CAM-42 MAY 9 1962

CIVIL AERONAUTICS MANUALS—Volume VII

U. S. Department of Commerce — Civil Aeronautics Administration

Civil Aeronautics Manuals and supplements thereto are issued by the Office of Flight Operations and Airworthiness, Civil Aeronautics Administration, for the guidance of the public and are published in the Federal Register and the Code of Federal Regulations.

Supplement No. 2 — **June 15, 1957**

SUBJECT: Revisions to Civil Aeronautics Manual 42 dated August 1956.

This supplement is being issued to (1) incorporate Civil Air Regulations, Part 42, and pretinent Special Civil Air Regulations into the manual; (2) make minor editorial corrections; (3) revise CAM material regarding emergency equipment; (4) delete section 42.60–3; and (5) add a new section regarding international air taxi operations.

Revised CAM material is indicated by black brackets.

Remove and destroy the following pages:	*Insert in lieu thereof the following pages:*
III through VIII	III through IX
1 through 14	1 through 14–11
23 and 24	23 through 24–3
27 through 38	27 through 38–8
83 through 88	83 through 99

Roy Keeley

ROY KEELEY,
Director, Office of Flight Operations and Airworthiness.

Attachments.

Introductory Note

[Civil Aeronautics Manual 42 contains in a consolidated form (1) Civil Air Regulations Part 42, Irregular Air Carrier and Off-Route Rules, adopted by the Civil Aeronautics Board, amendments 42–1 through 42–8, and applicable Special Civil Air Regulations to April 1, 1957; and (2) the rules, policies, and interpretations issued by the Administrator of Civil Aeronautics in application to the various sections of the regulations.]

CAA *rules* are supplementary regulations issued pursuant to authority expressly conferred on the Administrator in the Civil Air Regulations. Such rules are mandatory and must be complied with.

CAA *policies* provide detailed technical information on recommended methods of complying with the Civil Air Regulations. Such policies are for the guidance of the public and are not mandatory in nature.

CAA *interpretations* define or explain words and phrases of the Civil Air Regulations. Such interpretations are for the guidance of the public and will be followed by the Administration in determing compliance with the regulations.

[This manual is arranged to give the number, title, and text of each section of the regulations followed by any rules, policies, or interpretations applicable to that section. These rules, policies, or interpretations of the Administrator are identified by consecutive dash numbers appended to the regulation section number.]

This manual supersedes Civil Aeronautics Manual 42 dated August 1954 and all supplements issued thereto. Moreover, the contents of this manual supersede any contradictory material which may be found in any Aviation Safety Release or like publication outstanding on the issuance date of this manual.

This edition extends and brings up to date the text in the edition dated August 1954 by including all material which has been published in the Federal Register and is effective on [June 15, 1957.] New or revised material in this edition is indicated by black brackets.

(Rev. 6/15/57)

Contents

General

	Section	Page
Applicability of this part	**42.0**	1
Charter flights or other special services (*CAA policies which apply to sec. 42.0 (b)*)	42.01–1	1
Provisions of Part 42 which are applicable to air taxi operators (*CAA interpretations which apply to sec. 42.0 and [SR–395A)*]	42.0–2	2
Operations for which an Air Taxi Operator Certificate is not required (*CAA interpretations which apply to sec. 42.0 and [SR–395A)*]	42.0–3	2
Definitions	**42.1**	2
Flight time (*CAA interpretations which apply to sec. 42.1*	42.1–1	5
Twilight (*CAA interpretations which apply to sec. 42.1*	42.1–2	5
Deviation authority	**42.2**	5

Certificate Rules

Certificate issuance	**42.5**	5
Appropriate economic authority (*CAA interpretations which apply to sec. 42.5 (a)*)	42.5–1	6
Application for an Irregular Air Carrier Operating Certificate (*CAA rules which apply to sec. 42.5*)	42.5–2	6
Application for amendment (*CAA rules which apply to sec. 42.5*)	42.5–3	6
Application for overseas and international authorization (*CAA rules which apply to sec. 42.5*)	42.5–4	6
Application for an Air Taxi Operator Certificate (*CAA rules which apply to sec. 42.5 and [SR–395A)*]	42.5–5	7
Amendment and reissuance of Air Taxi Operator Certificates (*CAA rules which apply to sec. 42.5*)	42.5–6	7
Application for worldwide operation (*CAA policies which apply to sec. 42.5*)	42.5–7	7
[International air taxi operations (*CAA policies which apply to sec. 42.5 and SR–395A*)	42.5–8]	7
Duration and renewal	**42.6**	7
Display	**42.7**	7
Inspection	**42.8**	8
Operations base, maintenance base, and/or office	**42.9**	8
Notice (*CAA rules which apply to sec. 42.9*)	42.9–1	8

Aircraft Requirements

Aircraft required	**42.11**	8
Listing of aircraft (*CAA rules which apply to sec. 42.11*)	42.11–1	8
Listing of small aircraft (*CAA interpretations which apply to sec. 42.11*)	42.11–2	9
Fire prevention requirement	**42.12**	9
Engine rotation	**42.13**	9
Minimum performance requirements for all aircraft	**42.14**	9
Takeoff performance limitations for large aircraft (*CAA rules which apply to sec. 42.14*)	42.14–1	9
[Airplane certification] requirements for large airplanes used in passenger operations	**42.15**	9
Aircraft limitations for IFR and land aircraft overwater operations	**42.16**	9
En route performance limitations (*CAA policies which apply to sec. 42.16 (b)*)	42.16–1	10

Aircraft Equipment

	Section	Page
Basic required instruments and equipment for aircraft	**42.21**	10
Seats and safety belts (*CAA rules which apply to sec. 42.21 (a) (11)*)	42.21–1	11
Fire extinguisher (*CAA rules which apply to sec. 42.21 (a) (12)*)	42.21–2	11
Altimeter (*CAA policies which apply to sec. 42.21 (b) (1)*)	42.21–3	11
Warning lights for reversible propellers (*CAA policies which apply to sec. 42.21*)	42.21–4	12
Additional required instruments and equipment for large aircraft	**42.22**	12
Air-speed indicators, limitations, and related information for large aircraft	**42.22a**	12
Airspeed limitations and related information contained in the Airplane Flight Manual (*CAA policies which apply to sec. 42.22a (d)*)	42.22a–1	12
Radio communications system and navigational equipment for large aircraft	**42.23**	12
Approved types of radio equipment (*CAA interpretations which apply to sec. 42.23*)	42.23–1	13
Independent means (*CAA interpretations which apply to sec. 42.23*)	42.23–2	13
Installation and use of nonapproved radio communication equipment (*CAA policies which apply to sec. 42.23*)	42.23–3	13
[Emergency and safety] equipment	**42.24**	13
[First-aid and safety equipment (*CAA policies which apply to sec. 42.24*)	42.24–1]	13
[First-aid kits and emergency equipment	**42.24a**	13
[First-aid kits and emergency equipment (*CAA policies which apply to sec. 42.24a*)	42.24a–1	14
[Equipment for overwater operations	**42.24b**	14–1
[Survival kit for overwater operations (*CAA policies which apply to sec. 42.24b*)	42.24b–1	14–1
[Emergency evacuation equipment	**42.24c]**	14–2
Cockpit check list	**42.25**	14–2
Cockpit check list (*CAA policies which apply to sec. 42.25*)	42.25–1	14–2
Minimum standard cockpit check list (*CAA policies which apply to sec. 42.25*)	42.25–2	14–2
Supplemental oxygen	**42.26**	14–4
Supplemental oxygen for crew members (*CAA interpretations which apply to sec. 42.26 (a) (1)*)	42.26–1	14–5
Oxygen requirements for standby crew members (*CAA interpretations which apply to sec. 42.26 (a)*)	42.26–2	14–5
Operating instructions (*CAA polieies which apply to sec. 42.26*)	42.26–3	14–5
Oxygen requirements for jump-seat occupant (*CAA policies which apply to sec. 42.26*)	42.26–4	14–5
Oxygen requirements for infants-in-arms (*CAA policies which apply to sec. 42.26 (b)*)	42.26–5	14–5
Oxygen requirements for clinical purposes (*CAA policies which apply to sec. 42.26 (b)*)	42.26–6	14–5
Supplemental oxygen requirements for pressurized cabin airplanes	**42.27**	14–6
Computation of supply for crew members in pressurized cabin aircraft (*CAA policies which apply to sec. 42.27 (a)*)	42.27–1	14–6
Computation of supply for passengers in pressurized cabin aircraft (*CAA policies which apply to sec. 42.27 (b)*)	42.27–2	14–7
Oxygen requirements for clinical purposes (*CAA policies which apply to sec. 42.27 (b)*)	42.27–3	14–8
Oxygen requirements for infants-in-arms (*CAA policies which apply to sec. 42.26 (b)*)	42.27–4	14–8
Equipment standards	**42.28**	14–8
Protective breathing equipment for the flight crew	**42.29**	14–8
Protective breathing equipment and installation (*CAA policies which apply to sec. 42.29*)	42.29–1	14–8
Requirement of protective breathing equipment in nonpressurized cabin airplanes (*CAA rules which apply to sec. 42.29 (b)*)	42.29–2	14–9

Maintenance Requirements

	Section	Page
General	**42.30**	14–9
General (*CAA policies which apply to sec. 42.30*)	42.30–1	14–9
Inspection and maintenance	**42.31**	14–9
Inspection and maintenance—large aircraft (*CAA policies which apply to sec. 42.31 (a) (1)*)	42.31–1	14–10
Deleted	42.31–2	14–10
Deleted	42.31–3	14–10
Maintenance and inspection records (*CAA policies which apply to sec. 42.31 (b)*)	42.31–4	14–10
Additional maintenance requirements for large aircraft	**42.32**	14–10
Facilities for the proper inspection, maintenance, overhaul, and repair (*CAA policies which apply to sec. 42.32*)	42.32–1	14–11
Arrangements acceptable to the Administrator (*CAA policies which apply to sec. 42.32 (a)*)	42.32–2	14–11
Maintenance personnel (*CAA policies which apply to sec. 42.32 (b)*)	42.32–3	15
Reporting of mechanical irregularities in operation (*CAA policies which apply to sec. 42.32 (c)*)	42.32–4	15
Maintenance manual (*CAA rules which apply to sec. 42.32 (d) (1)*)	42.32–5	16
Copy of maintenance manual in aircraft (*CAA policies which apply to sec. 42.32 (d) (2)*)	42.32–6	23
Mandatory revisions (*CAA rules which apply to sec. 42.32 (d) (3)*)	42.32–7	23

Flight Crew Requirements

Airman requirements	**42.40**	23
Composition of flight crew	**42.41**	23
Pilot qualifications for small aircraft	**42.42**	23
Pilot qualifications for large aircraft	**42.43**	24
Recent flight experience requirements for flight crew members	**42.44**	24
Equipment check (*CAA policies which apply to sec. 42.44 (a) (2)*)	42.44–1	24–1
Instrument checks (*CAA policies which apply to sec. 42.44 (a) (3)*)	42.44–2	24–2
Aircraft used in instrument checks (*CAA policies which apply to sec. 42.44 (a) (3)*)	42.44–3	26
Use of flight simulator in instrument checks (*CAA policies which apply to sec. 42.44 (a) (3)*)	42.44–4	27
Persons from whom the equipment and instrument checks must be received (*CAA interpretations which apply to sec. 42.44*)	42.44–5	27
Flight engineer qualifications for duty (*CAA interpretations which apply to sec. 42.44*)	42.44–6	27
Proficiency of crew members serving on large aircraft	**42.45**	27
Training program (*CAA policies which apply to sec. 42.45*)	42.45–1	28
Logging flight time	**42.46**	28
Grace period of airman periodic checks	**42.47**	29
Flight time limitations for pilots on large aircraft	**42.48**	29
"Scheduled to fly," "scheduled to be aloft," and "scheduled for duty on the flight deck" (*CAA interpretations which apply to sec. 42.48*)	42.48–1	29
Scheduled type operations (*CAA policies which apply to sec. 42.48*)	42.48–2	29
[Assignment of emergency evacuation functions for each crew member	**42.49]**	30

Flight Operation Rules

Pilot responsibilities	**42.51**	30
Preflight responsibilities (*CAA interpretations which apply to sec. 42.51 (a) and (b)*)	42.51–1	30
Responsibilities of the pilot-in-command (*CAA policies which apply to sec. 42.51*)	42.51–2	31
Time of reporting for duty (*CAA policies which apply to sec. 42.51 (b)*)	42.51–3	31
Flight equipment (*CAA policies which apply to sec. 42.51 (c)*)	42.51–4	31
Serviceability of equipment (*CAA policies which apply to sec. 42.51 (e)*)	42.51–5	31

	Section	Page
Fuel supply	**42.52**	32
Operations in the Territory of Alaska (*CAA policies which apply to sec. 42.52 (a)*)	42.52–1	32
Operations in the Territory of Alaska (*CAA policies which apply to sec. 42.52 (b)*)	42.52–2	32
Minimum flight altitude rules	**42.53**	33
Flight into known icing conditions	**42.54**	33
Other parts of the aircraft (*CAA interpretations which apply to sec. 42.54*)	42.54–1	33
Weather minimums	**42.55**	33
Deleted	42.55–1	33
Air traffic clearance (*CAA interpretations which apply to sec. 42.55 (a)*)	42.55–2	33
IFR takeoff and landing minimums (*CAA policies which apply to sec. 42.55*)	42.55–3	34
Instrument approach	**42.56**	34
Standard instrument approach procedures (*CAA rules which apply to sec. 42.56*)	42.56–1	34
Takeoff and landing weather minimums (*CAA rules which apply to secs. 42.55 and 42.56*)	42.56–2	34
Airport lighting for night operations	**42.57**	34
Minimum facilities (*CAA policies which apply to sec. 42.57*)	42.57–1	34
Navigational aids for IFR flight	**42.58**	35
Off-airway instrument operation (*CAA rules which apply to sec. 42.58*)	42.58–1	35
Briefing of passenger	**42.59**	35
Placement of established procedures (*CAA policies which apply to sec. 42.59*)	42.59–1	35
Operations manual for large aircraft	**42.60**	35
Form of operations manual (*CAA rules which apply to sec. 42.60*)	42.60–1	36
Content of operations manual (*CAA rules which apply to sec. 42.60 (a)*)	42.60–2	36
[Deleted]	42.60–3	36
Copy of operations manual in aircraft (*CAA policies which apply to sec. 42.60 (b)*)	42.60–4	36
Preflight certification (*CAA rules which apply to sec. 42.60 (a) and (c)*)	42.60–5	36
Airplane flight manual	**42.60a**	36
Flight plan for large aircraft	**42.61**	37
IFR operation in control zone or control area (*CAA policies which apply to sec. 42.61*)	42.61–1	37
Flight manifest for large aircraft and passenger-carrying aircraft operating under IFR conditions	**42.62**	37
Content of flight manifest (*CAA policies which apply to sec. 42.62*)	42.62–1	37
Weight control system (*CAA interpretations which apply to sec. 42.62*)	42.62–2	37
Night VFR operations for large passenger-carrying aircraft; special rules	**42.63**	37

