231
42.121	121.233
42.122	121.235
42.123	121.237

[1] Transferred to Part 1 [New].
[2] Surplusage.

DISTRIBUTION TABLE—Continued

Former section	Revised section
42.124	121.239
42.125	121.241
42.126	121.243
42.127	121.245
42.128	121.247
42.129	121.249
42.130	121.251
42.131	121.253
42.132	121.255
42.133	121.257
42.134	121.259
42.135	121.261
42.136	121.263
42.137	121.265
42.138	121.267
42.139	121.269
42.140	121.271
42.141	121.273
42.142	121.275
42.143	121.277
42.150	121.279
42.151	121.281
42.152	121.283
42.153	121.285
42.154	121.287
42.155	121.289
42.170	121.303
42.171	121.305
42.172	121.307
42.173	121.309
42.174	121.311
42.175	121.313
42.176	121.315
42.177	121.317
42.178	121.319
42.179	121.321
42.200	121.323
42.201	121.325
42.202	121.327
42.202–T	121.329
42.203	121.331
42.203–T	121.333
42.204	121.335
42.205	121.337
42.206	121.339
42.207	121.341
42.208	121.343
42.209	121.345
42.210	121.343
42.213	121.359
42.230	121.345
42.231	121.347
42.232	121.349
42.233	121.351
42.240	121.361
42.241(a) (1st sentence)	121.367
42.241 (less 1st sentence of (a))	121.365
42.242	121.369
42.243	121.371
42.260	121.383
42.261	121.385
42.262	121.389
42.263	121.387
42.265	121.393
42.267	121.397
42.280	121.411
42.281	121.413
42.282	121.415
42.283	121.419
42.284	121.421
42.285	121.423
42.300(a) (1st 37 words of 1st sentence) and (b)	121.433
42.300(a) (1st sentence less 1st 37 words)	121.435
42.300 (less 1st sentence of (a) and less (b))	121.437
42.301	121.439
42.302	121.441
42.303	121.445
42.305	121.449
42.306	121.451
42.307	121.453
42.315	121.501
42.317(a) (less (6) and (7))	121.503
42.317(b)	121.505
42.317(c)	121.507

DISTRIBUTION TABLE—Continued

Former section	Revised section
42.317(a)(6)	121.517
42.317(a)(7)	121.519
42.317 (less (a), (b), and (c))	121.509
42.318	121.511
42.319	121.513
42.320(a)	121.515
42.320(b)	121.519
42.320 (less (a) and (b))	121.517
42.321	121.521
42.322	121.523
42.323	121.525
42.350	121.537
42.352	121.537
42.353	121.539
42.354	121.543
42.355	121.545
42.356	121.547
42.357	121.549
42.358	121.553
42.360	121.559
42.361	121.561
42.362	121.563
42.363	121.565
42.364	121.567
42.370(a)	121.573
42.370 (less (a))	121.571
42.371	121.575
42.372	121.579
42.373	121.587
42.381	121.597
42.382	121.599
42.383	121.603
42.384	121.605
42.385	121.609
42.386	121.611
42.387(a) (1st 56 words)	121.613
42.387 (less (a) 1st 56 words)	121.615
42.388	121.617
42.389	121.623
42.390	121.625
42.391	121.627
42.392	121.629
42.393	121.631
42.396(a)	121.643
42.396 (less (a))	121.645
42.397	121.647
42.406	121.653
42.407	121.655
42.408	121.657
42.409	121.659
42.411	121.665
42.412	121.667
42.501	121.683
42.503	121.689
42.504(b)	121.695
42.504 (less (b))	121.693
42.505	121.697
42.506	121.699
42.507	121.701
42.508	121.703
42.509	121.705
42.510	121.707
42.511	121.709
42.513	121.713
SR 386F	121.487
SR 389B	Transferred to Part 91
SR 405	121.471
SR 406C	121.157
SR 410	121.503
SR 411B (less applicability to foreign air carriers)	121.196
SR 420	121.909
SR 422 § 40T.80	121.173
SR 422 § 40T.81 (less (b) and (d))	121.189
SR 422 § 40T.81(b)	121.195
SR 422 § 40T.81(d)	121.173
SR 422 § 40T.82	121.189
SR 422 § 40T.83(a)	121.191
SR 422 § 40T.83 (less (a))	121.193
SR 422 § 40T.84(a)	121.195
SR 422 § 40T.84 (less (a))	121.197
SR 422A § 40T.80	121.173
SR 422A § 40T.81 (less (b) and (d))	121.189
SR 422A § 40T.81(b)	121.195
SR 422A § 40T.81(d)	121.173
SR 422A § 40T.82	121.189
SR 422A § 40T.83(a)	121.191

Former section	Revised section
SR 422 § 40T.82 (less (a))	121.193
SR 422A § 40T.84(a)	121.196
SR 422A § 40T.84 (less (a))	121.197
SR 422B 40T.80	121.173
SR 422B § 40T.81 (less (b) and (d))	121.189
SR 422B § 40T.81(b)	121.196
SR 422B § 40T.81(d)	121.173
SR 422B § 40T.82	121.189
SR 422B § 40T.83(a)	121.193
SR 422B § 40T.83 (less (a))	121.191
SR 422B § 40T.84(a)	121.196
SR 422B § 40T.84 (less (a))	121.197
SR 425C § 14	121.307
SR 432A	121.563
SR 436B	121.357
SR 440	121.567
SR 448A	121.585
SR 458	121.543
406.19(a)	121.721
406.19 (less (a))	121.723

Appendix A—First-Aid Kits

Appendix B—Minimum Standards for the Approval of Airplane Simulators

Appendix C—C–46 Nontransport Category Airplanes

NOTE: Text of Appendixes A, B, and C to Part 121 will be published in the FEDERAL REGISTER early in January 1965.

[F.R. Doc. 64–13424; Filed, Dec. 30, 1964; 8:45 a.m.]

Title 14—AERONAUTICS AND SPACE

Chapter I—Federal Aviation Agency

[Docket Nos. 3059, 5033, 5036, 5094, 6161, 6258; Amdt. 1–7]

PART 121—CERTIFICATION AND OPERATIONS: DOMESTIC, FLAG, AND SUPPLEMENTAL AIR CARRIERS AND COMMERCIAL OPERATORS OF LARGE AIRCRAFT

Correction

In F.R. Doc. 64–13424, appearing at page 19186 of the issue for Thursday, December 31, 1964, paragraphs (e) through (g) of § 121.173 and all of § 121.175 were omitted inadvertently. The omitted matter should appear immediately after § 121.173(d), and should read as follows:

(e) No person may take off a reciprocating engine powered transport category airplane at a weight that is more than the allowable weight for the runway being used (determined under the runway takeoff limitations of the transport category operating rules of this Part) after taking into account the temperature operating correction factors in § 4a.749a–T or 4b.117 of the Civil Air Regulations as in effect on January 31, 1965, and set forth in the applicable Airplane Flight Manual.

(f) The Administrator may authorize in the operations specifications deviations from the requirements in the subpart if special circumstances make a literal observance of a requirement unnecessary for safety.

(g) The ten-mile width specified in §§ 121.179 through 121.183 may be reduced to five miles, for not more than 20 miles, when operating VFR or where navigation facilities furnish reliable and accurate identification of high ground and obstructions located outside of five miles, but within ten miles, on each side of the intended track.

§ 121.175 Transport category airplanes: reciprocating engine powered: weight limitations.

(a) No person may take off a reciprocating engine powered transport category airplane from an airport located at an elevation outside of the range for which maximum takeoff weights have been determined for that airplane.

(b) No person may take off a reciprocating engine powered transport category airplane for an airport of intended destination that is located at an elevation outside of the range for which maximum landing weights have been determined for that airplane.

(c) No person may specify, or have specified, an alternate airport that is located at an elevation outside of the range for which maximum landing weights have been determined for the reciprocating engine powered transport category airplane concerned.

(d) No person may take off a reciprocating engine powered transport category airplane at a weight more than the maximum authorized takeoff weight for the elevation of the airport.

(e) No person may take off a reciprocating engine powered transport category airplane if its weight on arrival at the airport of destination will be more than the maximum authorized landing weight for the elevation of that airport, allowing for normal consumption of fuel and oil en route.

See correction

PART 121—CERTIFICATION AND OPERATIONS: DOMESTIC, FLAG, AND SUPPLEMENTAL AIR CARRIERS AND COMMERCIAL OPERATORS OF LARGE AIRCRAFT

Appendixes A, B, and C to Part 121 of Title 14, Chapter I, published in the FEDERAL REGISTER dated December 31, 1964 (F.R. Doc. 64-13424, 29 F.R. 19186), read as follows:

Appendix A—First-Aid Kits

Approved first-aid kits required by § 121.309 must meet the following specifications and requirements.

(1) Each first-aid kit must be dust and moisture proof, and contain only materials that meet Federal Specifications GG-K-391a, as revised.

(2) The type of first-aid kit and the contents thereof based upon the capacity of the airplane is as follows:

(a) No. 1 kit for airplanes of 1 to 5 persons capacity.

Contents	*No.*
Adhesive bandage compresses, 1-inch (16 per unit)	1
Antiseptic swabs, 10mm. (10 per unit)	1
Ammonia inhalants, 6mm. (10 per unit)	1
2-inch bandage compresses (4 per unit)	1
4-inch bandage compresses (1 per unit)	1
Triangular bandage compressed, 40-inch (1 per unit)	2
Burn compound, ⅛ oz. (6 per unit) or equivalent amount of other burn remedy	1
Ophthalmic ointment, ⅛ oz. (6 per unit)	1

(b) No. 2 kit for airplanes of 6 to 25 persons capacity.[1]

Contents	*No.*
Adhesive bandage compresses, 1-inch (16 per unit)	2
Antiseptic swabs, 10mm. (10 per unit)	2
Ammonia inhalants, 6mm. (10 per unit)	1
2-inch bandage compresses (4 per unit)	3
4-inch bandage compresses (1 per unit)	2
Triangular bandage compressed, 40-inch (1 per unit)	3
Burn compound, ⅛ oz. (6 per unit) or equivalent amount of other burn remedy	2
Ophthalmic ointment, ⅛ oz. (6 per unit)	1

[1] Kit No. 2 in canvas may also be used on liferafts.

Recodification

(c) No. 3 kit for airplanes of over 25 persons capacity.

Contents	No.
Adhesive bandage compresses, 1-inch (16 per unit)	4
Antiseptic swabs, 10mm. (10 per unit)	4
Ammonia inhalants, 6mm. (10 per unit)	2
2-inch bandage compresses (4 per unit)	3
4-inch bandage compresses (1 per unit)	3
Triangular bandage compressed, 40-inch (1 per unit)	5
Burn compound, ⅛ oz. (6 per unit) or an equivalent amount of other burn remedy	2
Ophthalmic ointment, ⅛ oz. (6 per unit)	1

Appendix B—Minimum Standards for the Approval of Airplane Simulators

1. *Application for approval.* An application for approval of an airplane simulator is submitted, in triplicate, to the Administrator. The application must include the following:

(a) Enough information to show that the simulator adequately simulates the type of airplane with respect to the items and systems listed in section 3 of this appendix.

(b) Comparative data sheets showing that the performance and flight characteristics of the airplane simulator have been flight checked and found to be within the limits prescribed for the items listed in section 4 of this appendix. The airplane data used for comparison purposes must be applicable to the currently certificated airplanes. This data may be obtained:

(1) From the approved Airplane Flight Manual, Type Inspection Reports, or other flight test data provided by the airplane manufacturer. Other sources of airplane data may be used if approved by the Administrator. Such data must be submitted so as to allow sufficient time for investigation of their adequacy.

(2) By flight tests conducted in the certificate holder's own airplane. If this procedure is used, performance and flight characteristics data for the center of gravity limits and weights used during training will be satisfactory. Before starting these flights, an outline of the tests to be conducted in the airplane must be prepared and coordinated by the certificate holder with the Administrator. This outline must contain procedures to be followed and data to be obtained during each phase of the flight testing program. Administrator may observe and participate in the flight test program to the extent he considers necessary and appropriate. Any data so obtained will be acceptable for use by other certificate holders using the same type of airplane if appropriate arrangements are made with the certificate holder originating the data.

2. *General requirements.*

(a) The effect of changes on the basic forces and moments must be introduced for all combinations of drag and thrust normally encountered in flight. The effect of changes in airplane attitude, power, drag, altitude, temperature, gross weight, center of gravity location, and configuration must be included.

(b) In response to control movement by a flight crew member, all instrument indications involved in the simulation of the applicable airplane must be entirely automatic in character unless otherwise specified.

(c) The rate of change of simulator instrument readings and of control forces must, unless specific tolerances are otherwise specified in this Appendix, reasonably correspond to the rate of change which would occur on the applicable airplane under actual flight conditions, for any given change in the applied load on the controls, in the applied power or in aircraft configuration.

(d) Control forces and degree of actuating control travel must, unless specific tolerances are otherwise specified in this Appendix, reasonably correspond to that which would occur in the airplane under actual flight conditions.

(e) Through the medium of instrument indication, it must be possible to use the simulator for the training and checking of a pilot in the operational use of controls and instruments on the applicable airplane model during the simulated execution of ground operation, takeoff, landing, normal flight, unusual attitudes, navigation problems, and instrument approach procedures. In addition, the simulator must be designed so that malfunction of aircraft engines, propellers, and primary systems may be presented and corrective action taken by the crew to cope with such emergencies.

(f) Suitable course and altitude recorders must be provided.

(g) Communication and navigation aids of the applicable airplane must be simulated for on-the-ground and in-flight operations.

3. *Minimum standards for simulation of airplane systems.* The simulator must simulate at least the following items and systems which are appropriate to the airplane being simulated:

(a) All normal cockpit noise related to engine or aerodynamic noise (adjustable volume is permissible);
(b) All flight controls;
(c) Gust locks;
(d) Trim tabs;
(e) Landing gear operation;
(f) Wheel brakes;
(g) Steering mechanisms used on the ground;
(h) Wing flaps and spoilers;
(i) Powerplant operations;
(j) Propeller controls and circuity;
(k) Antidetonation injection systems;
(l) Fuel and oil systems;
(m) Cockpit—the simulator must represent a full scale mockup, including normal flight crew stations and accommodations for the instructor or check airman, and shall be representative of a typical fleet airplane;
(n) Circuit breaker stations manageable by the flight crew in the flight compartment (those not related to essential flight equipment or systems need not be operative);
(o) Hydraulic systems;
(p) Fire detection and extinguishing systems;
(q) Pneumatic systems (including emergency airbrakes);
(r) Electrical systems;
(s) Interior cockpit lights;
(t) Exterior light controls;
(u) Pressurization and air-conditioning systems (instrument indication and warning signals);
(v) Deicing and anti-icing systems; and
(w) Supplemental breathing systems (the systems may be charged with or vented to air).

4. *Minimum standards of tolerance for performance and flight characteristics.* The simulator must simulate the performance and flight characteristics of the particular type of airplane being simulated within the tolerance limits specified in paragraphs (a) and (b) of this section. If alternate tolerance limits are given, whichever is the greater shall apply.

(a) *Performance characteristics.* (Airplane weight and center of gravity optional.)

(1) Propeller feathering time, ±3 seconds.

(2) Landing gear operating time, ±3 seconds.

(3) Wing flap operating time, ±3 seconds.

(4) Takeoff acceleration time, ±10 percent.

(5) Calibration of gyrocompass and turn-and-bank indicator in standard rate turns and 30-degree banked turns, through a range of 180 degrees. Average rate of turn shall be within ±10 percent.

(6) Minimum control speed (in flight), ±5 knots.

(7) Stall speeds and stall warning speeds (wings level), as follows:

(i) Stall warning speed (initial buffet) in the takeoff, approach, and landing configuration, ±3 knots.

(ii) Stall speeds in the takeoff, approach, and landing configuration, ±5 knots.

(iii) The difference between stall warning (initial buffet) and stall speed shall be within ±5 knots of that for the appropriate airplane, but in no case should the stall occur before the stall warning.

(8) Engine power (thrust) calibration at takeoff and maximum continuous ratings over an altitude range, as follows:

(i) Reciprocating engines: MP, for a given BMEP and RPM, ±1 inch.

(ii) Turbine engines: N_1 and N_2, for a given EPR, ±2 percent.

(iii) Critical altitude, piston engine simulators only, ±800 feet or ±10 percent.

(9) Speed versus power in level flight at cruise altitude, ±5 knots, or 3 percent, or .03 Mach.

(10) Rates of climb versus altitude in the following configurations (propeller airplane simulators, ±50 feet or 10 percent; jet airplane simulators, ±100 feet or 10 percent):

(i) Takeoff gear down (one engine inoperative),
(ii) Takeoff gear up (one engine inoperative),
(iii) Final takeoff (one engine inoperative),
(iv) All engines en route,
(v) One-engine-inoperative en route climb,
(vi) Two-engine-inoperative en route climb (for airplanes with four or more engines),
(vii) Approach (one engine inoperative), and
(viii) Landing.

NOTE: At least two airplane weights must be included in at least one configuration, and at least two outside air temperatures must be included in at least one other configuration.

(11) Rates of climb versus airspeed for one takeoff, and one en route configuration (propeller airplane simulators ±50 feet or ±10 percent; jet airplane simulators ±100 feet or ±10 percent).

(12) In determining compliance with subparagraphs (9), (10), and (11) of this paragraph, MP/BMEP/RPM relationships must conform to airplane data within the tolerance specified in subparagraph (8)(i), and EPR/Compressor RPM relationships must conform to airplane data within the tolerance specified in subparagraph (8)(ii) of this paragraph.

(b) *Flight characteristics.* (Airplane weight and center of gravity optional.)

(1) Static longitudinal control stability: In the landing, approach, cruise (high and low altitude), and climb configurations, return to trim, when the simulator speed is caused to depart 15 percent from trim speed, must be within ±5 knots of approved airplane data. The slope of the stick force curve must be positive. One of these configurations must cover a center of gravity range.

(2) Control forces: Simulator control forces in the following areas must be within ±8 pounds or ±25 percent of the forces encountered in the airplane as indicated by the required data; except that, in regard to rudder forces, the tolerances must be ±10 pounds or ±20 percent:

(i) Longitudinal control forces during flap retraction (power off and power on), flap extension, power or thrust application, go-around following a balked landing.

(ii) Minimum control speed (in flight), rudder and aileron forces.

(iii) Stick force per "g."

(3) The roll rate of the simulator must be within ±2 seconds or ±25 percent, whichever is greater, of that of the airplane.

NOTE: If data for items in subparagraphs (2)(ii), (2)(iii) and (3) of this paragraph are not contained in the Type Inspection Report, the Administrator may adjudge the adequacy of simulation.