Operating Limitations For Large Passenger-Carrying Airplanes

Operating limitations for transport category airplanes	**42.70**	38
Deviations (*CAA rules which apply to sec. 42.70 (a)*)	42.70–1	38
Accuracy of data (*CAA policies which apply to sec. 42.70 (b)*)	42.70–2	38
Temperature accountability (*CAA policies which apply to sec. 42.70 (c)*)	42.70–3	38
Weight limitations	**42.71**	38–1
Weight limitations (*CAA policies which apply to sec. 42.71*)	42.71–1	38–1
Takeoff limitations to provide for engine failure	**42.72**	38–1
Takeoff limitations to provide for engine failure (*CAA policies which apply to sec. 42.72*)	42.72–1	38–2
En route limitations; all engines operating	**42.73**	38–5
En route limitations; one engine inoperative	**42.74**	38–5
En route limitations; two engines inoperative	**42.75**	38–6
En route limitations; where special air navigational facilities exist	**42.76**	38–6
En route limitations; where special air navigational facilities exist (*CAA policies which apply to sec. 42.76*)	42.76–1	38–6
Landing distance limitations; airport of destination	**42.77**	38–6
Landing distance limitations; airport of destination (*CAA policies which apply to sec. 42.77*)	42.77–1	38–7

	Section	Page
Landing distance limitations; alternate airports	**42.78**	38–7
Operating limitations for aircraft not certificated in the transport category	**42.80**	38–7
Performance data on Curtiss Model C46 aircraft certificated for maximum weight of 45,000 pounds to 48,000 pounds (*CAA rules which apply to sec. 42.80*)	42.80–1	38–8
Performance data on Douglas DC–3 aircraft (*CAA rules which apply to sec. 42.80*)	42.80–2	44
Performance data on Lockheed 18 G202A aircraft (*CAA rules which apply to sec. 42.80*)	42.80–3	49
Convair Model 28–5ACF and PBY–5A landplane aircraft (*CAA rules which apply to sec. 42.80*)	42.80–4	53
Performance data on Douglas B–18, RB–18A (R1820–53) aircraft (*CAA rules which apply to sec. 42.80*)	42.80–5	57
En route limitations on multiengine aircraft with maximum allowable takeoff weights below 12,500 pounds (*CAA rules which apply to sec. 42.80*)	42.80–6	61
Performance data on Boeing S–307 aircraft (*CAA rules which apply to sec. 42.80*)	42.80–7	73
Performance data—operations from sod runway surfaces (*CAA rules which apply to sec. 42.80*)	42.80–8	77
Takeoff limitations	**42.81**	83
En route limitations; one engine inoperative	**42.82**	83
Landing distance limitations; airport of destination	**42.83**	83

Required Records And Reports

Maintenance records	**42.91**	83
Content of maintenance records (*CAA policies which apply to sec. 42.91*)	42.91–1	84
Principal maintenance base (*CAA policies which apply to sec. 42.91*)	42.91–2	84
Retention of records (*CAA policies which apply to sec. 42.91*)	42.91–3	84
Airman records	**42.92**	84
Content of airman records (*CAA policies which apply to sec. 42.92*)	42.92–1	84
Availability of records (*CAA policies which apply to sec. 42.92*)	42.92–2	84
Retention of records (*CAA policies which apply to sec. 42.92*)	42.92–3	84
Emergency flight reports	**42.93**	85
Submission of emergency flight reports (*CAA policies which apply to sec. 42.93*)	42.93–1	85
Pilot's emergency deviation report	**42.94**	85
Submission of pilot's emergency deviation report (*CAA policies which apply to sec. 42.94*)	42.94–1	85
Flight manifest record	**42.95**	85
Reporting of malfunctioning and defects	**42.96**	85
Mechanical hazard and difficulty reports (*CAA rules which apply to sec. 42.96*)	42.96–1	85
Change in exclusive use of large aircraft	**42.97**	86

Appendices

APPENDIX A—Special Civil Air Regulations		87
APPENDIX B—Air Taxi Operators		97
Provisions of Part 42 which are applicable to air taxi operations (*CAA interpretations which apply to sec. 42.0 and [SR–395A)*]	42.0–2	97
Operations for which an Air Taxi Operator Certificate is not required (*CAA interpretations which apply to sec. 42.0 and [SR–395A)*]	42.0–3	98
Application for an Air Taxi Operator Certificate (*CAA rules which apply to sec. 42.5 and [SR–395A)*]	42.5–5	98
Amendment and reissuance of Air Taxi Operator Certificates (*CAA rules which apply to sec. 42.5)*	42.5–6	99
[International air taxi operations (*CAA policies which apply to sec. 42.5 and SR–395A*)	42.5–8]	99
Listing of small aircraft (*CAA interpretations which apply to sec. 42.11*)	42.11–2	99

Irregular Air Carrier and Off-Route Rules

General

42.0 *Applicability of this part.*

(a) The provisions of this part shall apply to irregular air carriers operating in interstate, overseas, or foreign air transportation, to Alaskan air carriers when authorized by the Administrator under the provisions of section 41.1 (a) of this subchapter, and to air carriers holding scheduled air carrier operating certificates when making charter trips or when performing other special services.

(b) An air carrier holding a scheduled air carrier operating certificate may elect to conduct charter flights or other special services, between points which it is authorized to serve under the terms of such certificate, under the provisions of Part 40 or 41 of this subchapter, as the case may be, and the scheduled air carrier operating certificate: *Provided,* That the certificate is amended to authorize such operation: *And provided further,* That charter or special services to other points shall be conducted under the provisions of this part, except that it shall not be necessary for the carrier to obtain an irregular air carrier operating certificate if its scheduled air carrier operating certificate is appropriately amended.

42.0–1 *Charter flights or other special services (CAA policies which apply to sec. 42.0 (b)).*

(a) *General.* The policies provided in this section will be applied by the Civil Aeronautics Administration in amending a scheduled air carrier operating certificate to authorize charter flights or other special services.

(b) *Authority.* Upon application, a scheduled air carrier electing under section 42.0 (b) to conduct charter trips or other special services pursuant to the provisions of its scheduled air carrier operating certificate, may have such certificate amended to authorize such operations.

(c) *Application for amendment.* Application for this amendment will consist of submission of form ACA–1014, Operations Specifications, available at the local district office.[1a] On the face (blank side) of the form, the air carrier will list all the operations for which authorization is desired, as outlined in paragraph (d) of this section. The air carrier will also complete the upper half of the back of the form, and submit the signed original and four copies to the local [inspector [1b]].

(d) *Operations specifications.* The amended scheduled air carrier operating certificate will include form ACA–1014, Operations Specifications, and an amendment to the scheduled air carrier operating certificate. The amendment will be issued by the CAA regional office having direct inspectional responsibility for the principal operations of the air carrier. The form ACA–1014 will be prepared by the applicant; and will be prefaced by the statement: "Charter Flights or Other Special Services are authorized in the following category and class aircraft under the conditions specified and within the areas of operation listed."; and will specify the category and class of aircraft authorized to be used (e. g., Airplane Multiengine Land); the flight conditions under which operations are authorized (e. g., VFR (Day), VFR (Night), IFR (Day), IFR (Night); whether the carriage of passengers, cargo, or both is authorized; and the areas of operation (e. g., continental United States, and specific United States territories or possessions and foreign countries or possessions).

(e) *Operation outside the United States, its territories or possessions.* When applying for an amendment to a scheduled air carrier operating certificate to include charter or other special services outside the United States, its territories or possessions, the following paragraph will also be included on the form ACA–1014:

When operating aircraft pursuant to the terms of this certificate and these operations

[1a "District office", unless otherwise specified means "Flight Operations and Airworthiness District Office."

[1b "Inspector", unless otherwise specified means "Flight Operations and Airworthiness Inspector."]

specifications over or within any foreign country, the air carrier shall comply with the provisions of the air traffic rules of such country, including any special air traffic rules applicable to air carriers, except where any rule prescribed in the Civil Air Regulations is more restrictive and may be followed without violating the rules of such country.

(f) *Area of operation.*

(1) The air carrier should specify in the space provided under the section of the operations specifications entitled "Area of Operation Authorized" the proposed areas of operation.

(2) If the air carrier is able to show to the satisfaction of the assigned [inspector] that it is able to conduct charter flights or special services on a worldwide basis, the following phraseology should be used in filling out the section of the operations specifications pertaining to area of operation:

> "The air carrier is authorized to conduct charter flights or other special services within the United States and between any point within the United States and any point outside thereof."

(3) If the air carrier does not desire to conduct charter operations to the extent indicated in subparagraph (2) of this paragraph, the specific areas to and from which charter operations are contemplated should be listed in the operations specifications. Such listing should show the particular countries or possessions of such countries instead of continental areas. Operations within the United States should be shown as "Continental United States". When a country or possession is comprised of a number of islands, the island group rather than the individual islands should be listed.

(g) *Flight operations and maintenance manuals.* Prior to the conduct of operations off route, the Flight Operations and Maintenance Manuals will be revised to incorporate additional instructions to flight and ground personnel for the operation, servicing and handling of the aircraft used in this type of service.

(h) *Scheduled air carriers holding irregular air carrier operating certificates.* A scheduled air carrier holding an irregular air carrier operating certificate may conduct charter flights or other special services both on route and off route under the provisions of such certificate and this part without amending its scheduled air carrier operating certificate in accordance with the above. However, if a scheduled air carrier, holding an irregular operating certificate elects to amend its scheduled operating certificate to include charter flights or other special services, the irregular operating certificate will be surrendered to the Civil Aeronautics Administration for cancellation at the time the amendment to the scheduled operating certificate becomes effective.

(Published in 15 F. R. 3150, May 24, 1950, effective upon publication in the Federal Register; amended in 18 F. R. 1719, Mar. 27, 1953, effective Apr. 15, 1953; further amended in 21 F. R. 1697, Mar. 17, 1956, effective May 17, 1956; amended effective June 15, 1957.)

42.0–2 *Provisions of Part 42 which are applicable to air taxi operators (CAA interpretations which apply to sec. 42.0 and [SR–395A).]* See appendix B.

(Published in 19 F. R. 1601, Mar. 25, 1954, effective Apr. 1, 1954; amended effective June 15, 1957.)

42.0–3 *Operations for which an Air Taxi Operator Certificate is not required (CAA interpretations which apply to sec. 42.0 and [SR–395A).]* See appendix B.

(Published in 19 F. R. 1601, Mar. 25, 1954, effective Apr. 1, 1954; amended effective June 15, 1957.)

42.1 *Definitions.* As used in this part the words listed below shall be defined as follows:

***Accelerate-stop distance.* Accelerate-stop distance is the distance required to reach the critical point of takeoff and, assuming failure of the critical engine at that point, to bring the airplane to a stop using approved braking means. (See the airworthiness requirements under which the airplane was type certificated for the manner in which such distance is determined.)**

***Air carrier.* Air carrier means any citizen of the United States who undertakes directly the carriage by aircraft of persons or property as a common carrier for compensation or hire, whether such carriage is wholly by aircraft or partly by aircraft and partly by other forms of transportation between any of the following places: A place in any State of the United States, or the District of Columbia, and a place in any other State of the United States, or the District of Columbia; places in the same State**

of the United States through the airspace over any place outside thereof; places in the same Territory or possession of the United States, or the District of Columbia; a place in any State of the United States, or the District of Columbia, and any place in a Territory or possession of the United States, and a place in any other Territory or possession of the United States; a place in the United States and any place outside thereof; or the carriage of mail by aircraft.

Alaskan air carrier. Alaskan air carrier includes any air carrier subject to the provisions of Part 292 [1] of this chapter as heretofore or hereafter amended.

[1] Part 292 currently provides that Alaskan air carriers shall include certificated and noncertificated air carriers engaging solely in air transportation within the Territory of Alaska.

Alternate airport. An alternate airport is one listed in the flight plan as a point to which a flight may be directed if, subsequent to departure, a landing at the point of intended destination becomes inadvisable.

Approach or takeoff area. The approach or takeoff area shall be an area symmetrical about a line coinciding with and prolonging the center line of the runway, or the most probable landing or takeoff path for instrument approaches where there is a multiplicity of parallel runways, or a large hard-surfaced area continuously available for landing or takeoff. This area shall be assumed to extend longitudinally in a straight line from the intersection of the obstruction clearance line with the runway to the most remote obstacle touched by the obstruction clearance line and in no case less than 1,500 feet. Thence, it shall be assumed to continue in a path consistent with the instrument approach or takeoff procedures for the runway in question or, where such procedures are not specified, consistent with turns of at least 4,000 feet in radius. It shall be further assumed to extend laterally at the point of intersection of the obstruction clearance line with the runway 200 feet on each side of such center line. This distance shall increase uniformly to 500 feet on each side of such center line at a longitudinal distance of 1,500 feet from such point of intersection. Thereafter, this distance shall be assumed to be 500 feet on each side of such center line.

Approved. Approved, when used either alone or as modifying other words such as "means," "method" "action," etc., shall mean approved by the Administrator.

Check pilot. Check pilot is a pilot authorized by the Administrator to check pilots of the air carrier for such items as familiarity with en route procedures and piloting technique.

Crew member. Crew member means any individual assigned by the air carrier for the performance of duty on the aircraft in flight.

Critical engine. The critical engine is the engine the failure of which gives the most adverse effect on the performance characteristics of the aircraft. (See the airworthiness requirements under which the airplane was type certificated for the manner in which such engine is determined.)

Critical-engine-failure speed. The critical-engine-failure speed is a true indicated air speed, selected by the aircraft manufacturer, at which the takeoff may be safely continued even though the critical engine becomes suddenly inoperative. (See the airworthiness requirements under which the airplane was type certificated for the manner in which such speed is determined.)

Critical point of takeoff. The critical point of takeoff is that point beyond which the aircraft cannot be brought to a safe stop in the event of failure of the critical engine. (See the airworthiness requirements under which the airplane was type certificated for the manner in which such point is determined.)

Effective length of runway. The effective length of runway is the distance from the point where the obstruction clearance line intersects the runway to the far end thereof.

Exclusive use of aircraft. Exclusive use of an aircraft means that an air carrier has the sole possession, control, and use of an aircraft for flight arising from either (i) a lease or other agreement or arrangement under which the air carrier is to have the right to such possession, control, and use for a period of at least six consecutive months from the date of such lease or other agreement or arrangement,[2] or (ii) ownership of the aircraft.

[2] Attention is invited to the provisions of sec. 408 of the Civil Aeronautics Act of 1938, as amended (52 Stat. 1001, 49 U. S. C. 488) which, in certain cases, regulates sales, leases of, or contracts for use of aircraft between air carriers, or other persons engaged in any phase of

aeronautics, and which may require that prior Board approval of such arrangements be obtained. Attention is further invited to the fact that aircraft leased from United States Government agencies may not ordinarily be subleased without prior approval of the lessor.

Extended overwater operation. An extended overwater operation shall be considered an operation over water conducted at a distance in excess of 50 miles from the nearest shore line.

Flight crew member. Flight crew member means a pilot, flight radio operator, flight engineer, or flight navigator assigned to flight duty on the aircraft.

Flight time. Flight time shall mean the total time from the moment the aircraft first moves under its own power for the purpose of flight until the moment it comes to rest at the end of the flight.

IFR. The symbol used to designate instrument flight rules.

Irregular air carrier. Irregular air carrier includes any air carrier subject to the provisions of Part 291 of this chapter as heretofore or hereafter amended.

Large aircraft. Aircraft of 12,500 pounds or more maximum certificated takeoff weight shall be considered large aircraft.

Maximum certificated takeoff weight. Maximum certificated takeoff weight shall mean the maximum takeoff weight authorized by the terms of the aircraft airworthiness certificate.[3]

[3] Note that the aircraft airworthiness certificate incorporates as a part thereof an airplane operating record or an airplane flight manual which contains the pertinent limitation.

Minimum control speed. The minimum control speed is the minimum speed at which the airplane can be maintained in straight flight after an engine suddenly becomes inoperative. (See the airworthiness requirements under which the airplane was type certificated for the manner in which such speed is determined.)

Night. Night is the time between the ending of evening twilight and the beginning of morning twilight as published in the Nautical Almanac converted to local time for the locality concerned.[4]

[4] The Nautical Almanac containing the ending of evening twilight and the beginning of morning twilight tables may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Information is also available concerning such tables in the offices of the Civil Aeronautics Administration or the United States Weather Bureau.

Obstruction clearance line. The obstruction clearance line is a line drawn tangent to or clearing all obstructions showing in a profile of the approach or takeoff area which has a slope to the horizontal of 1/20.

Passenger-carrying aircraft. An aircraft carrying any individual other than a flight crew or crew member, company employee, or an authorized Government representative shall be considered a passenger-carrying aircraft.

Pilot compartment. Pilot compartment means that part of the aircraft designed for the use of the flight crew.

Pilot in command. Pilot in command shall mean the pilot responsible for the operation and safety of the aircraft during the time defined as flight time.

Point-of-no-return. Point-of-no-return means the point beyond which the aircraft no longer has sufficient fuel, under existing conditions, to return to the point of departure or any alternate for that point.

Power-off stall speed. The power-off stall speed is the minimum steady flight speed at which the airplane with engines idling is controllable in the landing configuration. (See the airworthiness requirements under which the airplane was type certificated for the manner in which such speed is determined.)

Rating. Rating is an authorization issued with a certificate, and forming a part thereof, stating special conditions, provileges, or limitations pertaining to such certificate.

Runway. A runway is a hard-surfaced area normally used for the landing or takeoff of airplanes. An unpaved area at the end of a paved area may be considered as part of a runway if it is smooth and firm enough to permit an airplane to traverse it safely.

Second pilot. Second pilot shall include any pilot other than the pilot in command assigned as a member of the flight crew.

Small aircraft. Aircraft of less than 12,500 pounds maximum certificated takeoff weight shall be considered small aircraft.

Transport category aircraft. Transport category aircraft are aircraft which have been certificated in accordance with the requirements of Part 4b of this subchapter, or under the transport category performance requirements of Part 4a of this subchapter.

Type. **Type shall mean all aircraft of the same basic design, including all modifications thereto except those modifications which result in a change in handling or flight characteristics.**

VFR. **The symbol used to designate visual flight rules.**

V_{so}. V_{so} means the power-off true-indicated stalling speed of an aircraft. (See the airworthiness requirements under which the airplane was type certificated for the manner in which V_{so} is determined.)

42.1–1 *Flight time (CAA interpretations which apply to [sec. 42.1).]* This is construed to mean from "block to block."

(Published in 14 F. R. 7032, Nov. 22, 1949, effective upon publication; amended effective June 15, 1957.)

42.1–2 *Twilight (CAA interpretations which apply to [sec. 42.1).]* The twilight referred to in this section is deemed to mean civil twilight. "The duration of civil twilight is the interval in the evening from sunset until the time when the center of the sun is 6 degrees below the horizon; or the corresponding interval in the morning between sunrise and the time at which the sun was still 6 degrees below the horizon." [16]

(Published in 14 F. R. 7032, Nov. 22, 1949, effective upon publication; amended effective June 15, 1957.)

42.2 ***Deviation authority.***

(a) Contrary provisions of this part notwithstanding,

(1) The Administrator may, upon application by an appropriately certificated air carrier conducting, or intending to conduct, operations pursuant to a contract with the military services (primary contractor), or an appropriately certificated air carrier conducting operations for the military services pursuant to a subcontract with a primary contractor, authorize such air carrier to deviate from the applicable provisions of this part, subject to any terms and conditions that the Administrator shall find are necessary in the interest of safety: *Provided,* That the Department of Defense certifies to the Administrator that the subject operation is essential to the national defense and requires the requested deviation: *And provided further,* That the granting of a deviation shall not be based upon an economic advantage or convenience to either the air carrier or the government, or both.

(2) The Administrator may, upon application by an appropriately certificated air carrier, authorize an air carrier proposing to conduct operations under conditions of an emergency necessitating the transportation of persons or supplies for the protection of life or property, to deviate from any provision of this part to the extent that the Administrator finds that a deviation from this part is necessary for the expeditious conduct of such operations.

(b) Any deviation authority granted by the Administrator pursuant to this section shall be limited to those military contract operations certified by the Department of Defense as essential to the national defense, or operations conducted under conditions of an emergency as determined by the Administrator and shall not be applicable to any other type of operation.

(c) The Administrator shall, in any authorization granted pursuant to this section, specify the terms, conditions, and limitations of the authorization for the deviation and each air carrier shall, in the conduct of these operations, comply with such terms, conditions, and limitations.

(d) Grants of deviation authority issued pursuant to this section shall be subject to review by the Board and may be terminated at any time by the Board or the Administrator. The Administrator shall give prompt notice to the Board of any deviation authority issued hereunder.

(e) Authorized deviations now in existence shall be continued in effect in accordance with their terms and conditions until 90 days after the effective date of this amendment, or upon their stated expiration date, whichever shall first occur, unless reissued pursuant to this section.

Certificate Rules

42.5 ***Certificate issuance.***

(a) *General.* An air carrier operating certificate, describing the operations authorized and

[16] Supplement to the American Ephemeris, 1946—Tables of Sunrise, Sunset, and Twilight, issued by the Nautical Almanac Office, United States Naval Observatory. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

prescribing such operating specifications and limitations as may be reasonably required in the interest of safety, shall be issued by the Administrator to a properly qualified citizen of the United States possessing appropriate economic authority granted by the Board pursuant to Title IV of the Civil Aeronautics Act of 1938, as amended, who is capable of conducting the proposed operations in accordance with the applicable requirements hereinafter specified. Application for a certificate, or application for amendment thereof, shall be made in a manner and contain information prescribed by the Administrator. No person subject to the provisions of this part shall operate in air transportation without, or in violation of the terms of, an air carrier operating certificate.

(b) ***Exceptions.*** **Whenever upon investigation the Administrator finds that the general standards of safety required for air carrier operations require or permit a deviation from any specific requirement of this part, he may issue an air carrier operating certificate or amendment providing for such deviation. The Administrator shall promptly notify the Board of any deviation included in the air carrier operating certificate and the reasons therefor.**

42.5–1 *Appropriate economic authority (CAA interpretations which apply to sec. 42.5 (a)).* The term "appropriate economic authority" as used in section 42.5 (a) means economic authority from the Board to engage in the air carrier operations for which the air carrier operating certificate is issued.

(Published in 18 F. R. 1719, Mar. 27, 1953, effective Apr. 15, 1953.)

42.5–2 *Application for an Irregular Air Carrier Operating Certificate (CAA rules which apply to sec. 42.5).*

(a) Application for an irregular air carrier operating certificate will be made in triplicate on form ACA–1602, provided for this purpose by the Administrator. The application form may be obtained by contacting the local [inspector]. When the requirements, as prescribed in this part, have been met, the applicant should present his application to the local [inspector] and arrange for inspection of his flight equipment and all ground facilities.

(b) Where inspection of the applicant indicates that he is capable of conducting the proposed operation in accordance with applicable requirements, an irregular air carrier operating certificate will be issued, together with operations specifications, which become a part thereof, and will specify the carriage of passengers, cargo, or both; the category and class of aircraft (e. g. airplane single engine land); and the flight conditions under which operations are authorized (e. g. VFR (Day), VFR (Night), IFR (Day), IFR (Night)).

(Published in 14 F. R. 7032, Nov. 22, 1949, effective Nov. 22, 1949; amended effective June 15, 1957.)

42.5–3 *Application for amendment (CAA rules which apply to sec. 42.5).* Application for amendment of existing operations authorizations listed in the Operations Specifications shall be made on form ACA–1014, Operations Specifications, available at the local district office. On the face (blank side) of the form, the air carrier should list all the operations for which authorization is desired; i. e., show operations for which approval is requested and omit the operations no longer desired or for which he is no longer qualified. The air carrier should also complete the upper half of the back of the form and submit the signed original and four copies to the local [inspector.]

(Published in 14 F. R. 7033, Nov. 22, 1949, effective Nov. 22, 1949; amended effective June 15, 1957.)

42.5–4 *Application for overseas and international authorization (CAA rules which apply to sec. 42.5).* Application for overseas and international authorization shall be made to the local [inspector] in the following manner:

(a) An applicant desiring to engage in overseas and international air transportation shall so indicate in the space provided on form ACA–1602.

(b) The following information must be attached to the application:

(1) List of foreign areas for which operations specifications are desired.

(2) Points between which operations are contemplated.

(3) Type of activity; e. g., cargo, passengers, or a combination of both, etc.

(4) Statement to the effect that diplomatic clearances have been or will be obtained prior to departure either directly or through State Department channels for entry into, or flight

over, all of the foreign countries involved. (Indicate which and duration.)

(5) Arrangements which the company has completed or contemplates for the servicing and maintenance of aircraft and equipment abroad.

(6) An outline of the method by which control will be exercised by company headquarters over operations outside the continental limits of the United States or its territories. (In lieu thereof, when a single aircraft and individual are involved, appropriate addresses in foreign countries through which the operator may be reached by normal communication channels.)

(c) An irregular air carrier possessing an irregular air carrier operating certificate, who desires to amend such certificate to include overseas and international operations authorization, shall make application on form ACA–1014 and submit it to the local [inspector], together with the information required by paragraph (b) of this section.

(d) Any operator or pilot contemplating foreign flight should be well-acquainted with the airports of entry, fields to be visited, navigational facilities available, air laws, public health, customs, and any other requirements established by the country or countries into which operations are to be conducted.[2]

(Published in 14 F. R. 7033, Nov. 22, 1949, effective Nov. 22, 1949; amended effective June 15, 1957.)

42.5–5 *Application for an Air Taxi Operator Certificate (CAA rules which apply to sec. 42.5 and [SR–395A)]*. See appendix B.

(Published in 19 F. R. 1602, Mar. 25, 1954, effective Apr. 1, 1954; amended effective June 15, 1957.

42.5–6 *Amendment and resissuance of Air Taxi Operator Certificates (CAA rules which apply to sec. 42.5)*. See appendix B.

(Published in 19 F. R. 1602, Mar. 25, 1954, effective Apr. 1, 1954.)

42.5–7 *Application for worldwide operation (CAA policies which apply to sec. 42.5)*. If the air carrier is able to show to the satisfaction of the assigned [inspector] that it is able to conduct operations on a worldwide basis, the following phraseology should be used by the air carrier in filling out the section of the operations specifications pertaining to area of operation:

> "The air carrier is authorized to conduct operations between any point within the United States and any point outside thereof."