(4) In the following areas, specified tolerance limitations are not set forth in these standards. In these areas of flight characteristics, when appropriate to the type of airplane being simulated, the adequacy of simulation must be subject to the approval of the Administrator:

(i) Compressibility trim change.

(ii) Approaches to stall in the takeoff, approach, and landing configuration (wings level), from initial buffet to stall; except that at least one approach to a stall must be done in a 20-degree bank turn.

(iii) Buffet at high Mach numbers up to design Mach limits.

(iv) Dutch roll.

(v) Emergency descents.

5. *Minimum standards of tolerance for simulator navigational accuracy.* At any altitude, on any heading, and at any airspeed, the navigational accuracy of the simulator must be as follows:

(a) The distance traveled with zero wind in a particular time interval must be equivalent to ±5 percent of the horizontal component of the true airspeed multiplied by the time interval.

(b) The track of the simulator with no wind must agree with the true heading of the simulator within ±3 degrees which must include allowances for instrument error. (This applies when the simulator is turning as well as flying a straight course.)

(c) During simulated ILS approaches with zero wind, the descent path of the simulator, as indicated by airspeed, altitude, and rate of descent, must agree with the descent path as indicated by the flight instrument indicating glide path deviation, within ±20 feet from 0 to 200 feet, ±10 percent of the height above the runway, from 200 to 1,000 feet, and ±100 feet from 1,000 to 5,000 feet above the airport elevation.

Appendix C—C–46 Nontransport Category Airplanes

Cargo Operations

1. *Required engines.* (a) Except as provided in paragraph (b) of this section, the engines specified in subparagraphs (1) or (2) of this section must be installed in C–46 nontransport category airplanes operated at gross weights exceeding 45,000 pounds:

(1) Pratt and Whitney R2800–51–M1 or R2800–75–M1 engines (engines converted from basic model R2800–51 or R2800–75 engines in accordance with FAA approved data) that—

(i) Conform to Engine Specification 5E–8;

(ii) Conform to the applicable portions of the operator's manual;

(iii) Comply with all the applicable airworthiness directives; and

(iv) Are equipped with high capacity oil pump drive gears in accordance with FAA approved data.

(2) Other engines found acceptable by the FAA Regional Flight Standards Division having type certification responsibility for the C–46 airplane.

(b) Upon application by an operator conducting cargo operations with nontransport category C–46 airplanes between points within the State of Alaska, the appropriate FAA Air Carrier District Office, Alaskan Region, may authorize the operation of such airplanes, between points within the State of Alaska; without compliance with paragraph (a) of this section if the operator shows that, in its area of operation, installation of the modified engines is not necessary to provide adequate cooling for single-engine operations. Such authorization and any conditions or limitations therefor is made a part of the Operations Specifications of the operator.

2. *Minimum acceptable means of complying with the special airworthiness requirements.* Unless otherwise authorized under § 121.213, the data set forth in §§ 3 through 34 of this Appendix, as correlated to the C–46 nontransport category airplane, is the minimum means of compliance with the special airworthiness requirements of §§ 121.215 through 121.281.

3. *Susceptibility of material to fire.* [Deleted as unnecessary]

4. *Cabin interiors.* C–46 crew compartments must meet all the requirements of § 121.215, and, as required in § 121.221, the door between the crew compartment and main cabin (cargo) compartment must be flame resistant.

5. *Internal doors.* Internal doors, including the crew to main cabin door, must meet all the requirements of § 121.217.

6. *Ventilation.* Standard C–46 crew compartments meet the ventilation requirements of § 121.219 if a means of ventilation for controlling the flow of air is available between the crew compartment and main cabin. The ventilation requirement may be met by use of a door between the crew compartment and main cabin. The door need not have louvers installed; however, if louvers are installed, they must be controllable.

7. *Fire precautions.* Compliance is required with all the provisions of § 121.221.

(a) In establishing compliance with this section, the C–46 main cabin is considered as a Class A compartment if—

(1) The operator utilizes a standard system of cargo loading and tiedown that allows easy access in flight to all cargo in such compartment, and, such system is included in the appropriate portion of the operator's manual; and

(2) A cargo barrier is installed in the forward end of the main cabin cargo compartment. The barrier must—

(i) Establish the most forward location beyond which cargo cannot be carried;

(ii) Protect the components and systems of the airplane that are essential to its safe operation from cargo damage; and

(iii) Permit easy access, in flight, to cargo in the main cabin cargo compartment.

The barrier may be a cargo net or a network of steel cables or other means acceptable to the Administrator which would provide equivalent protection to that of a cargo net. The barrier need not meet crash load requirements of FAR § 25.561; however, it must be attached to the cargo retention fittings and provide the degree of cargo retention that is required by the operators' standard system of cargo loading and tiedown.

(b) C–46 forward and aft baggage compartments must meet, as a minimum, Class B requirements of this section or be placarded in a manner to preclude their use as cargo or baggage compartments.

8. *Proof of compliance.* The demonstration of compliance required by § 121.223 is not required for C–46 airplanes in which—

(1) The main cabin conforms to Class A cargo compartment requirements of § 121.219; and

(2) Forward and aft baggage compartments conform to Class B requirements of § 121.221, or are placarded to preclude their use as cargo or baggage compartments.

9. *Propeller deicing fluid.* No change from the requirements of § 121.225. Isopropyl alcohol is a combustible fluid within the meaning of this section.

10. *Pressure cross-feed arrangements, location of fuel tanks, and fuel system lines and fittings.* C–46 fuel systems which conform to all applicable Curtiss design specifications and which comply with the FAA type certification requirements are in compliance with the provisions of §§ 121.227 through 121.231.

11. *Fuel lines and fittings in designated fire zones.* No change from the requirements of § 121.233.

12. *Fuel valves.* Compliance is required with all the provisions of § 121.235. Compliance can be established by showing that the fuel system conforms to all the applicable Curtiss design specifications, the FAA type certification requirements, and, in addition, has explosion-proof fuel booster pump electrical selector switches installed in lieu of the open contact type used originally.

13. *Oil lines and fittings in designated fire zones.* No change from the requirements of § 121.237.

14. *Oil valves.* C–46 oil shutoff valves must conform to the requirements of § 121.239. In addition, C–46 airplanes using Hamilton Standard propellers must provide, by use of stand pipes in the engine oil tanks or other approved means, a positive source of oil for feathering each propeller.

15. *Oil system drains.* The standard C–46 "Y" drains installed in the main oil inlet line for each engine meet the requirements of § 121.241.

16. *Engine breather line.* The standard C–46 engine breather line installation meets the requirements of § 121.243 if the lower breather lines actually extend to the trailing edge of the oil cooler air exit duct.

17. *Firewalls and firewall construction.* Compliance is required with all of the provisions of §§ 121.245 and 121.247. The following requirements must be met in showing compliance with these sections:

(a) *Engine compartment.* The engine firewalls of the C–46 airplane must—

(1) Conform to type design, and all applicable airworthiness directives;

(2) Be constructed of stainless steel or approved equivalent; and

(3) Have fireproof shields over the fairleads used for the engine control cables that pass through each firewall.

(b) *Combustion heater compartment.* C–46 airplanes must have a combustion heater fire extinguishing system which complies with AD–49–18–1 or an FAA approved equivalent.

18. *Cowling.* Standard C–46 engine cowling (cowling of aluminum construction employing stainless steel exhaust shrouds) which conforms to the type design and cowling configurations which conform to the C–46 transport category requirements meet the requirements of § 121.249.

19. *Engine accessory section diaphragm.* C–46 engine nacelles which conform to the C–46 transport category requirements meet the requirements of § 121.251. As provided for in that section, a means of equivalent protection which does not require provision of a diaphragm to isolate the engine power section and exhaust system from the engine accessory compartment is the designation of the entire engine compartment forward of and including the firewall as a designated fire zone, and the installation of adequate fire detection and fire extinguishing systems which meet the requirements of § 121.263 and § 121.273, respectively, in such zone.

20. *Powerplant fire protection.* C–46 engine compartments and combustion heater compartments are considered as designated fire zones within the meaning of § 121.253.

21. *Flammable fluids*—

(a) *Engine compartment.* C–46 engine compartments which conform to the type design and which comply with all applicable airworthiness directives meet the requirements of § 121.255.

(b) *Combustion heater compartment.* C–46 combustion heater compartments which conform to type design and which meet all the requirements of AD–49–18–1 or an FAA approved equivalent meet the requirements of § 121.255.

22. *Shutoff means*—

(a) *Engine compartment.* C–46 engine compartments which comply with AD–62–10–2 or FAA approved equivalent meet the requirements of § 121.257 applicable to engine compartments, if, in addition, a means satisfactory to the Administrator is provided to shut off the flow of hydraulic fluid to the cowl flap cylinder in each engine nacelle. The shutoff means must be located aft of the engine firewall. The operator's manual must include, in the emergency portion, adequate instructions for proper operation of the additional shutoff means to assure correct sequential positioning of engine cowl flaps under emergency conditions. In accordance with § 121.315, this positioning must also be incorporated in the emergency section of the pilot's checklist.

(b) *Combustion heater compartment.* C–46 heater compartments which comply with paragraph (5) of AD–49–18–1 or FAA approved equivalent meet the requirements of § 121.257 applicable to heater compartments if, in addition, a shutoff valve located above the main cabin floor level is installed in the alcohol supply line or lines between the alcohol supply tank and those alcohol pumps located under the main cabin floor. If all of the alcohol pumps are located above the main cabin floor, the alcohol shutoff valve need not be installed. In complying with paragraph (5) of AD–49–18–1, a fail-safe electric fuel shutoff valve may be used in lieu of the manually operated valve.