If the air carrier does not desire to conduct operations on a worldwide basis or the assigned [inspector] finds that it is not able to do so, the specific areas to and from which operations are authorized should be listed in the operations specifications. Such listing should show the particular countries or possessions of such countries instead of continental areas. When a country or possession is comprised of a number of islands, the island group rather than the individual should be listed.

(Published in 21 F. R. 2586, Apr. 20, 1956, effective May 15, 1956; amended effective June 15, 1957.)

[42.5–8 *International air taxi operations (CAA policies which apply to sec. 42.5 and SR–395A)*. See appendix B.]

(Published in 22 F. R., effective June 15, 1957.)

42.6 *Duration and renewal.*

(a) An air carrier operating certificate issued under this part, shall expire one year from date of issuance thereof, unless such certificate is renewed by the Administrator or such certificate has been sooner surrendered, suspended, or revoked.

(b) The Administrator shall renew an air carrier operating certificate if, upon inspection and examination, he finds that the air carrier meets the current requirements of the regulations in this subchapter for issuance of any such certificate. Evidence of renewal of air carrier operating certificates issued subsequent to July 1, 1950, shall be made a part of the air carrier operating certificate in such form and manner as the Administrator may prescribe.

(c) Application for renewal of an air carrier operating certificate shall be made no later than 60 days prior to the expiration thereof, and shall be made in the form and manner prescribed by the Administrator.

42.7 *Display.* The air carrier operating certificate shall be kept available at the carrier's principal operations office for inspection by

[2] This information is normally contained in the International Flight Information Manual obtainable from the [Printing Services Branch] CAA, Washington 25, D. C.

423764 O—57——2

any authorized representative of the Administrator or Board.

42.8 *Inspection.* Any authorized representative of the Administrator or the Board shall be permitted at any time and place to make inspections or examinations to determine the air carrier's compliance with the regulations in this subchapter.

42.9 *Operations base, maintenance base, and/or office.* Each irregular air carrier shall give written notice to the Administrator of his principal business office, his principal operations base, and principal maintenance base. Thereafter the air carrier shall not change his principal operations or maintenance base without having secured prior approval of the Administrator of the new base or bases, nor shall the air carrier change his principal business office without advance notice thereof to the Administrator.

42.9–1 *Notice (CAA rules which apply to sec. 42.9).* Three copies of each notice, in letter form, shall be delivered by the air carrier to the district office of the Civil Aeronautics Administration serving the air carrier's principal business office, operations base, or maintenance base, whichever is appropriate, in order to give notice to the Administrator.

(Published in 14 F. R. 7033, Nov. 22, 1949, effective upon publication.)

Aircraft Requirements

42.11 *Aircraft required.* An air carrier shall have the exclusive use of at least one aircraft. All aircraft used in the carriage of persons or property for compensation or hire shall be certificated in accordance with standard airworthiness requirements. No air carrier shall operate a large aircraft for the carriage of goods or persons for compensation or hire unless (a) the air carrier has the exclusive use of such aircraft, (b) the Administrator has found such aircraft safe for the service to be offered and has listed such aircraft in the air carrier operating certificate, and (c) such aircraft is not listed in the air carrier operating certificate or commercial operator certificate of any other air carrier or commercial operator.

42.11–1 *Listing of aircraft (CAA rules which apply to sec. 42.11).* When an air carrier utilizes large aircraft, they shall be listed in the Operations Specifications—Aircraft Identification, form ACA–1014. When an aircraft is no longer regularly used in the air carrier's operation, it must be deleted from the Operations Specifications—Aircraft Identification, form ACA–1014. Prior to listing any aircraft in the operations specifications, the following standards shall be met:

(a) The aircraft must be properly registered and there shall be conspicuously displayed in the aircraft a current Airworthiness Certificate accompanied by an appropriate Operations Record or Airplane Flight Manual.

(b) The basic empty weight of the aircraft shall be provided and procedures effected to include the aircraft in the air carrier's weight control system.

(c) Proper application covering the maintenance of all the pertinent components of the aircraft in the maintenance manual must be submitted.

(d) The aircraft shall have the required equipment installed and shall show compliance with other requirements of applicable regulations in this subchapter (i. e., the Civil Air Regulations), the Air Carrier Operating Certificate, and operational or route requirements. Required equipment shall include an adequate number of emergency exits for rapid evacuation in the event of an emergency or crash landing. The installation, operation, and marking of required emergency exits must comply with the pertinent airworthiness regulations. Emergency exits of passenger-carrying aircraft shall be clearly marked with luminous paint. Such markings are to be located either on or immediately adjacent to the pertinent exit and readily visible to passengers. Location and method of operation of the handles shall be marked with luminous paint. In those instances where aircraft are, on occasion, utilized in combination cargo/passenger operation, the aircraft shall be so loaded that emergency exits will be readily accessible in direct proportion to available passenger seats.

(e) The aircraft, its components and accessories shall be in such condition initially that application of the maintenance time

limitations listed in the maintenance manual covering overhaul and inspection periods will provide a continuous state of airworthiness.

(Published in 14 F. R. 7033, Nov. 22, 1949, effective upon publication; amended in 16 F. R. 926, Feb. 1, 1951, effective upon publication; amended in 18 F. R. 1719, Mar. 27, 1953, effective Apr. 15, 1953.)

42.11–2 *Listing of small aircraft (CAA interpretations which apply to sec. 42.11).* See appendix B.

(Published in 19 F. R. 1602, Mar. 25, 1954, effective Apr. 1, 1954.)

42.12 *Fire prevention requirements.* **All airplanes used in passenger service, powered by engines rated at more than 600 horsepower each for maximum continuous operation shall comply with the applicable fire prevention requirements of Part 4b of this subchapter in effect on or after November 1, 1946, except that fire detectors of the heat type shall be acceptable in lieu of smoke detectors for installation in Class "B" and "C" cargo compartments: *Provided,* That if the Administrator finds that in particular models of existing airplanes literal compliance with specific items of these requirements might be extremely difficult of accomplishment and that such compliance would not contribute materially to the objective sought, he may accept such measures of compliance as he finds will effectively accomplish the basic objectives of these regulations.**

42.13 *Engine rotation.* **Multiengine aircraft having any engine rated at more than 480 h. p. for maximum continuous operation shall be so equipped that the rotation of each such engine can be stopped promptly in flight, except that for turbine engine installations means for completely stopping the rotation need be provided only if the Administrator finds that rotation could jeopardize the safety of the aircraft.**

42.14 *Minimum performance requirements for all aircraft.* **Except as otherwise provided in this part, no air carrier shall use any aircraft unless it meets such operating limitations as the Administrator determines will provide a safe relation between the performance of the aircraft and the airports to be used and the areas to be traversed.**

42.14–1 *Takeoff performance limitations for large aircraft (CAA rules which apply to sec. 42.14).* Whenever large aircraft are utilized in cargo operation, the following takeoff performance limitations shall apply:

(a) Transport category airplanes shall be operated in compliance with the provisions of sections 42.70 (b), 42.71 (b), and 42.72.

(b) Nontransport category airplanes shall be operated in compliance with the provisions of section 42.81 and shall meet the en route one-engine inoperative climb requirement of section 42.82 at an altitude of 1,000 feet above the airport from which the takeoff is being made. The pertinent performance limitations data published under sections 42.80–1, 42.80–2, 42.80–3, 42.80–4, 42.80–5, 42.80–7 and 42.80–8 shall be used in determining compliance with section 42.81.

(Published in 18 F. R. 766, Feb. 6, 1953, effective Feb. 15, 1953.)

42.15 *Airplane certification requirements for large airplanes used in passenger operations.*

(a) *Airplanes certificated on or before June 30, 1942.* **Airplanes certificated as a basic type on or before June 30, 1942, shall either:**

(1) Retain their present airworthiness certification status and meet the requirements of section 42.80, or

(2) Comply with either the performance requirements of sections 4a.737–T through 4a.750–T of this subchapter or the performance requirements of sections 4b.110 through 4b.125 of this subchapter and in addition shall meet the requirements of sections 42.70 through 42.78: *Provided,* That should any type be so qualified all airplanes of any one operator of the same or related types shall be similarly qualified and operated.

(b) *Airplanes certificated after June 30, 1942.* **Airplanes certificated as a basic type after June 30, 1942, shall be certificated as transport category airplanes and shall meet the requirements of section 42.70.**

42.16 *Aircraft limitations for IFR and land aircraft overwater operations.* **When passengers are carried, no air carrier shall use any aircraft under IFR weather conditions or**

any land aircraft in overwater operations except as follows:

(a) *IFR operations.* Aircraft shall be multiengine with fully functioning dual controls and shall meet the appropriate en route operating limitations of section 42.74 or section 42.82.

(b) *Overwater operations.* Land aircraft shall be multiengine and shall meet the appropriate en route operating requirements of section 42.74 or section 42.82, unless the overwater operation consists only of takeoffs and landings or the aircraft is flown at such an altitude that it can reach land in the event of power failure.

42.16–1 *En route performance limitations (CAA policies which apply to sec. 42.16 (b)).* Performance data applicable to this section are published under section 42.80.

(Published in 15 F. R. 83, Jan. 10, 1950, effective Jan. 1, 1950; amended in 18 F. R. 1719, Mar. 27, 1953, effective Apr. 15, 1953.)

Aircraft Equipment

42.21 *Basic required instruments and equipment for aircraft.* The following instruments and equipment acceptable to the Administrator for the type of operations specified shall be installed and in serviceable condition in all aircraft, except that the Administrator may permit or require different instrumentation or equipment for turbine-powered aircraft to provide equivalent safety:

(a) *VFR (day).* For day VFR flight the following is required:

(1) Air-speed indicator,

(2) Altimeter,

(3) Magnetic direction indicator,

(4) Tachometer for each engine,

(5) Oil pressure gauge for each engine using pressure system,

(6) Coolant temperature gauge for each liquid-cooled engine,

(7) Oil temperature gauge for each air-cooled engine,

(8) Manifold pressure gauge or equivalent when required for the proper operation of the engine,

(9) Fuel gauge indicating the quantity of fuel in each tank,

(10) Position indicators for retractable landing gear and flaps: *Provided,* That the Administrator may approve operation of aircraft of less than 12,500 pounds maximum certificated takeoff weight without a position indicator for flaps in the event he finds that the position of the flaps is readily determinable either by direct visual inspection from the cockpit or by other adequate means,

(11) An approved seat and an approved safety belt for each occupant. In no case shall the rated strength of a safety belt be less than that corresponding with the ultimate load factors specified in the pertinent currently effective aircraft airworthiness parts of the regulations in this subchapter, taking due account of the dimensional characteristics of the safety belt installation for the specific seat or berth arrangement. The webbing of safety belts shall be subject to periodic replacement as prescribed by the Administrator,

(12) In passenger service, a minimum of two approved hand-type fire extinguishers, one of which is installed in the pilot compartment, the other accessible to the passengers and ground personnel, unless the aircraft is so designed that the fire extinguisher in the pilot compartment is directly available to passengers and ground personnel, in which case only one fire extinguisher is required; in cargo service, fire extinguisher or extinguishers adequate for the aircraft,

(13) Source of electrical energy sufficient to operate all radio and electrical equipment installed,

(14) One spare set of fuses or 3 spare fuses of each magnitude,

(15) Effective July 1, 1956, a means shall be provided for each reversible propeller on airplanes equipped with reversible propellers, which will indicate to the pilots when the propeller is in reverse pitch. Such means may be actuated at any point in the reversing cycle between the normal low pitch stop position and full reverse pitch. No indication shall be given at or above the normal low pitch stop position. The source of indication shall be actuated by the propeller blade angle or be directly responsive to the propeller blade angle,

(b) *VFR (night).* For night VFR flight the following is required:

(1) Instruments and equipment specified in paragraph (a) of this section,

(2) Carburetor temperature gauge,

(3) Carburetor heating or de-icing equipment for each engine,

(4) Set of approved forward and rear position lights,

(5) At least one landing light,

(6) Approved landing flares as follows, if the aircraft is operated beyond a 3-mile radius from the center of the airport of takeoff.

Maximum certificated takeoff weight of aircraft:		*Flares*
Less than 3,500 lbs	5	class–3, or 3 class–2.
3,500 lbs. to 5,000 lbs	4	class–2.
More than 5,000 lbs	2	class–1, or 3 class–2 and 1 class–1.

If desired, flare equipment specified for heavier aircraft may be used.

(7) Two-way radio communications system and navigational equipment appropriate to the ground facilities to be used,

(8) Generator of adequate capacity,

(9) One set of instrument lights.

(c) *IFR (day).* For day IFR fight the following is required:

(1) Instruments and equipment specified in paragraph (a) of this section,

(2) Two-way radio communications system and navigational equipment appropriate to the ground facilities to be used,

(3) Gyroscopic rate-of-turn indicator,

(4) Bank indicator,

(5) Rate-of-climb indicator,

(6) Artificial horizon indicator,

(7) Sensitive altimeter adjustable for changes in barometric pressure, in lieu of paragraph (a) (2) of this section,

(8) Clock with a sweep-second hand,

(9) One gryo direction indicator,

(10) Generator of adequate capacity,

(11) One outside air temperature gauge easily readable from the pilot's position,

(12) One carburetor temperature gauge or equivalent approved device,

(13) Power failure warning means or vacuum gauge on instrument panel connecting to lines leading to gyroscopic instruments,

(14) Carburetor heating or de-icing equipment for each engine,

(15) Heated pilot tube for each airspeed indicator,

(d) *IFR (night).* For night IFR flight the following is required:

(1) Instruments and equipment specified in paragraphs (a), (b), and (c) of this section: *Provided,* That when any requirements under paragraphs (a), (b), or (c) of this section are identical, such requirements need not be duplicated,

42.21–1 *Seats and safety belts (CAA rules which apply to sec. 42.21 (a) (11)).* The installation and use of an approved seat and approved individual seat belt for each person over 2 years of age is required. When a child under 2 years of age is held by an adult person, the safety belt shall be used only for the adult. In small aircraft, it will be permissible to carry persons in excess of the number specified in the pertinent aircraft specification; *Provided,* That the seat or seats occupied by such persons are adequate for side-by-side seating; and a safety belt is provided for each seat. Such belt shall not be used for more persons than the number for which it is approved. In any case, the maximum certificated takeoff weight, and allowable c. g. limits of the aircraft shall not be exceeded.

(Published in 14 F. R. 7034, Nov. 22, 1949, effective upon publication.)

42.21–2 *Fire extinguishers (CAA rules which apply to sec. 42.21 (a) (12)).*

(a) A portable fire extinguisher, which shall be of an approved type, shall have a minimum capacity, if carbon tetrachloride, of 1 quart, or, if carbon dioxide, of 2 pounds, or, if other, of equivalent effectiveness.

(b) On transport-type aircraft, fire extinguishers shall be installed so as to be accessible to the passengers and ground personnel. This may be done by securing the extinguisher near the main external cabin door. An extinguisher shall be readily available to the pilot and copilot.

(c) An approved type fire extinguisher is one that has been approved by the Underwriters Laboratories or by the Administrator.

(Published in 14 F. R. 7034, Nov. 22, 1949, effective upon publication.)

42.21–3 *Altimeter (CAA policies which apply to sec. 42.21 (b) (1)).* For VFR flight at night, the installation and use of a sensitive altimeter

adjustable for changes in barometric pressure is recommended.

(Published in 14 F. R. 7034, Nov. 22, 1949, effective upon publication.)

42.21–4 *Warning lights for reversible propellers (CAA policies which apply to sec. 42.21 (a) (15)).* In the interest of cockpit uniformity, when warning lights are used to indicate to the pilot that a reversible propeller is in reverse pitch, such warning lights should be amber in color.

(Published in 21 F. R. 4312, June, 20 1956, effective July 1, 1956.)

42.22 *Additional required instruments and equipment for large aircraft.* In addition to the basic instruments required by section 42.21, the following instruments and equipment for the type of operations specified shall be installed and in serviceable condition in large aircraft:

(a) *Day (VFR and IFR).* For flight during the day the following is required:

(1) Additional air-speed indicator,

(2) Additional sensitive altimeter,

(3) Alternate source of energy to supply gyroscopic instruments which shall be capable of carrying the required load. Engine-driven pumps, when used, shall be on separate engines and, in lieu of one such source of energy, an auxiliary power unit may be used. The installation shall be such that the failure of one source of energy will not interfere with the proper functioning of the instrument by means of the other source,

(4) In passenger service, in addition to fire-detecting and fire-extinguishing equipment necessitated as a result of compliance with section 42.12, such additional hand-type fire extinguishers as the Administrator finds necessary for compliance with section 42.21 (a) (12).

(b) *Night (VFR and IFR).* For flight during the night the following is required:

(1) Instruments and equipment specified in paragraph (a) of this section, and one additional landing light,

(2) After May 31, 1956, an approved anti-collision light; except that in the event of failure of such light, the aircraft may continue flight to the next stop where repairs or replacements can be made.

42.22a *Air-speed indicators, limitations, and related information for large aircraft.*

(a) Air-speed limitations and related information contained in the Airplane Flight Manual and pertinent placards shall be expressed in the same units as used on the air-speed indicator.

(b) When more than one air-speed indicator is required, all such indicators shall be calibrated to read in the same units.

(c) When an air-speed indicator is calibrated in statute miles per hour, a readily usable means shall be provided for the flight crew to convert statute miles per hour to knots.

(d) On and after April 1, 1956, all air-speed indicators shall be calibrated in knots, and all air-speed limitations and related information contained in the Airplane Flight Manual and pertinent placards shall be expressed in knots.

42.22a–1 *Airspeed limitations and related information contained in the Airplane Flight Manual (CAA policies which apply to sec. 42.22a (d)).* The airspeeds shown in the Performance Information Section only, of an Airplane Flight Manual approved prior to April 1, 1956, may continue to be expressed in statute miles per hour, provided that a table converting statute miles to knots is incorporated therein, and a cautionary note is placed on each page and chart where airspeeds are denoted indicating that the statute miles shown must be converted to knots when determining performance information. A similar note should be placed in the Operations Limitations Section, indicating that airspeeds shown in the Performance Information Section are in statute miles and must be converted to knots when determining performance information.

(Published in 21 F. R. 4312, June 20, 1956, effective July 1, 1956.)

42.23 *Radio communications system and navigational equipment for large aircraft.* In lieu of the radio communications system and navigational equipment specified in section 42.21 (b) (7) and (c) (2), the following shall be required in large aircraft for the type of operations specified. The radio equipment required under paragraphs (a) and (b) of this section shall be of approved types:

(a) For day VFR operations over routes on which navigation can be accomplished by visual reference to landmarks, each aircraft shall be equipped with such radio equipment as is necessary to accomplish the following:

(1) Transmit to at least one appropriate ground station from any point on the route and transmit to airport traffic control towers from a distance of not less than 25 miles.

(2) Receive communications at any point on the route.

(3) By either of two independent means, receive meteorological information at any point on the route and receive instructions from airport traffic control towers.

(b) For day VFR operations over routes on which navigation cannot be accomplished by visual reference to landmarks, for night VFR, or for IFR operations, each aircraft shall be equipped as specified in paragraph (a) of this section, and in addition shall be equipped with at least one marker beacon receiver and with such radio equipment as is necessary to receive satisfactorily, by either of two independent means, radio navigational signals from any other radio aid to navigation intended to be used. For operations outside the United States each aircraft operated for long distances over water or uninhabited terrain shall be equipped with two independent means of transmitting to at least one appropriate ground station from any point on the route.

(c) If appropriate, one of the means provided for compliance with paragraph (a) (3) of this section may be employed for compliance with paragraph (a) (2) of this section, and the means provided for compliance with the requirements of paragraph (b) of this section may be employed for compliance with paragraph (a) (1) and (3) of this section.

42.23–1 *Approved types of radio equipment (CAA interpretations which apply to sec. 42.23).* Radio equipment is of an approved type when it is approved in accordance with the terms of a CAA type certificate or a technical standard order issued by the Administrator.

(Published in 20 F. R. 3067, May 6, 1955, effective May 31, 1955.)

42.23–2 *Independent means (CAA interpretations which apply to sec. 42.23).* Radio systems are independent where each such system is separate and complete, and the function of any part or the whole of one system is not dependent on the continued functioning of any component of the other, and in event of failure in one system, the other system is capable of continued independent operation: *Provided,* That where rigidly supported non-wire antenna or other antenna installations of equivalent reliability are used, only one such antenna need be provided.

(Published in 20 F. R. 3067, May 6, 1955, effective May 31, 1955.)

42.23–3 *Installation and use of non-approved radio communication equipment (CAA policies which apply to sec. 42.23).* All radio communication and navigation equipment required for compliance with section 42.23 must be of approved types. However, additional non-approved radio communication equipment may be installed in aircraft for test and evaluation purposes or for the performance of a non-operational function. The non-approved equipment must be constructed and installed so that it will not interfere with the proper functioning of any approved operational equipment or create an unsafe condition aboard the aircraft.

(Published in 20 F. R. 3067–8, May 6, 1955, effective May 31, 1955.)

42.24 *Emergency and safety equipment.* After May 31, 1957, the equipment required in sections 42.24a, 42.24b, and 42.24c shall be approved.

[42.24–1 *First-aid and safety equipment (CAA policies which apply to sec. 42.24).* In order to retain CAA approval of first-aid kits, flotation equipment, and other emergency gear, after receiving initial approval by the Administrator, such equipment should be regularly inspected to insure that the condition and quantity continues to meet the standards of the original approval.]

(Published in 14 F. R. 7034, Nov. 22, 1949, effective upon publication; amended effective June 15, 1957.)

42.24a *First-aid kits and emergency equipment.* Each airplane shall be equipped

with a conveniently accessible first-aid kit adequate for the type of operation involved. Airplanes operated over routes requiring flights for long distances over uninhabited terrain must carry such additional emergency equipment as appropriate for the particular operation involved.

[42.24a–1 *First-aid kits and emergency equipment (CAA policies which apply to sec. 42.24a).* First-aid kits and emergency equipment which contain the materials and meet the standards prescribed below will be approved by the Administrator. To obtain approval to use first-aid kits not containing such materials or meeting such standards, application must be made through the local CAA inspector having certificate responsibility.]

[(a)] Each first-aid kit should be dust and moisture proof, should contain only materials which meet Federal Specifications GGK 391, as revised, and should include at least the following items or their equivalent:

[(1)] *No. 1 kit for aircraft of 1 to 5 persons capacity.*

Adhesive bandage compress, 1 inch (16 per unit)	1
Antiseptic swabs, 10 mm. (10 per unit)	1
Ammonia inhalants, 6 mm. (10 per unit)	1
Ammonia, aromatic spirits, 2 cc. with drinking cups (4 each per unit)	1
2-inch bandage compress (4 per unit)	1
4-inch bandage compress (1 per unit)	1
Triangular bandage compressed, 40-inch (1 per unit)	1
Burn compound, one-eighth oz. (6 per unit)	1
Tourniquet, forceps, and scissors (1 each per double unit container)	1

[(2)] *No. 2 kit for aircraft of 6 to 25 persons capacity.*[3]

Adhesive bandage compresses, 1-inch (16 per unit)	2
Antiseptic swabs, 10 mm. (10 per unit)	2
Ammonia inhalants, 6 mm. (10 per unit)	1
Ammonia, aromatic spirits, 2 cc. with drinking cups (4 each per unit)	2
2-inch bandage compresses (4 per unit)	2
4-inch bandage compresses (1 per unit)	2
Triangular bandage compressed, 40-inches (1 per unit)	1
Burn compound, one-eighth-ounce (6 per unit)	1
Tourniquet, forceps, and scissors (1 each per double unit container)	1
Eye dressing packet (3 each per unit) (ophthalmic ointment, one-eighth-ounce; eye pads; eye strips)	1

[(3)] *No. 3 kit for aircraft of more than 25 persons capacity.*

Adhesive bandage compresses, 1-inch (16 per unit)	4
Antiseptic swabs, 10 mm. (10 per unit)	2
Ammonia inhalants, 6 mm. (10 per unit)	2
Ammonia, aromatic spirits, 2 cc. with drinking cups (4 each per unit)	2
2-inch bandage compresses (4 per unit)	3
4-inch bandage compresses (1 per unit)	3
Triangular bandage compressed, 40-inches (1 per unit)	3
Burn compound, one-eighth-ounce (6 per unit)	2
Tourniquet, forceps, scissors (1 each per double unit container)	1
Eye dressing packet (3 each per unit) (ophthalmic ointment, one-eighth-ounce; eye pads; eye strips)	1

[(b)] *Emergency equipment for long-distance flights over uninhabited terrain.*] When the type of operation requires more than one class of equipment, it will not be necessary to carry more than one supply of items duplicated in another list.

[(1)] *Tropical land areas:*

1 machete.
1 axe.
1 mosquito headnet for each person.
1 bottle insect repellent for each person.
1 pint drinking water for each person.
1 bottle chlorine tablets for water purification.
1 waterproof box of matches.
1 magnetic compass.
1 bottle quinine tablets.
1 signaling mirror.
1 pyrotechnic pistol and 6 cartridges.

[3] Kit No. 2 in canvas may also be used on life rafts.

1 small bore rifle and cartridges.
1 hunting knife.
1 fishing kit.
1 snake-bite kit.
1 book on jungle survival.

[(2)] *Frigid land areas:*

1 machete.
1 axe.
1 blanket for each person.
2 pairs snowshoes.
1 pair sunglasses for each person.
1 book on Arctic survival.
1 waterproof box of matches.
1 magnetic compass.
1 bottle of chlorine tablets for water.
1 signaling mirror.
1 pyrotechnic pistol and 6 cartridges.
1 small bore rifle and cartridges.
1 hunting knife.
[2-day] supply emergency food ration for each person.
[1 mosquito headnet for each person.
[1 bottle insect repellent for each person.
[1 fishing kit.]

(Published in 17 F. R. 2748, Mar. 29, 1952, effective upon publication; amended in 18 F. R. 1719, Mar. 7, 1953, effective Apr. 15, 1953; amended effective June 15, 1957.)

42.24b *Equipment for overwater operations.*

(a) The following equipment shall be required for all extended overwater operations: *Provided,* That the Administrator, after appropriate investigation, may require the carriage of all of the prescribed equipment, or any item thereof, for any operation over water; or upon application of an air carrier, permit deviation from these requirements for a particular extended overwater operation:

(1) Life vest or other adequate individual flotation device for each occupant of the airplane:

(2) Life rafts sufficient in number and of such rated capacity and buoyancy as to accommodate all occupants of the airplane;

(3) Suitable pyrotechnic signaling devices; and

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

(b) All required life rafts, life vests, and signaling devices shall be easily accessible in the event of a ditching without appreciable time for preparatory procedures. After May 31, 1957, this equipment shall be installed in conspicuously marked approved locations.

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

[42.24b–1 *Survival kit for overwater operations (CAA policies which apply to sec. 42.24b).* Survival kits containing the materials listed below will be approved by the Administrator. To obtain approval to use survival kits which do not contain such materials, application must be made through the local CAA inspector having certificate responsibility.

[(a) *General.* When the type of operation requires more than one class of equipment, it will not be necessary to carry more than one supply of items duplicated in another list.]

1 canopy (for sail, sunshade, or for rain catcher).
1 liferaft repair kit.
1 bailing bucket.
1 signaling mirror.
1 police whistle.
1 raft knife.
1 CO_2 bottle for emergency inflation.
1 inflation pump.
2 oars.
1 75-foot retaining line.
1 magnetic compass.
1 pyrotechnic pistol and 6 cartridges.
[2-day] supply of emergency food ration for each person.
1 sea water desalting kit for each 2 persons the raft is authorized to carry, or 2 pints of water per person.
1 fishing kit.
[1 book on survival appropriate for area.]