23. *Lines and fittings.*—(a) *Engine compartment.* C–46 engine compartments which comply with all applicable airworthiness directives, including AD–62–10–2, by using FAA approved fire-resistant lines, hoses, and end fittings, and engine compartments which meet the C–46 transport category requirements, meet the requirements of § 121.259.

(b) *Combustion heater compartments.* All lines, hoses, and end fittings, and couplings which carry fuel to the heaters and heater controls, must be of FAA approved fire-resistant construction.

24. *Vent and drain lines.*—(a) *Engine compartment.* C–46 engine compartments meet the requirements of § 121.261 if—

(1) The compartments conform to type design and comply with all applicable airworthiness directives or FAA approved equivalent; and

(2) Drain lines from supercharger case, engine-driven fuel pump, and engine-driven hydraulic pump reach into the scupper drain located in the lower cowling segment.

(b) *Combustion heater compartment.* C–46 heater compartments meet the requirements of § 121.261 if they conform to AD–49–18–1 or FAA approved equivalent.

25. *Fire-extinguishing system.* (a) To meet the requirements of § 121.263, C–46 airplanes must have installed fire extinguishing systems to serve all designated fire zones. The fire-extinguishing systems, the quantity of extinguishing agent, and the rate of discharge shall be such as to provide a minimum of one adequate discharge for each designated fire zone. Compliance with this provision requires the installation of a separate fire extinguisher for each engine compartment. Insofar as the engine compartment is concerned, the system shall be capable of protecting the entire compartment against the various types of fires likely to occur in the compartment.

(b) Fire-extinguishing systems which conform to the C–46 transport category requirements meet the requirements set forth in paragraph (a). Furthermore, fire-extinguishing systems for combustion heater compartments which conform to the requirements of AD–49–18–1 or an FAA approved equivalent also meet the requirements in paragraph (a).

In addition, a fire-extinguishing system for C–46 airplanes meets the adequacy requirement of paragraph (a) if it provides the same or equivalent protection to that demonstrated by the CAA in tests conducted in 1941 and 1942, using a CW–20 type engine nacelle (without diaphragm). These tests were conducted at the Bureau of Standards facilities in Washington, D.C., and copies of the test reports are available through the FAA Regional Engineering Offices. In this connection, the flow rates and distribution of extinguishing agent substantiated in American Airmotive Report No. 128–52–d, FAA approved February 9, 1953, provides protection equivalent to that demonstrated by the CAA in the CW–20 tests. In evaluating any C–46 fire-extinguishing system with respect to the aforementioned CW–20 tests, the Agency would require data in a narrative form, utilizing drawings or photographs to show at least the following:

Installation of containers; installation and routing of plumbing; type, number, and location of outlets or nozzles; type, total volume, and distribution of extinguishing agent; length of time required for discharging; means for thermal relief, including type and location of discharge indicators; means of discharging, e.g., mechanical cutterheads, electric cartridge, or other method; and whether a one- or two-shot system is used; and if the latter is used, means of crossfeeding or otherwise selecting distribution of extinguishing agent; and types of materials used in makeup of plumbing.

High rate discharge (HRD) systems using agents such as bromotrifluoromethane, dibromodifluoromethane and chlorobromomethane (CB), may also meet the requirements of paragraph (a).

26. *Fire-extinguishing agents, Extinguishing agent container pressure relief, Extinguishing agent container compartment temperatures, and Fire-extinguishing system materials.* No change from the requirements of §§ 121.265 through 121.271.

27. *Fire-detector system.* Compliance with the requirements of § 121.273 requires that C–46 fire detector systems conform to:

(a AD–62–10–2 or FAA approved equivalent for engine compartments; and

(b) AD–49–18–1 or FAA approved equivalent for combustion heater compartments.

28. *Fire detectors.* No change from the requirements of § 121.275.

29. *Protection of other airplane components against fire.* To meet the requirements of § 121.277, C–46 airplanes must—

(a) Conform to the type design and all applicable airworthiness directives; and

(b) Be modified or have operational procedures established to provide additional fire protection for the wheel well door aft of each engine compartment. Modifications may consist of improvements in sealing of the main landing gear wheel well doors. An operational procedure which is acceptable to the Agency is one requiring the landing gear control to be placed in the up position in case of in-flight engine fire. In accordance with § 121.315, such procedure must be set forth in the emergency portion of the operator's emergency checklist pertaining to in-flight engine fire.

30. *Control of engine rotation.* C–46 propeller feathering systems which conform to the type design and all applicable airworthiness directives meet the requirements of § 121.279.

31. *Fuel system independence.* C–46 fuel systems which conform to the type design and all applicable airworthiness directives meet the requirements of § 121.281.

32. *Induction system ice prevention.* The C–46 carburetor anti-icing system which conforms to the type design and all applicable airworthiness directives meets the requirements of §121.283.

33. *Carriage of cargo in passenger compartments.* Section 121.285 is not applicable to nontransport category C–46 cargo airplanes.

34. *Carriage of cargo in cargo compartments.* A standard cargo loading and tiedown arrangement set forth in the operator's manual and found acceptable to the Administrator must be used in complying with § 121.287.

35. *Performance data.* Performance data on Curtiss model C–46 airplane certificated for maximum weight of 45,000 and 48,000 pounds for cargo-only operations.

1. The following performance limitation data, applicable to the Curtiss model C–46 airplane for cargo-only operation, must be used in determining compliance with §§ 121.199 through 121.205. These data are presented in the tables and figures of this Appendix.

TABLE 1—TAKEOFF LIMITATIONS

(a) Curtiss C–46 certificated for maximum weight of 45,000 pounds.

(1) "Effective length" of runway required when effective length is determined in accordance with § 121.171 (distance to accelerate to 93 knots TIAS and stop, with zero wind and zero gradient). (Factor=1.00)

Standard altitude in feet	Airplane weight in pounds		
	39,000	42,000	[1] 45,000
	Distance in feet		
S.L.	4,110	4,290	4,570
1,000	4,250	4,440	4,720
2,000	4,400	4,600	4,880
3,000	4,650	4,880	5,190
4,000	4,910	5,170	5,500
5,000	5,160	5,450	5,810
6,000	5,420	5,730	6,120
7,000	5,680	6,000	6,440
8,000	5,940	6,280	(1)

[1] Ref. Fig. 1(a)(1) for weight and distance for altitudes above 7,000'.

(2) Actual length of runway required when "effective length," considering obstacles, is not determined (distance to accelerate to 93 knots TIAS and stop, divided by the factor 0.85).

Standard altitude in feet	Airplane weight in pounds		
	39,000	42,000	[1] 45,000
	Distance in feet		
S.L.	4,830	5,050	5,370
1,000	5,000	5,230	5,550
2,000	5,170	5,410	5,740
3,000	5,470	5,740	6,100
4,000	5,770	6,080	6,470
5,000	6,070	6,410	6,830
6,000	6,380	6,740	7,200
7,000	6,680	7,070	7,570
8,000	6,990	7,410	(1)

[1] Ref. Fig. 1(a)(2) for weight and distance for altitudes above 7,000'.

(b) Curtiss C–46 certificated for maximum weight 48,000 pounds.

(1) "Effective length" of runway required when effective length is determined in accordance with § 121.171 (distance to accelerate to 93 knots TIAS and stop, with zero wind and zero gradient). (Factor=1.00)

Standard altitude in feet	Airplane weight in pounds			
	39,000	42,000	45,000	[1] 48,000
	Distance in feet			
S.L.	4,110	4,290	4,570	4,950
1,000	4,250	4,440	4,720	5,130
2,000	4,400	4,600	4,880	5,300
3,000	4,650	4,880	5,190	5,670
4,000	4,910	5,170	5,500	6,050
5,000	5,160	5,450	5,810	6,420
6,000	5,420	5,730	6,120	6,800
7,000	5,680	6,000	6,440	(1)
8,000	5,940	6,280	6,750	(1)

[1] Ref. Fig. 1(b)(1) for weight and distance for altitudes above 6,000'.

(2) Actual length of runway required when "effective length," considering obstacles, is not determined (distance to accelerate to 93 knots TIAS and stop, divided by the factor 0.85).

Standard altitude in feet	Airplane weight in pounds			
	39,000	42,000	45,000	[1] 48,000
	Distance in feet			
S.L.	4,830	5,050	5,370	5,830
1,000	5,000	5,230	5,550	6,030
2,000	5,170	5,410	5,740	6,230
3,000	5,470	5,740	6,100	6,670
7,000	5,770	6,080	6,470	7,120
4,000	6,070	6,410	6,830	7,560
5,000	6,380	6,740	7,200	8,010
6,000	6,680	7,070	7,570	(1)
8,000	6,990	7,410	7,940	(1)

[1] Ref. Fig. 1(b)(2) for weight and distance for altitudes above 6,000'.

TABLE 2—EN ROUTE LIMITATIONS

(a) Curtiss model C-46 certificated for maximum weight of 45,000 pounds (based on a climb speed of 113 knots (TIAS)).

Weight (pounds)	Terrain clearance (feet)[1]	Blower setting
45,000	6,450	Low.
44,000	7,000	Do.
43,000	7,500	Do.
42,200	8,000	High.
41,000	9,600	Do.
40,000	11,000	Do.
39,000	12,300	Do.

[1] Highest altitude of terrain over which airplanes may be operated in compliance with § 121.201.

Ref. Fig. 2(a).

(b) Curtiss model C-46 certificated for maximum weight of 48,000 pounds or with engine installation approved for 2,550 revolutions per minute (1,700 brake horsepower). Maximum continuous power in low blower (based on a climb speed of 113 knots (TIAS)).

Weight (pounds)	Terrain clearance (feet)[1]	Blower setting
48,000	5,850	Low.
47,000	6,300	Do.
46,000	6,700	Do.
45,000	7,200	Do.
44,500	7,450	Do.
44,250	8,000	High.
44,000	8,550	Do.
43,000	10,800	Do.
42,000	12,500	Do.
41,000	13,000	Do.

[1] Highest altitude of terrain over which airplanes may be operated in compliance with § 121.201.

Ref. Fig. 2(b).

TABLE 3—LANDING LIMITATIONS

(a) Intended Destination.

"Effective length" of runway required for intended destination when effective length is determined in accordance with § 121.171 with zero wind and zero gradient.

(1) Curtiss model C-46 certificated for maximum weight of 45,000 pounds. (0.60 factor.)

Standard altitude in feet	Airplane weight in pounds and approach speeds [1] in knots							
	40,000	V_{50}	42,000	V_{50}	44,000	V_{50}	45,000	V_{50}
	Distance in feet							
S.L.	4,320	86	4,500	88	4,700	90	4,800	91
1,000	4,440	86	4,620	88	4,830	90	4,930	91
2,000	4,550	86	4,750	88	4,960	90	5,050	91
3,000	4,670	86	4,880	88	5,090	90	5,190	91
4,000	4,800	86	5,000	88	5,220	90	5,320	91
5,000	4,920	86	5,140	88	5,360	90	5,460	91
6,000	5,040	86	5,270	88	5,500	90	5,600	91
7,000	5,170	86	5,410	88	5,650	90	5,750	91
8,000	5,310	86	5,550	88	5,800	90	5,900	91

[1] Steady approach speed through 50-foot height TIAS denoted by symbol V_{50}.

Ref. Fig. 3(a)(1).

(2) Curtiss model C-46 certificated for maximum weight of 48,000 pounds.[1] (0.60 factor.)

Standard altitude in feet	Airplane weight in pounds and approach speeds [1] in knots							
	42,000	V_{50}	44,000	V_{50}	46,000	V_{50}	48,000	V_{50}
	Distance in feet							
S.L.	3,370	80	3,490	82	3,620	84	3,740	86
1,000	3,460	80	3,580	82	3,710	84	3,830	86
2,000	3,540	80	3,670	82	3,800	84	3,920	86
3,000	3,630	80	3,760	82	3,890	84	4,020	86
4,000	3,720	80	3,850	82	3,980	84	4,110	86
5,000	3,800	80	3,940	82	4,080	84	4,220	86
6,000	3,890	80	4,040	82	4,180	84	4,320	86
7,000	3,980	80	4,140	82	4,280	84	4,440	86
8,000	4,080	80	4,240	82	4,390	84	4,550	86

[1] Steady approach speed through 50 height knots TIAS denoted by symbol V_{50}.

Ref. Fig. 3(a)(2).

(b) Alternate Airports.

"Effective length" of runway required when effective length is determined in accordance with § 121.171 with zero wind and zero gradient.

(1) Curtiss model C-46 certificated for maximum weight of 45,000 pounds. (0.70 factor.)

Standard altitude in feet	Airplane weight in pounds and approach speeds [1] in knots							
	40,000	V_{50}	42,000	V_{50}	44,000	V_{50}	45,000	V_{50}
	Distance in feet							
S.L.	3,700	86	3,860	88	4,030	90	4,110	91
1,000	3,800	86	3,960	88	4,140	90	4,220	91
2,000	3,900	86	4,070	88	4,250	90	4,340	91
3,000	4,000	86	4,180	88	4,360	90	4,450	91
4,000	4,110	86	4,290	88	4,470	90	4,560	91
5,000	4,210	86	4,400	88	4,590	90	4,680	91
6,000	4,330	86	4,510	88	4,710	90	4,800	91
7,000	4,430	86	4,630	88	4,840	90	4,930	91
8,000	4,550	86	4,750	88	4,970	90	5,060	91

[1] Steady approach speed through 50 foot-height-knots TIAS denoted by symbol V_{50}.

Ref. Fig. 3(b)(1).

(2) Curtiss model C-46 certificated for maximum weight of 48,000 pounds.[1] (0.70 factor.)

Standard altitude in feet	Airplane weight in pounds and approach speeds [1] in knots							
	42,000	V_{50}	44,000	V_{50}	46,000	V_{50}	48,000	V_{50}
	Distance in feet							
S.L.	2,890	80	3,000	82	3,110	84	3,220	86
1,000	2,960	80	3,070	82	3,180	84	3,280	86
2,000	3,040	80	3,150	82	3,260	84	3,360	86
3,000	3,110	80	3,220	82	3,340	84	3,440	86
4,000	3,180	80	3,300	82	3,410	84	3,520	86
5,000	3,260	80	3,380	82	3,500	84	3,610	86
6,000	3,330	80	3,460	82	3,580	84	3,700	86
7,000	3,420	80	3,540	82	3,670	84	3,800	86
8,000	3,500	80	3,630	82	3,760	84	3,900	86

[1] Steady approach speed through 50 foot-height-knots TIAS denoted by symbol V_{50}.

Ref. Fig. 3(b)(2).

[1] For use with Curtiss model C-46 airplanes when approved for this weight.

(c) Actual length of runway required when effective length, considering obstacles, is not determined in accordance with § 121.171.

(1) Curtiss model C–46 certificated for maximum weight of 45,000 pounds. (0.55 factor.)

Standard altitude in feet	Airplane weight in pounds and approach speeds [1] in knots							
	40,000	V_{50}	42,000	V_{50}	44,000	V_{50}	45,000	V_{50}
	Distance in feet							
S.L.	4,710	86	4,910	88	5,130	90	5,230	91
1,000	4,840	86	5,050	88	5,270	90	5,370	91
2,000	4,960	86	5,180	88	5,410	90	5,510	91
3,000	5,090	86	5,320	88	5,550	90	5,660	91
4,000	5,230	86	5,460	88	5,700	90	5,810	91
5,000	5,360	86	5,600	88	5,850	90	5,960	91
6,000	5,500	86	5,740	88	6,000	90	6,110	91
7,000	5,640	86	5,900	88	6,170	90	6,280	91
8,000	5,790	86	6,050	88	6,34 (	90	6,450	91

[1] Steady approach speed through 50 foot-height-knots TIAS denoted by symbol V_{50}.

Ref. Fig. 3(c)(1).

(2) Curtiss C–46 certificated for maximum weight of 48,000 pounds.[1] (0.55 factor.)

Standard altitude in feet	Airplane weight in pounds and approach speeds [1] in knots							
	42,000	V_{50}	44,000	V_{50}	46,000	V_{50}	48,000	V_{50}
	Distance in feet							
S.L.	3,680	80	3,820	82	3,960	84	4,090	86
1,000	3,770	80	3,910	82	4,050	84	4,180	86
2,000	3,860	80	4,000	82	4,140	84	4,280	86
3,000	3,960	80	4,090	82	4,240	84	4,380	86
4,000	4,050	80	4,190	82	4,340	84	4,490	86
5,000	4,150	80	4,290	82	4,450	84	4,600	86
6,000	4,240	80	4,400	82	4,560	84	4,710	86
7,000	4,350	80	4,510	82	4,670	84	4,840	86
8,000	4,450	80	4,620	82	4,790	84	4,960	86

[1] Steady approach speed through 50 foot-height-knots TIAS denoted by symbol V_{50}.

Ref. Fig. 3(c)(2).

[1] For use with Curtiss model C–46 airplanes when approved for this weight.

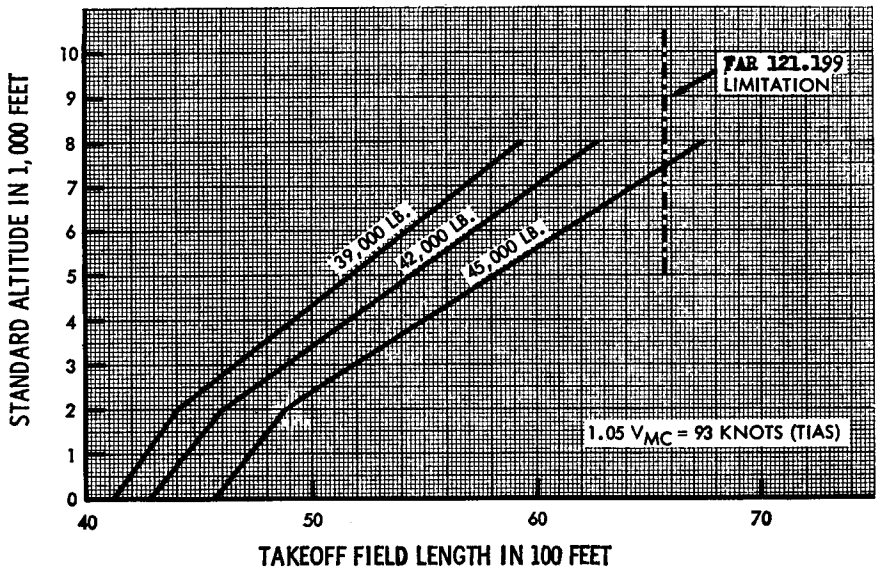
CURTISS C-46 MODELS

CERTIFICATED FOR MAX. WEIGHT OF 45,000 LBS.

TAKEOFF LIMITATION.
ZERO WIND AND ZERO GRADIENT.