(Published in 14 F. R. 7034, Nov. 22, 1949, effective upon publication; amended effective June 15, 1957.)

42.24c *Emergency evacuation equipment.*

(a) *Means for emergency evacuation.* **After May 31, 1957, on all passenger-carrying airplanes, at all emergency exits which are more than 6 feet from the ground with the airplane on the ground and with the landing gear extended, means shall be provided to assist the occupants in descending from the airplane. At floor level exits approved as emergency exits, such means shall be a chute or equivalent device suitable for the rapid evacuation of passengers. During flight time this means shall be in a position for ready use: *Provided,* That the requirements of this paragraph do not apply to emergency exists over the wing where the greatest distance from the lower sill of the exit to the wing surface does not exceed 36 inches.**

(b) *Interior emergency exit markings.*

(1) After May 31, 1957, all emergency exits of large aircraft, their means of access, and their means of opening shall be marked conspicuously. The identity and location of emergency exits shall 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 shall be marked on or adjacent to the emergency exit and shall be readable from a distance of 30 inches by a person with normal eyesight.

(2) After May 31, 1957, for night operations, a source or sources of light, with an energy supply independent of the main lighting system, shall be installed in large aircraft to illuminate all emergency exit markings. Such lights shall be designed to function automatically in a crash landing and to continue to function thereafter and shall also be operable manually, or shall be designed only for manual operation and also to continue to function following a crash landing. When such lights require manual operation to function, they shall be turned on prior to each night takeoff and landing.

42.25 *Cockpit check list.* The air carrier shall provide for each type of aircraft a cockpit check list adapted to each operation in which the aircraft is to be utilized. The check list shall be installed in a readily accessible location in the cockpit of each aircraft and shall be used by the flight crew.

42.25–1 *Cockpit checklist (CAA policies which apply to sec. 42.25).*

(a) The cockpit checklist shall be legible during hours of daylight and darkness under the light conditions of the cockpit.

(b) Checklists developed by the manufacturer, military services, or the operator will be considered satisfactory, providing the following steps are covered:

Prior to starting engines.
Prior to takeoff.
Cruising.
Prior to landing.
Powerplant emergencies.
After landing.
Stopping engines.

(c) It is recommended that in all multiengine equipment a one-engine inoperative checklist be available in cockpit for pilot reference after encountering difficulty which may cause one or more engines to become inoperative. It is further recommended that all aircraft having retractable gear and flaps also have checklists prepared for emergency use in event of failure.

(Published in 14 F. R. 7035, Nov. 22, 1949, effective upon publication.)

42.25–2 *Minimum standard cockpit checklist (CAA policies which apply to sec. 42.25).* The following checklist using general terms will be considered as the minimum standard check list for compliance with the foregoing requirements in irregular air carrier operations. Those items not applicable to the aircraft being operated may be deleted and the order of arrangement of the individual items is left to the air carrier. The checklist shall include all applicable items, but will not necessarily be limited thereto.

PRIOR TO STARTING ENGINE

Fuel system:
Quantity—checked.
Proper tank selection—checked.
Mixtures—as required.
Fuel booster pumps—as required.
Crossfeeds—as required.

Hydraulic system:[4]
Brakes—set.
Electrical system:
Battery switch—proper position.

PRIOR TO TAKEOFF

Weight and balance:
Pilot is aware of weight and takeoff limitations.
Fuel System:
Quantity—rechecked.
Proper tank selection—rechecked.
Mixtures—takeoff position.
Fuel booster pumps—as required.
Crossfeed—as required.
Hydraulic system:[4]
Hydraulic pressures and quantity—checked.
Brakes—checked.
Hydraulic selector valves—checked.
Anti-icing and de-icing equipment:[4]
Checked and set.
Electrical system:
Battery switch—proper position.
Invertors—as required.
Ignition—checked.
Generators—checked.
Radio—checked.
Powerplants and propellers:[4]
Propellers—checked and set in take-off position.
All engines—checked for proper functioning and required power.
Superchargers—checked and set in proper takeoff position.
Heaters:
Checked and set.
Instruments—engine:
Oil—quantity, temperature and pressure—normal for takeoff.
Fuel pressure—normal for takeoff.
Carburetor temperature—checked.
Cylinder head temperature—checked.
Instruments—flight:
Static and vacuum selectors—checked.
Directional gyro—set.
Altimeter—set.
Horizon—uncaged.
Turn and bank—checked.
Clock—set.
Pressurization:[4]
Checked.
Flaps:[4]
Wing flaps—takeoff position.
Cowl flaps—takeoff position.
Controls:[4]
Auto pilot—off.
Trim tabs—set for takeoff.
Gust locks—off.
Free and tested through full limit of travel.

PRIOR TO LANDING

Fuel system:[5]
Proper tank selection—checked.
Mixtures—landing position.
Fuel booster pumps—as required.
Cross feeds—as required.
Weight and balance:
Maximum landing gross weight—checked
Hydraulic system:[5]
Hydraulic pressure—checked.
Brakes—checked and off.
Hydraulic selector valves—checked.
Anti-icing and de-icing equipment:[5]
Checked.
Powerplants and propellers:[5]
Propellers—as required.
Superchargers—as required.
Manual reverse pitch actuator or indicator [5]—checked.
Heaters:[5]
Checked.
Instruments:
Static and vacuum selectors—checked.
Altimeter—set.
Directional gyro—set.
Pressurization:[5]
Checked.
Controls:
Autopilot—off.
Trim tabs—as desired.

[4] Items thus marked will be double checked, such as by challenge and response, or positively checked, such as by a mechanical method.

[5] Items thus marked will be checked by one pilot calling out the item to be checked and then performing the operation with the other pilot observing the action or making a momentary visual check after the operation is completed.

Landing gear:[4]
Down and locked—checked.

Flaps:[5]
Wing flaps—as desired.
Cowl flaps—as desired.

POWERPLANT EMERGENCIES

Fuel system:
Mixtures—idle cutoff on dead engine; required position on all others.
Fuel-selector valve: dead engine—off.
Fuel-booster pumps: dead engine—off.
Cross feeds—as required.
Throttle: dead engine—closed.

Hydraulic system:
Hydraulic selector valve—set on proper engine.
Hydraulic pressures—checked.
Brakes—checked.
Ignition: off—dead engine.
Generators: off—dead engine.

Powerplants and propellers:
Propellers: Low revolutions per minute and feathered on dead engine—set as required on all live engines.

Engines:
All live engines set for proper functioning and required power.
Superchargers—checked and set in proper position.

Heaters:
Checked and set in safe operation position.

Instruments:
Engine—oil temperature and pressure checked.
Engine—fuel supply and pressure checked.
Carburetor—temperature checked.
Cylinder head—temperature checked.

Flight instruments:
Checked and reset if necessary.

Pressurization:
Checked.

(Published in 14 F. R. 7035, Nov. 22, 1949, effective upon publication; amended in 17 F. R. 9132, Oct. 15, 1952, effective Oct. 31, 1952.)

[4] See footnote 4, page 14-3.

[5] Items thus marked will be checked by one pilot calling out the item to be checked and then performing the operation with the other pilot observing the action or making a momentary visual check after the operation is completed.

42.26 *Supplemental oxygen.* Except where supplemental oxygen is provided in accordance with the requirements of section 42.27, supplemental oxygen shall be furnished and used as set forth in paragraphs (a) and (b) of this section. The amount of supplemental oxygen required for a particular operation to comply with the rules in this part shall be determined on the basis of flight altitudes and flight duration consistent with the operating procedures established for each such operation and route. As used in the oxygen requirements hereinafter set forth, "altitude" shall mean the pressure altitude corresponding with the pressure in the cabin of the airplane, and "flight altitude" shall mean the altitude above sea level at which the airplane is operated.

(a) *Crew members.*

(1) At altitudes above 10,000 feet to and including 12,000 feet oxygen shall be provided for, and used by, each member of the flight crew on flight deck duty, and provided for all other crew members, during the portion of the flight in excess of 30 minutes within this range of altitudes.

(2) At altitudes above 12,000 feet oxygen shall be provided for, and used by, each member of the flight crew on flight deck duty, and provided for all other crew members, during the entire flight time at such altitudes.

(b) *Passengers.* Each air carrier shall provide a supply of oxygen for passenger safety as approved by the Administrator in accordance with the following standards:

(1) For flights of over 30-minute duration at altitudes above 8,000 feet to and including 14,000 feet, a supply of oxygen sufficient to furnish oxygen for 30 minutes to 10 percent of the number of passengers carried shall be required.

(2) For flights at altitudes above 14,000 feet to and including 15,000 feet, a supply of oxygen sufficient to provide oxygen for the duration of the flight at such altitudes for 30 percent of the number of passengers carried shall generally be considered adequate.

(3) For flights at altitudes above 15,000 feet, a supply of oxygen sufficient to provide oxygen for each passenger carried during the entire flight at such altitudes shall be required.

(Rev. 6/15/57)

42.26–1 *Supplemental oxygen for crew members (CAA interpretations which apply to sec. 42.26 (a) (1)).*

(a) The phrase, "during the portion of flight in excess of 30 minutes within this range of altitudes" applies to all crew members including the flight crew members on flight-deck duty. Thus, oxygen is required to be provided for, and used by, each member of the flight crew on flight-deck duty only during the portion of the flight in excess of 30 minutes within this range of altitudes.

(b) The words "and used by" mean continuous use of the oxygen by a crew member during the required periods, except when it is necessary for the crew member to remove the oxygen mask in connection with his regular duties.

(Published in 19 F. R. 549, Feb. 2, 1954, effective Feb. 15, 1954; amended in 21 F. R. 5437, July 20, 1956, effective July 31, 1956.)

42.26–2 *Oxygen requirements for standby crew members (CAA interpretations which apply to sec. 42.26 (a)).* Standby crew members who are on call or are definitely going to have flight-deck duty prior to the completion of a flight must be provided with the same amount of supplemental oxygen as that provided for crew members on duty other than on flight-deck duty. However, if the standby crew members are not on call and will not be on flight-deck duty during the remainder of the flight, they must be considered as passengers with regard to supplemental oxygen.

(Published in 19 F. R. 549, Feb. 2, 1954, effective Feb. 15, 1954.)

42.26–3 *Operating instructions (CAA policies which apply to sec. 42.26).* Operating instructions appropriate to the type of system and masks installed should be provided for the flight crew in the appropriate air carrier manual. These operating instructions should contain a graph or a table which will show the duration of the oxygen supply for the various bottle pressures and pressure altitudes.

(Published in 19 F. R. 549, Feb. 2, 1954, effective Feb. 15, 1954.)

42.26–4 *Oxygen requirements for jump-seat occupant (CAA policies which apply to sec. 42.26).* When the jump seat is occupied by a check pilot, a crew member, or a flight crew member, as defined by section 42.1 (a) (7), (8), and (13) respectively, oxygen should be provided in accordance with the requirements of section 42.26. The provision of oxygen at the jump seat location may be accomplished either by a portable oxygen unit or an outlet in a fixed system.

(Published in 19 F. R. 549, Feb. 2, 1954, effective Feb. 15, 1954.)

42.26–5 *Oxygen requirements for infants in arms (CAA policies which apply to sec. 42.26 (b)).* Provisions should be made for administering oxygen to infants in arms and additional oxygen should be carried whenever an unusually large number of infants is carried. This additional oxygen is needed only when there is a passenger or infant for each seat position and the number of infants not provided for exceeds 50 percent of the seat positions. Acceptable methods of administering the oxygen to infants and now used by many operators are: (1) a disposable plastic mask which can be fitted to the face; (2) an infant size BLB oro-nasal mask and (3) semirigid paper cups, specifically reserved for the purpose, which can be fitted over the infant's nose and mouth, with a hole punched through the bottom through which an oxygen tube or a Y-connector can be inserted. Any other acceptable method may also be used.

(Published in 19 F. R. 549, Feb. 2, 1954, effective Feb. 15, 1954.)

42.26–6 *Oxygen requirements for clinical purposes (CAA policies which apply to sec. 42.26 (b)).* The regulations do not require that oxygen be provided for clinical purposes; hence, if the air carrier believes that such oxygen is to be desired, he should provide oxygen for this purpose. It is suggested that portable units of any size the air carrier desires be used for this purpose in order that the minimum supply required for supplementary breathing purposes will be preserved. If, however, the operator wishes to use a common source of supply for the oxygen required by the regulations and for clinical purposes, he may do so if he provides an amount of oxygen sufficiently greater than that required by the regulations.

A quantity of 300 liters STPD would probably be considered as satisfying reasonable needs.

(Published in 19 F. R. 549, Feb. 2, 1954, effective Feb. 15, 1954.)

42.27 *Supplemental oxygen requirements for pressurized cabin airplanes.* When operating pressurized cabin airplanes, the air carrier shall so equip such airplanes as to permit compliance with the following requirements in the event of cabin pressurization failure.

(a) *For crew members.* When operating such airplanes at flight altitudes above 10,000 feet, the air carrier shall provide sufficient oxygen for all crew members for the duration of the flight at such altitudes: *Provided,* That not less than a two-hour supply of oxygen shall be provided for the flight crew members on flight deck duty. The oxygen supply required by sec. 42.29 may be considered in determining the supplemental breathing supply required for flight crew members on flight deck duty in the event of cabin pressurization failure.

(b) *For passengers.* When operating such airplanes at flight altitudes above 8,000 feet, the air carrier shall provide the following amounts of oxygen:

(1) When an airplane is not flown at a flight altitude of over 25,000 feet, a supply of oxygen sufficient to furnish oxygen for 30 minutes to 10 percent of the number of passengers carried shall be considered adequate, 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 4 minutes.