BASED ON EFFECTIVE TAKEOFF LENGTH. (1.00 FACTOR)

FAR 121.199



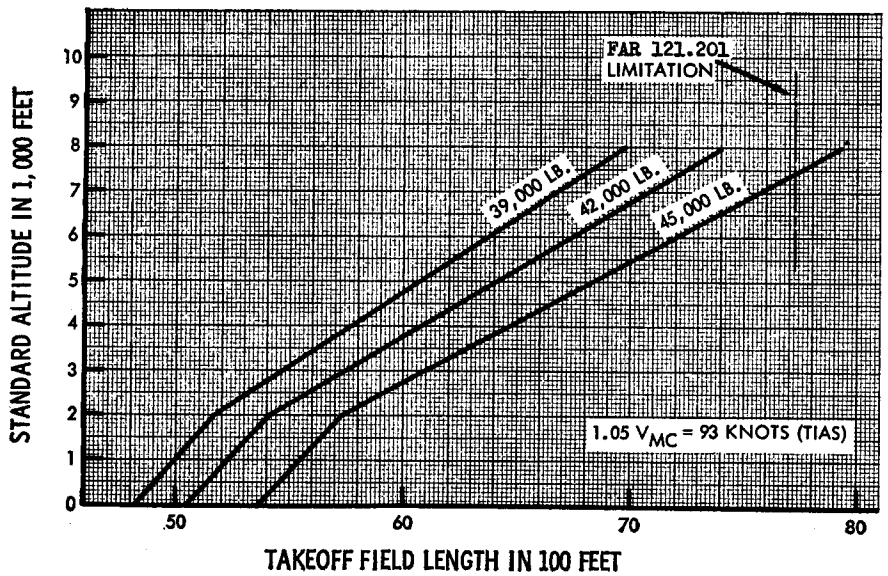
REFERENCE TABLE 1(a) (1)

FIG. 1 (a)(1)

CURTISS C-46 MODELS
CERTIFICATED FOR MAX. WEIGHT OF 45,000 LBS.

TAKEOFF LIMITATION
ZERO WIND AND ZERO GRADIENT

BASED ON ACTUAL TAKEOFF LENGTH
WHEN EFFECTIVE LENGTH IS NOT
DETERMINED. (0.85 FACTOR)



REFERENCE TABLE 1 (a) (2)

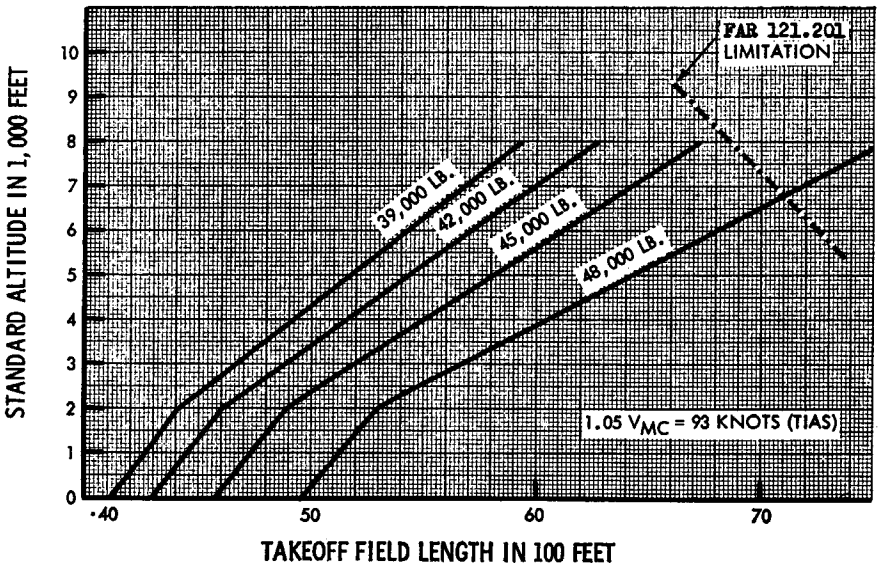
FIG. 1(a) (2)

CURTISS C-46 MODELS
CERTIFICATED FOR MAX. WEIGHT OF 48,000 LBS.

TAKEOFF LIMITATION
ZERO WIND AND ZERO GRADIENT

BASED ON EFFECTIVE TAKEOFF
LENGTH. (1.00 FACTOR)

FAR 121.199



REFERENCE TABLE 1(b) (1)

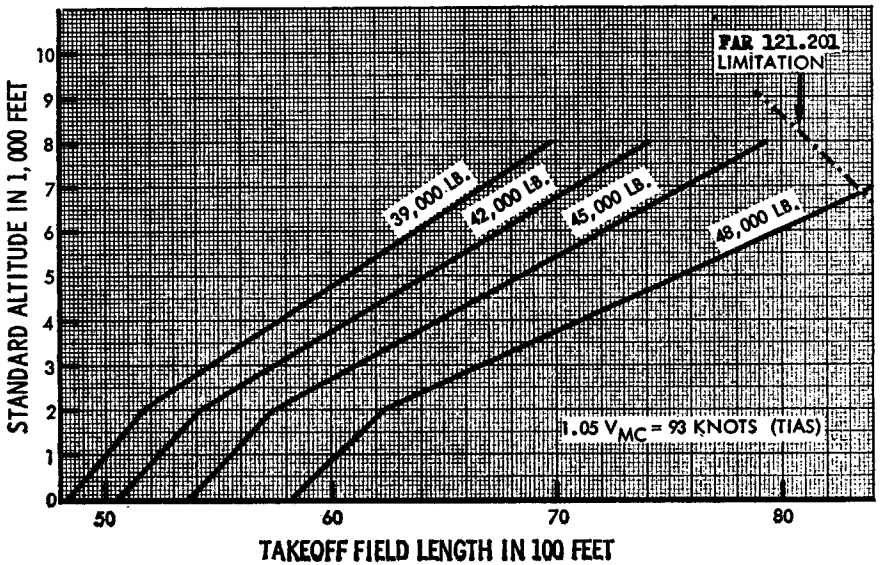
FIG. 1(b) (1)

CURTISS C-46 MODELS

CERTIFICATED FOR MAX. WEIGHT OF 48,000 LBS.

TAKEOFF LIMITATION
ZERO WIND AND ZERO GRADIENT

BASED ON ACTUAL TAKEOFF LENGTH
WHEN EFFECTIVE LENGTH IS NOT
DETERMINED. (0.85 FACTOR)



REFERENCE TABLE 1(b) (2)

FIG. 1(b) (2) 1-27-64

RUNWAY GRADIENT CORRECTION
FOR ACCELERATE - STOP DISTANCE

FOR C-46 AIRPLANES UNDER FAR 121.199

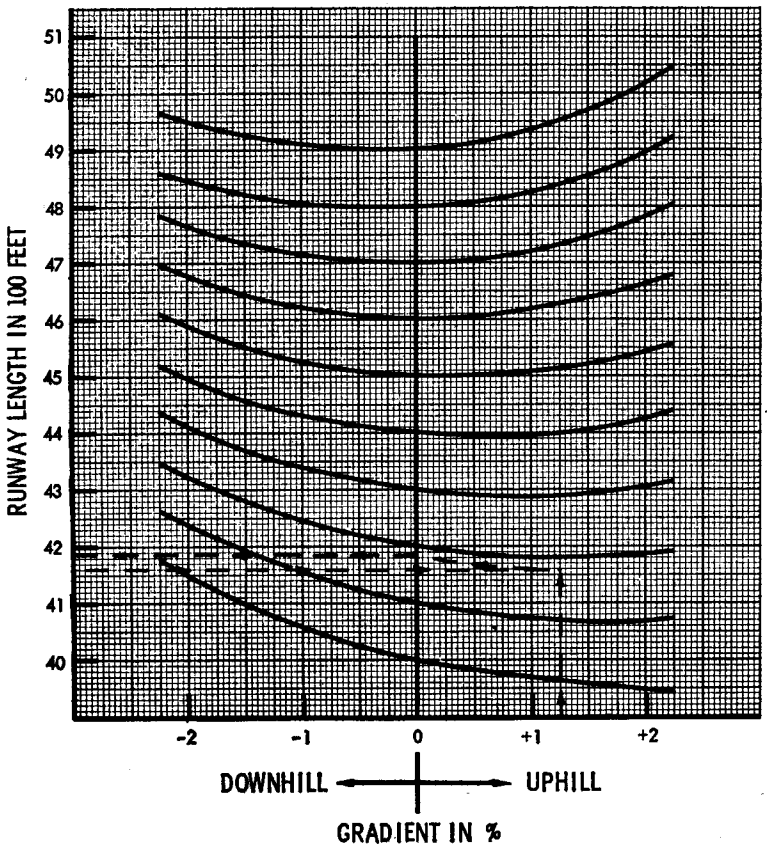


FIG. 1(c)

CURTISS C-46 MODELS

ENROUTE LIMITATIONS - ONE ENGINE INOPERATIVE

FAR 121.201

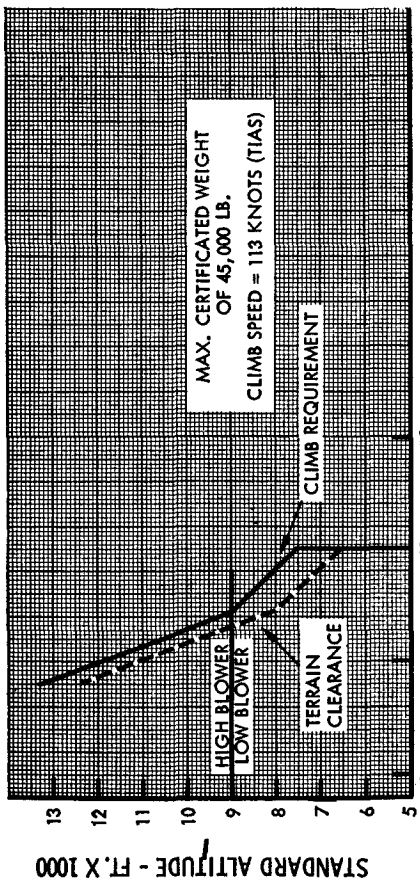


FIG. 2(a)