(2) In the event that such airplane cannot descend to a flight altitude of 14,000 feet or less within 4 minutes, the following supply of oxygen shall be provided:

(i) For the duration of the flight in excess of 4 minutes at flight altitudes above 15,000 feet, a supply sufficient to comply with sec. 42.26 (b) (3);

(ii) For the duration of the flight at flight altitudes above 14,000 feet to and including 15,000 feet, a supply sufficeint to comply with sec 42.26 (b) (2); and

(iii) For flight at flight altitudes above 8,000 feet to and including 14,000 feet, a supply sufficient to furnish oxygen for 30 minutes to 10 percent of the number of passengers carried.

(3) When an airplane is flown at a flight altitude above 25,000 feet, sufficient oxygen shall be furnished in accordance with the following requirements to permit the airplane to descend to an appropriate flight altitude at which the flight can be safely conducted. Sufficient oxygen shall be furnished to provide oxygen for 30 minutes to 10 percent of the number of passengers carried for the duration of the flight above 8,000 feet to and including 14,000 feet and to permit compliance with sec. 42.26 (b) (2) and (3) for flight above 14,000 feet.

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

42.27–1 *Computation of supply for crew members in pressurized cabin aircraft (CAA policies which apply to sec. 42.27 (a)).*

(a) *Cabin altitudes less than 10,000 feet.* When a pressurized cabin aircraft is certificated to fly with a cabin pressure altitude no greater than 10,000 feet, only the supply of oxygen stipulated by section 42.27 (a) need be provided for crew members. In determining this supply the following policies should be considered:

(1) The supply of oxygen which should be provided for all crew members for the duration of the flight should be computed on the basis of the cabin pressure altitude which would exist after cabin depressurization has occurred and the aircraft has descended to the altitude which would permit safe flight with respect to terrain clearance. (See sec. 42.27 (c).)

(2) The operator may use the supply furnished for protective breathing purposes (see sec. 42.29) for compliance with the 2-hour requirement for supplementary breathing oxygen. For example, the 300-liters STPD supply per flight crew member which is the protective breathing supply when demand (or diluter-demand) systems are used, will provide a 2-hour supplementary breathing supply for one

flight crew member at 20,000 feet, so that both the minimum 2-hour supplementary breathing requirement and the protective breathing requirement would be fulfilled under most emergency conditions resulting from loss of cabin pressure or from contamination of cabin air with smoke or poisonous gases.

(b) *Cabin altitudes greater than 10,000 feet.* When operating a pressurized cabin aircraft which is certificated to fly with a cabin pressure altitude greater than 10,000 feet, a supply of oxygen for crew members computed on the basis of the requirements of section 42.26 (a) should be provided.

(1) The oxygen supply required for protective breathing purposes, as defined in section 42.29, should be provided in addition to the above supply for the flight crew members on flight deck duty. This emergency supply may be used in the event of cabin pressurization failure. In the event that operations occur over terrain which require flights of such duration and altitude as to use up the emergency oxygen supplied either for protective breathing purposes or for the two hour supply following pressurization failure, the supply should be increased to provide for this difference, computing it for crew members on the basis of section 42.27 (a).

(2) To provide oxygen for crew members other than the flight crew members on flight deck duty in the event of cabin pressurization failure, a supply of oxygen in addition to the supplies mentioned above should be provided in accordance with the requirements of section 42.27 (a) except that the total supply for these other crew members need not exceed that provided on the basis of section 42.26 (a) for cabin pressure altitudes in excess of 10,000 feet plus an additional supply necessary to satisfy the increased oxygen flow which might be needed following a pressurization failure; this supplement to the section 42.26 (a) supply should be based on the duration of flight at the altitudes which would permit safe flight with respect to terrain clearance.

(3) During normal operation at cabin pressure altitudes above 10,000 feet oxygen should be used by each member of the flight crew on flight-deck duty for the duration of the flight in excess of 30 minutes at the cabin pressure altitudes between 10,000 and 12,000 feet and for the duration of the flight at cabin pressure altitudes in excess of 12,000 feet. In the event of the loss of cabin pressurization, oxygen should continue to be used by the flight crew members on flight-deck duty for the duration of the flight at cabin pressure altitudes greater than 10,000 feet. All other crew members may use oxygen according to their individual needs.

(Published in 19 F. R. 549, Feb. 2, 1954, effective Feb. 15, 1954.)

42.27–2 *Computation of supply for passengers in pressurized cabin aircraft (CAA policies which apply to sec. 42.27 (b)).*

(a) *Cabin altitudes less than 10,000 feet.* When a pressurized cabin aircraft is certificated to fly with a cabin pressure altitude no greater than 10,000 feet, only the supply of oxygen stipulated by section 42.26 (b) need be provided for passengers. In determining this supply the following policies should be considered:

(1) The altitude which should be used in computing the supply of oxygen required by this section should be the altitude to which the aircraft would descend following a cabin pressurization failure, considering terrain clearance and operation limitations.

(2) Relative to section 42.27 (b) (1) and (2), no oxygen need be provided for the first four minutes following a cabin pressurization failure.

(b) *Cabin altitudes greater han 10,000 feet.* When a pressurized cabin aircraft is certificated to fly with a cabin pressure altitude greater than 10,000 feet, the following policies should be considered: When the cabin pressure altitude is above 10,000 feet to and including 14,000 feet, sufficient oxygen shall be provided for 10 percent of the number of passengers for the duration of flight between such cabin pressure altitudes. When the cabin pressure altitude is above 14,000 feet to and including 15,000 feet, sufficient oxygen shall be provided for 30 percent of the number of passengers for the duration of flight between such cabin pressure altitudes. When the cabin pressure altitude is above 15,000 feet, sufficient oxygen shall be provided for each passenger for the duration of

flight above such a cabin pressure altitude. In addition to the above supply of oxygen, in order to provide for loss of cabin pressure, the supplementary oxygen required by whatever portions of section 42.27 (b) are applicable, shall be provided except that in no case will it be necessary to furnish a supply of oxygen in excess of that necessary to supply oxygen to 100 percent of the passengers for the maximum possible duration of flight at the maximum cabin altitude which could be attained under either of the normal operating or emergency conditions whichever is greater.

(Published in 19 F. R. 549, Feb. 2, 1954, effective Feb. 15, 1954.)

42.27–3 *Oxygen requirements for clinical purposes (CAA policies which apply to sec. 42.27 (b)).* The regulations do not require that oxygen be provided for clinical purposes; hence, if the air carrier believes that such oxygen is to be desired, he should provide oxygen for this purpose. It is suggested that portable units of any size the air carrier desires be used for this purpose in order that the minimum supply required for supplementary breathing purposes will be preserved. If, however, the operator wishes to use a common source of supply for the oxygen required by the regulations and for clinical purposes, he may do so if he provides an amount of oxygen sufficiently greater than that required by the regulations. It is suggested that a quantity of 300 liters may be considered as satisfying reasonable needs.

(Published in 19 F. R. 549, Feb. 2, 1954, effective Feb. 15, 1954.)

42.27–4 *Oxygen requirements for infants-in-arms (CAA policies which apply to sec. 42.26 (b)).* Provisions should be made for administering oxygen to infants in arms and additional oxygen should be carried whenever an unusually large number of infants is carried. This additional oxygen is needed only when there is a passenger or infant for each seat position and the number of intants not provided for exceeds 50 percent of the seat positions. Acceptable methods of administering the oxygen to infants and now used by many operators are: (a) a disposable plastic mask which can be fitted to the face; (b) an infant size BLB oro-nasal mask and (c) semirigid papercups, specifically reserved for the purpose, which can be fitted over the infant's nose and mouth, with a hole punched through the bottom through which an oxygen tube or a Y-connector can be inserted. Any other acceptable method may also be used.

(Published in 19 F. R. 549, Feb. 2, 1954, effective Feb. 15, 1954.)

42.28 *Equipment standards.* The oxygen apparatus, the minimum rates of oxygen flow, and the supply of oxygen necessary to comply with the requirements of sec. 4b.651 of this subchapter effective July 20,1950: *Provided,* That where full compliance with such standards is found by the Administrator to be impractical, he may authorize such changes in these standards as he finds will provide an equivalent level of safety.

42.29 *Protective breathing equipment for the flight crew.*

(a) *Pressurized cabin airplanes.* Each required flight crew member on flight deck duty shall have easily available at his station protective breathing equipment covering the eyes, nose, and mouth, or the nose and mouth, where accessory equipment is provided to protect the eyes, to protect him from the effects of smoke, carbon dioxide, and other harmful gases.

(1) Not less than a 300-liter STPD supply of oxygen for each required flight crew member on flight deck duty shall be provided for this purpose.

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

42.29–1 *Protective breathing equipment and installation (CAA policies which apply to sec. 42.29).* Protective breathing equipment for the flight crew and its installation should comply with sections 4b.651–1 and 4b.651–2.

(Published in 15 F. R. 8924, Dec. 15, 1950, effective Jan. 1, 1951.)

42.29–2 *Requirement of protective breathing equipment in nonpressurized cabin airplanes (CAA rules which apply to sec. 42.29 (b)).* Protective breathing equipment for the flight crew shall be required in nonpressurized cabin aircraft having built-in carbon dioxide fire-extinguisher systems in fuselage compartments (for example, cargo or combustion heater compartments); except that protective breathing equipment will not be required where:

(a) Not more than 5 pounds of carbon dioxide will be discharged into any one such compartment in accordance with established fire control procedures, or

(b) The carbon dioxide concentration at the flight crew stations has been determined in accordance with section 4b.484–1 of this subchapter (i. e. the Civil Air Regulations) and found to be less than 3 percent by volume (corrected to standard sea-level conditions).

(Published in 15 F. R. 8924, Dec. 15, 1950, effective Jan. 1, 1951.)

Maintenance Requirements

42.30 *General.* No person shall operate an aircraft which is not in an airworthy condition. All inspections, repairs, alterations, and maintenance shall be performed in accordance with Part 18 of this subchapter, and with the maintenance manual when required by sec. 42.32 (d).

42.30–1 *General (CAA policies which apply to sec. 42.30).*

(a) It is the operator's responsibility to maintain all aircraft in an airworthy condition at all times when operated in irregular air carrier operation.

(b) All maintenance, repairs, overhauls, and alterations shall be accomplished under the supervision of a certificated airman holding the appropriate mechanical rating for the work involved.

(c) All repairs, overhauls, and alterations shall be in accordance with materials, procedures, and standards set forth in Part 18 of this subchapter (i. e. the Civil Air Regulations) using proper equipment and tools for the type of work involved.

(d) CAA Airworthiness Directives and manufacturers' manuals, directives, bulletins, and notes shall be complied with as directed.

(e) Large aircraft must be maintained in accordance with the time limitations and maintenance schedules prescribed in the approved maintenance manual and the applicable regulations in this subchapter (i. e. the Civil Air Regulations).

(f) No engine or other major component which has not been maintained in accordance with the maintenance manual shall be installed in a large aircraft unless such engine or component is shown to be in an airworthy condition, and that it complies with current Airworthiness Directives. This may be accomplished by showing (1) that the engine or component is new and of current manufacture, (2) has been overhauled within the last 90 days by a certificated repair agency holding appropriate ratings, or (3) by disassembly to the extent necessary for the assigned agent to determine the airworthiness and extent of compliance with Airworthiness Directives and manufacturers' service bulletins.

(g) Small aircraft must be maintained in accordance with the provisions of the applicable regulations in this subchapter (i. e. the Civil Air Regulations) and the manufacturer's recommendations. No aircraft will be dispatched on any flight during which the aircraft may exceed any prescribed maintenance time limitations.

(Published in 14 F. R. 7035, Nov. 22, 1949, effective upon publication.)

42.31 *Inspections and maintenance.*

(a) Aircraft shall be given a preflight check to determine compliance with section 42.51 (e) and, in addition, shall meet the following requirements:

(1) Large aircraft shall be maintained and inspected in accordance with a continuous maintenance and inspection system as provided for in the maintenance manual.

(2) Small aircraft shall be inspected in accordance with the inspection provisions of Part 43 of this subchapter.

(b) A record shall be carried in the aircraft at all times showing that the latest inspections required by paragraph (a) of this section have

423764 O—57——3

been accomplished, except such record may be kept at the principal operations base when the aircraft is maintained and inspected as provided in paragraph (a) (1) of this section.

42.31–1 *Inspection and maintenance—large aircraft (CAA policies which apply to sec. 42.31 (a) (1)).* A continuous maintenance and inspection system is one in which a prescribed schedule of maintenance and inspection functions is set forth in the maintenance manual approved by Administrator. The schedules of maintenance functions shall include the overhaul time limitations and inspection program including time limitations which are considered adequate by the Administrator to maintain the aircraft in a continuously airworthy condition.

(Published in 14 F. R. 7036, Nov. 22, 1949, effective upon publication.)

42.31–2 Deleted.

(Published in 21 F. R. 3183, May 15, 1956, effective July 17, 1956.

42.31–3 Deleted.

(Published in 19 F. R. 6829, Oct. 23, 1954, effective upon publication.)

42.31–4 *Maintenance and inspection records (CAA policies which apply to sec. 42.31 (b)).* The record required in this paragraph may consist of the aircraft log book if it is so arranged as to provide full information on the maintenance work performed on the aircraft. In case the aircraft is maintained under a continuous maintenance and inspection system, the maintenance records which are utilized in such system may be considered as complying with this requirement; however, all such records shall be complete and shall properly identify the aircraft, aircraft time, and the extent of maintenance work or inspections performed. When maintenance or inspection functions are performed away from their principal maintenance base, a copy of the record of maintenance or inspections performed shall be retained in the aircraft and a copy promptly mailed to the principal maintenance base.

(Published in 14 F. R. 7036, Nov. 22, 1949, effective upon publication; amended in 15 F. R. 3151, May 25, 1950, effective upon publication.)

42.32 *Additional maintenance requirements for large aircraft.* **The following requirements are applicable to operations conducted in large aircraft:**

(a) *Facilities.* Facilities for the proper inspection, maintenance, overhaul, and repair of the types of aircraft used shall be maintained by the air carrier, unless arrangements acceptable to the Administrator are made with other persons possessing such facilities.