REFERENCE TABLE 2(a)

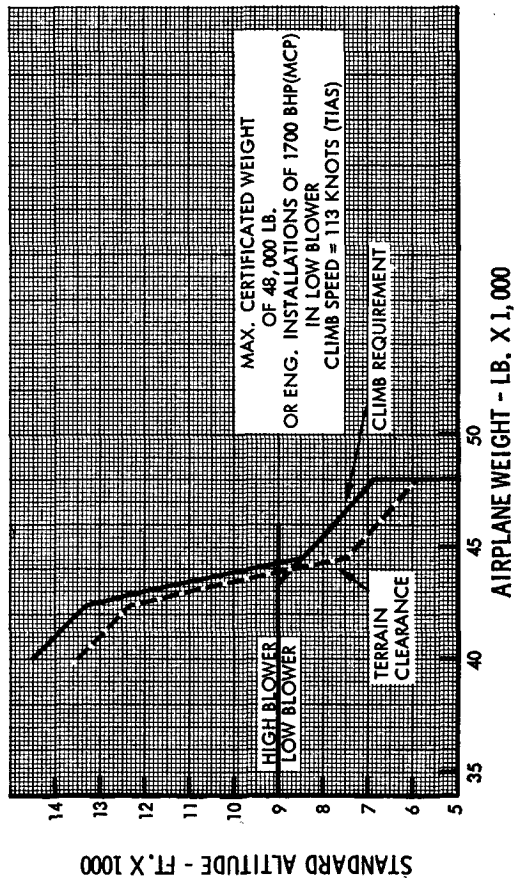


FIG. 2(b)

REFERENCE TABLE 2(b)

C-46 MAX. CERTIFICATED WEIGHT 48,000 LBS.
DRIFT-DOWN CHART FAR 121.201
SINGLE ENGINE ENROUTE OPERATION

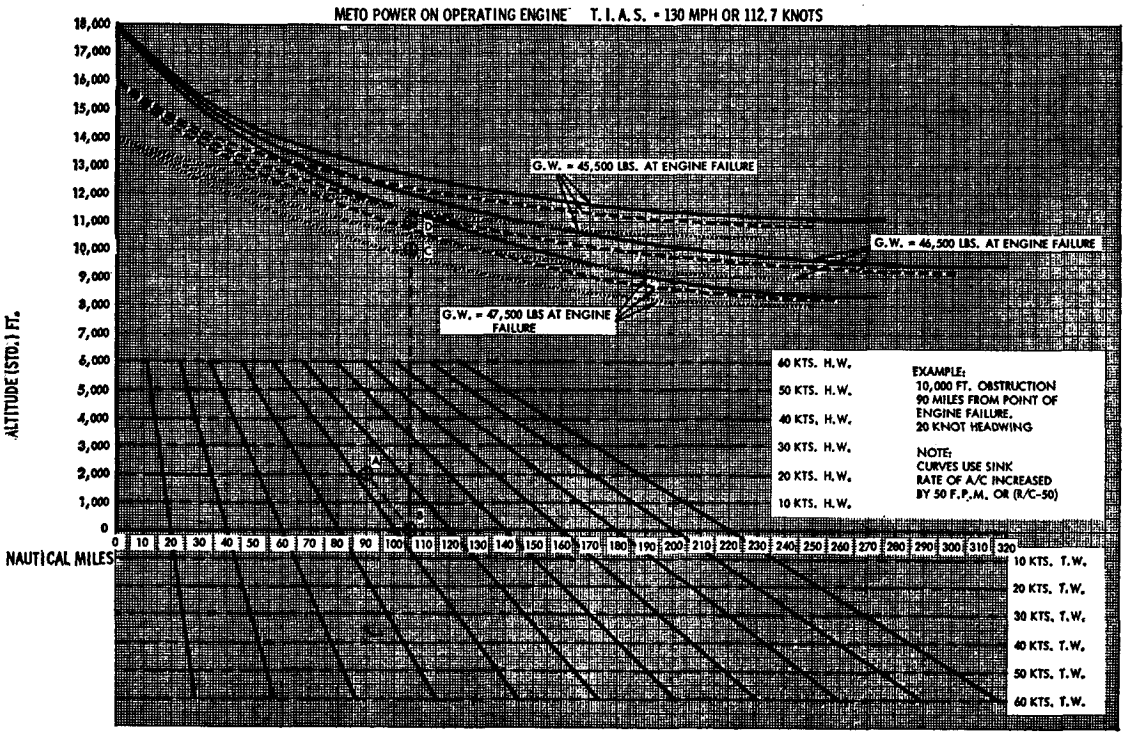


FIG. 2(c)

C-46 MAX. CERTIFICATED WEIGHT 48,000 LBS.
ENROUTE CLIMB SUMMARY

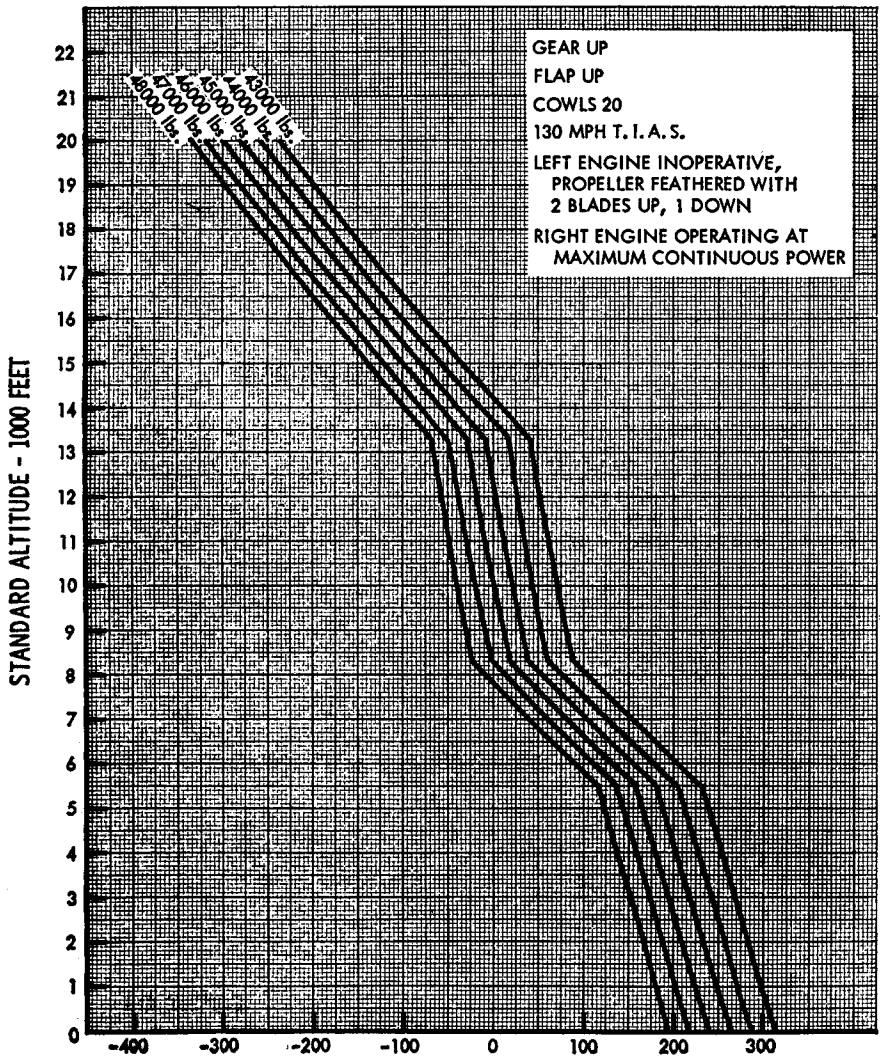


FIG. 2(d)

CURTISS C-46 MODELS

CERTIFICATED FOR MAX. WEIGHT OF 45,000 LBS.

LANDING LIMITATIONS.
ZERO WIND AND ZERO GRADIENT

BASED ON EFFECTIVE LANDING LENGTH AT INTENDED DESTINATION. (0.60 FACTOR)

FAR 121.203

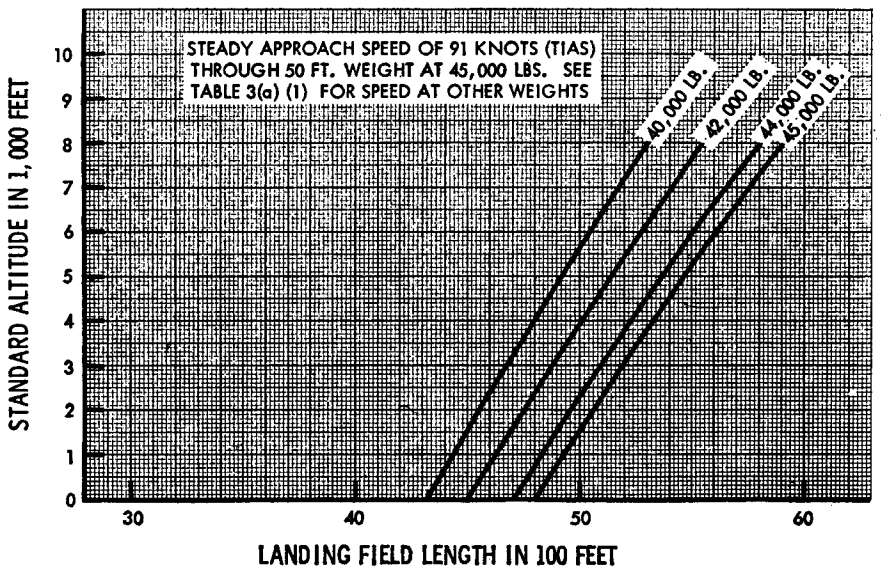


FIG. 3(a) (1)

CURTISS C-46 MODELS

CERTIFICATED FOR MAX. WEIGHT OF 48,000 LBS.

LANDING LIMITATIONS.
ZERO WIND AND ZERO GRADIENT

BASED ON EFFECTIVE LANDING LENGTH
AT ALTERNATE AIRPORTS. (0.70 FACTOR).

FAR 121.205

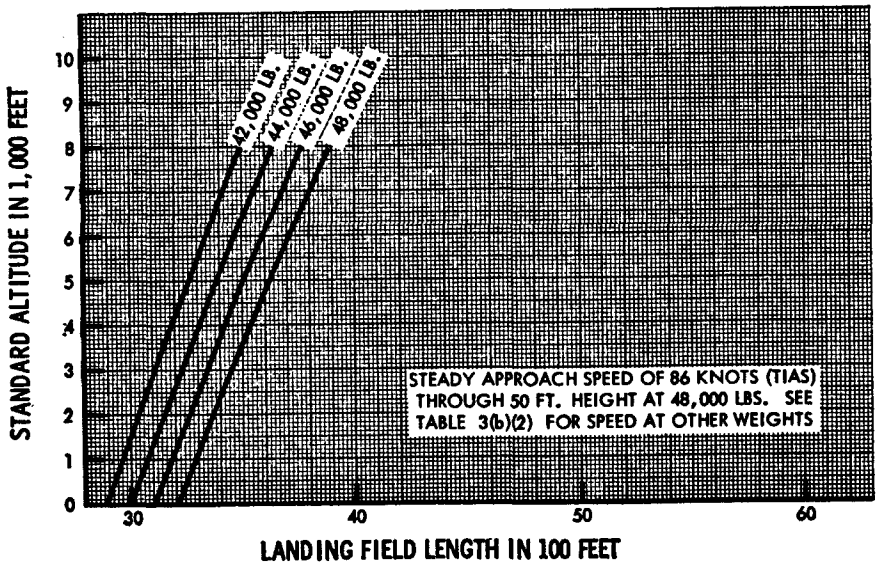


FIG. 3(b) (2)

CURTISS C-46 MODELS

CERTIFICATED FOR MAX. WEIGHT OF 45,000 LBS.

LANDING LIMITATIONS.
ZERO WIND AND ZERO GRADIENT

BASED ON ACTUAL LANDING LENGTH
WHEN EFFECTIVE LENGTH IS NOT
DETERMINED. (0.55 FACTOR)

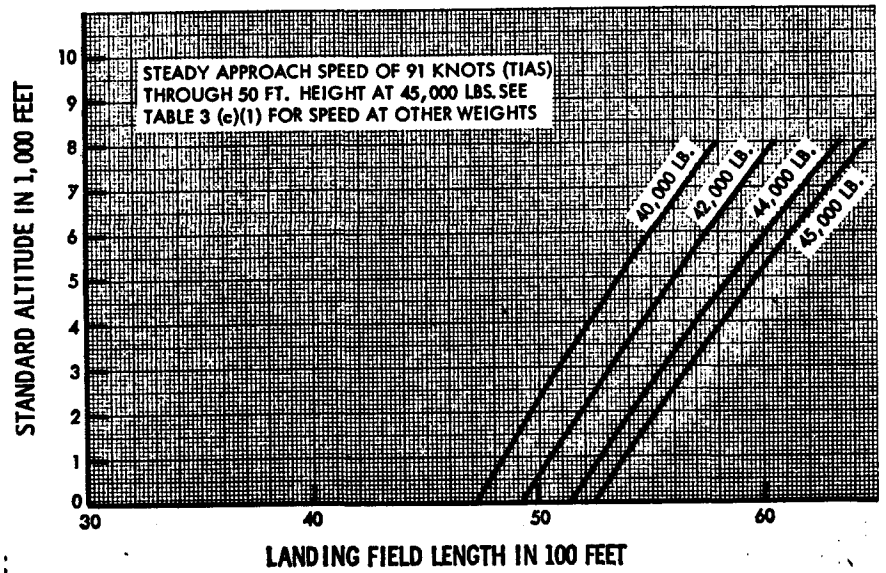


FIG. 3(c) (1)

CURTISS C-46 MODELS
CERTIFICATED FOR MAX. WEIGHT OF 48,000 LBS.

LANDING LIMITATIONS,
ZERO WIND AND ZERO GRADIENT

BASED ON ACTUAL LANDING LENGTH
WHEN EFFECTIVE LENGTH IS NOT
DETERMINED. (0.55 FACTOR)

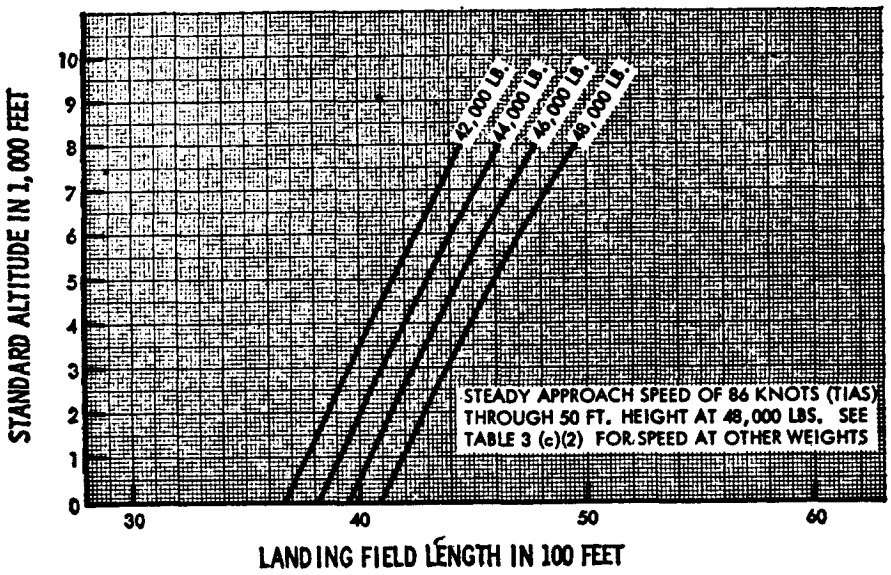


FIG. 3(c) (2)

PART 121—CERTIFICATION AND OPERATIONS: DOMESTIC, FLAG, AND SUPPLEMENTAL AIR CARRIERS AND COMMERCIAL OPERATORS OF LARGE AIRCRAFT

Appendix C—C–46 Nontransport Category Airplanes

Correction

In Appendix C of Part 121 of Title 14, appearing at page 258 of the issue for Saturday, January 9, 1965, the FAR number in the graph of Fig. 1(a)(1) should read "FAR 121.201" instead of "FAR 121.199". As corrected, Fig. 1(a)(1) reads as follows:

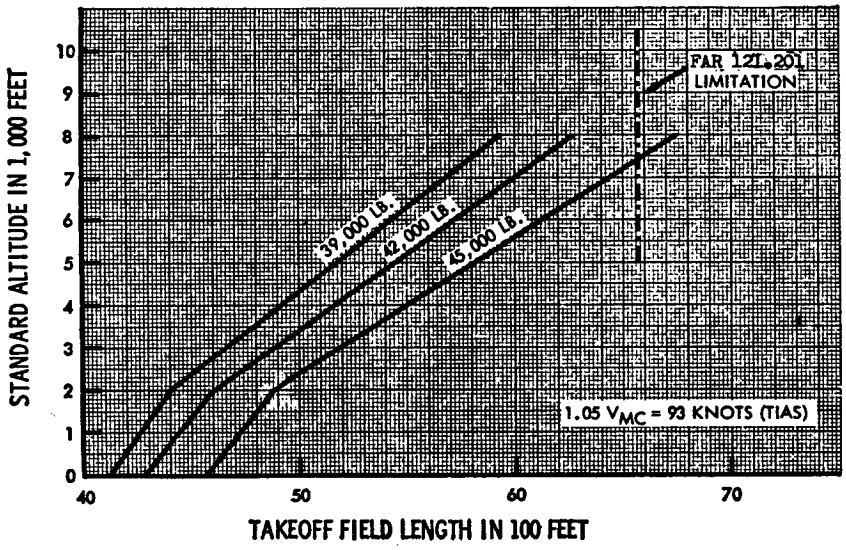
CURTISS C-46 MODELS

CERTIFICATED FOR MAX. WEIGHT OF 45,000 LBS.

TAKEOFF LIMITATION.
ZERO WIND AND ZERO GRADIENT.

BASED ON EFFECTIVE TAKEOFF LENGTH. (1.00 FACTOR)

FAR 121.199



REFERENCE TABLE 1(a) (1)

FIG. 1 (a)(1)