(b) *Maintenance personnel.* A staff of qualified mechanics, inspectors, and appropriate supervisory personnel shall be employed by the air carrier and kept available for performing the functions specified in section 42.30, except where the air carrier has obtained the approval of the Administrator for the performance of such functions by some other person. The air carrier shall permit maintenance to be performed only by an individual competent therefor.

(c) *Reporting of mechanical irregularities occurring in operation.* Each air carrier shall prescribe in its operations manual a procedure for the submission of written reports by the members of the flight crew for all mechanical irregularities occurring during the operation of the aircraft. The members of the flight crew designated by the air carrier shall submit a written report in accordance with such system to the person responsible for the maintenance of the aircraft. This report shall be submitted at the end of each through flight or sooner if the seriousness of the irregularity so warrants. Such report or copy thereof indicating the action taken shall be retained in the aircraft for the information of the next flight crew.[5]

[5] See section 42.96 for the requirements for reporting aircraft or component malfunctioning and defects.

(d) *Maintenance manual.*

(1) The air carrier shall prepare and maintain for the use and guidance of maintenance personnel a maintenance manual which contains full information pertaining to the maintenance, repair, and inspection of aircraft and equipment and clearly outlines the duties and the responsibilities of maintenance personnel. The form and content shall be acceptable to the Administrator. It shall contain a copy of the approved time limitations for inspection and overhauling of aircraft, aircraft engines, propellers, and appliances. Copies and revis-

ions shall be furnished to all persons designated by the Administrator. All copies in the hands of company personnel shall be kept up to date.

(2) A copy of those portions pertaining to the aircraft shall be carried therein.

(3) Any changes prescribed by the Administrator in the interest of safety shall be promptly incorporated in the manual. Other changes not inconsistent with any Federal regulation, the air carrier operating certificate, or safe operating practices may be made without prior approval of the Administrator.

(4) No maintenance, repair, or inspection of aircraft or equipment shall be made by the air carrier contrary to the provisions of the maintenance manual.

42.32–1 *Facilities for the proper inspection, maintenance, overhaul, and repair (CAA policies which apply to sec. 42.32).*

(a) The facilities required in section 42.32 (a) of this subchapter include housing, work space, equipment, supplies, materials, tools, parts, and aircraft components in sufficient quantity and quality to assure that the needed inspection, maintenance, overhaul, and repair of the air carrier's or commercial operator's aircraft (including airframes, powerplants, propellers, and appliances) can be satisfactorily performed at all times by either the air carrier, or commercial operator, or persons with whom arrangements have been made for the performance of such functions.

(b) Sections 52.21–1 through 52.21–3 and sections 52.30–1 through 52.36–1 of this subchapter, outline housing, facilities, equipment and materials which constitute criteria that may be used to determine the minimum facilities required by section 42.32 (a) insofar as applicable and appropriate to the air carrier's aircraft and maintenance system: Provided, That a work dock is used for the performance of airframe maintenance in lieu of a permanent hangar, if such work dock is appropriate for the proper performance of such maintenance under the climatic conditions which prevail at the particular maintenance location. When necessary, the entire airframe or portion thereof on which work is being performed should be enclosed so as to exclude rain, snow, dust, and provide reasonable protection to workers from the extremes of temperature which might impair the work being performed.

(c) When an air carrier contracts to perform inspection, maintenance, overhaul and repair on aircraft of other air carriers, the minimum facilities required by section 42.32 (a) are considered to be the same as required for a certificated repair station performing identical functions.

(Published in 20 F. R. 4184 on June 15, 1955, effective June 30, 1955.)

42.32–2 *Arrangements acceptable to the Administrator (CAA policies which apply to sec. 42.32 (a)).* The Administrator will determine the acceptability of arrangements made by the air carrier with other persons for the inspection, maintenance, overhaul, and repair of the types

42.32–6 *Copy of maintenance manual in aircraft (CAA policies which apply to sec. 42.32 (d) (2)).* This manual shall contain such maintenance instructions as are necessary for the type of operations and aircraft concerned, and interpreting the air carrier's procedures to be followed in complying with the maintenance requirements of this part and the Operations Specifications. The foregoing shall not be construed as requiring an air carrier to carry in the aircraft complete maintenance and overhaul instructions for a particular type of aircraft. It is essential, however, that the manual contain such maintenance information as will provide adequate guidance for routine and emergency maintenance procedures, in addition to the air carrier's policy relative to their accomplishment.

(Published in 14 F. R. 7039, Nov. 22, 1949, effective upon publication; amended in 18 F. R. 7537, Nov. 26, 1953; amended in 19 F. R. 6829, Oct. 23, 1954, effective upon publication.)

42.32–7 *Mandatory revisions (CAA rules which apply to sec. 42.32 (d) (3)).* When the operator is instructed to incorporate changes in the manual by the Administrator or his properly authorized representatives, such changes shall be made promptly in all copies of the manual in the hands of designated personnel.

(Published in 14 F. R. 7039, Nov. 22, 1949, effective upon publication; amended in 18 F. R. 7537, Nov. 26, 1953.)

Flight Crew Requirements

42.40 *Airman requirements.*

(a) No air carrier shall utilize and individual as an airman unless he has met the appropriate requirements of the Civil Air Regulations: *Provided,* That the provisions of secs. 42.44 (a) and 42.45 shall not be applicable to pilots who for the previous six months have been continuously in the employ and participating regularly in the training program of an air carrier which has established pilot training and check procedures in accordance with the requirements of Part 40 or Part 41 of this subchapter.

(b) Each air carrier operating large aircraft shall designate a chief pilot who shall be responsible for seeing that no individual is assigned as a pilot unless he has met the appropriate requirements of the Civil Air Regulations.

42.41 *Composition of flight crew.*

(a) No air carrier shall operate an aircraft with less than the minimum flight crew required for the particular operation and the type of aircraft, as determined by the Administrator in accordance with the standards prescribed in this section, and specified in the air carrier operations manual for the area in which operations are authorized.

(b) Where the provisions of this part require the performance of two or more functions for which an airman certificate is necessary, such requirement shall not be satisfied by the performance of multiple functions at the same time by any airman.

(c) *Second pilot.* A second pilot shall be required on large aircraft, or on other aircraft when passengers are carried on operations under IFR, or when the Administrator finds that as second pilot is otherwise required in the interest of safety.

(d) *Flight radio operator.* An airman holding a flight radio operator certificate shall be required for flight over any area over which the Administrator has determined that radiotelegraphy is necessary for communication with ground stations during flight.

(e) *Flight engineer.* An airman holding a flight engineer certificate shall be required on all aircraft of more than 80,000 lbs. maximum certificated takeoff weight, and on all other aircraft certificated for more than 30,000 lbs. maximum certificated takeoff weight where the Administrator finds that the design of the aircraft used or the type of operation is such as to require a flight engineer for the safe operation of the aircraft, or on other aircraft where required by the aircraft airworthiness certificate.

(f) *Flight navigator.* An airman holding a flight navigator certificate shall be required for flight over any area where the Administrator has determined that celestial navigation is necessary.

42.42 *Pilot qualification for small aircraft.*

(a) *Pilot in command.* Any pilot serving as pilot in command on small aircraft shall

hold a valid commercial pilot certificate with an appropriate rating for the aircraft on which he is to serve, and for:

(1) *Day flight VFR.* He shall have had at least 50 hours of cross-country flight time as a pilot;

(2) *Night flight VFR.* He shall have had a total of at least 500 hours of flight time as a pilot, including 100 hours of cross-country flight time of which 25 hours shall have been at night;

(3) *IFR flight.* He must possess a currently effective instrument rating and have had a total of at least 500 hours of flight time as a pilot including 100 hours of cross-country flight.

(b) *Second pilot.* Any pilot serving as second pilot on small aircraft shall hold for:

(1) *VFR flight.* A valid commercial pilot certificate with the appropriate ratings;

(2) *IFR flight.* A currently effective instrument rating.

42.43 *Pilot qualifications for large aircraft.*

(a) *Pilot in command.* Any pilot serving as pilot in command on large aircraft shall possess a valid airline transport pilot rating with an appropriate rating for the aircraft on which he is to serve.

(b) *Second pilot.* Before a pilot shall serve as second pilot on large aircraft, he shall:

(1) Possess a valid commercial pilot rating and instrument rating, or a valid air line transport pilot rating, and

(2) Demonstrate to an authorized representative of the Administrator, or to a check pilot designated by the Administrator, his ability to take off and land each type of aircraft on which he is to serve by making at least three satisfactory takeoffs and landings in each type.

(c) *Three-pilot crew.* In a crew of three or more pilots at least two pilots shall meet the requirements of paragraph (a) of this section.

42.44 *Recent flight experience requirements for flight crew members.* No air carrier shall utilize an airman, nor shall any individual serve as an airman, unless he meets the appropriate experience requirements specified below:

(a) *Pilots.*

(1) Within the preceding 90 days a pilot shall have made at least 3 takeoffs and landings in an aircraft of the same type on which he is to serve. For night flight one of the takeoffs and landings required above shall have been made at night.

(2) Within the preceding 6 months a pilot on large aircraft shall have successfully accomplished an equipment check on aircraft of the type on which he is to serve. Such equipment check shall be given by an authorized representative of the Administrator or a check pilot of the air carrier.

(3) Within the preceding 6 months the pilot in command on any large aircraft, or on any aircraft under IFR conditions, shall have successfully accomplished an instrument check demonstrating his ability to pilot and navigate by instruments, to accomplish a standard instrument approach using radio range facilities, and to accomplish an instrument approach in accordance with ILS, GCA, or D/F procedures when such facilities are to be used. This instrument check shall be given by an authorized representative of the Administrator or a check pilot of the air carrier on an aircraft of, a type on which the pilot in command is to serve.

(4) Subsequent to the initial pilot equipment and instrument checks required by subparagraphs (2) and (3), respectively, of this paragraph, a pilot in command need accomplish in flight within each 12 months only one of the required equipment checks and only one of the required instrument checks, if he satisfactorily completes within such 12 months an approved course of training in an aircraft simulator. The interval between completion of the proficiency check in flight and the simulator training course shall be not less than 4 nor more than 8 months. The carrier shall show that the flight characteristics, performance, instrument reaction, and control loadings of the applicable aircraft are accurately simulated in the aircraft simulator through all ranges of normal and emergency operations in accordance with subdivisions (i) through (vii) of this subparagraph:

(i) The simulator shall represent a full-scale mockup of the cockpit interior, including normal flight crew stations and accommodations for the instructor or check airman.

(ii) The effect of changes on the basic forces and moments shall 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 shall be included.

(iii) In response to control movement by a flight crew member, all instrument indications involved in the simulation of the applicable airplane shall be entirely automatic in character unless otherwise specified. The rate of change of simulator instrument readings and of control forces shall 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. Control forces and degree of actuating control travel shall correspond to that which would occur in the airplane under actual flight conditions.

(iv) Through the medium of instrument indication, it shall 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, take-off, landing, normal flight, unusual attitudes, navigation problems, and instrument approach procedures. In addition, the simulator shall 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.

(v) Suitable course and altitude recorders shall be included.

(vi) Communication and navigation aids of the applicable airplane shall be simulated for on-the-ground and in-flight operations.

(vii) Other aircraft systems and components shall be simulated to the extent found necessary by the Administrator.

(b) ***Flight radio operator.*** No individual shall perform, or be assigned to perform, the duties of a flight radio operator unless he has met the recent experience requirements specified in Part 33 of this subchapter.

(Rev. 6/15/57)

(c) ***Flight engineer.*** No individual shall be assigned to nor perform duties as a flight engineer unless within the preceding 12 months he has had at least 50 hours of experience as a flight engineer on the type of aircraft on which he is to serve, or until a person designated by the Administrator has checked the airman and determined that he is (1) familiar with all current information and operating procedures relating to the type of aircraft on which he is to serve and (2) competent with respect to the flight engineer's duties on such aircraft.

(d) ***Flight navigator.*** No individual shall be assigned to nor perform duties as a flight navigator unless within the preceding 12 months he has had at least 50 hours of experience as a flight navigator, or until a person designated by the Administrator has checked the airman and determined that he is (1) familiar with all current navigational information pertaining to the operations of the air carrier and (2) competent with respect to the operating procedures and navigational equipment to be used.

42.44–1 *Equipment check (CAA policies which apply to sec. 42.44 (a) (2)).*

(a) *General.* The equipment check for pilots on large aircraft, other than pilots in command, should consist of (1) an equipment examination (oral or written) and (2) a flight check.

The equipment check for pilots in command on large aircraft need only consist of the equipment examination, since a pilot in command should successfully accomplish all of the instrument checks prescribed in section 42.44–2.

(b) *Equipment examination for all pilots.* This examination, which may be oral or written, should be pertinent to the type of aircraft to be flown by the pilot and should be given (1) in the air carrier's ground school, (2) during a routine line check, (3) during the flight phase of the equipment check, or (4) during the instrument checks prescribed in section 42.44–2. The examination should include, but need not be limited to, questions relative to engine power settings, stall speeds at various configurations and weights, airplane placard speeds, critical engine failure speeds, control systems, fuel and lubrication systems, propeller and supercharger operations, hydraulic systems, electric systems, anti-icing, heating and ventilating, and pressurization system (if pressurized).

(c) *Flight check for pilots other than pilots in command.* This check should include at least the following items, but no maneuvers need be accomplished solely by reference to instruments. It may be given during any flight which is of at least one hour duration.

(1) *Preflight planning.* The pilot should be directed to execute a flight plan for the flight involved, including the interpretation of weather maps, upper air charts, and sequence reports.

(2) *Taxiing, sailing, or docking.* Attention should be directed to (i) the manner in which the pilot conducts taxiing, sailing, or docking with reference to the taxi instruction as issued by airport traffic control or other traffic control agency, (ii) any taxi instruction which may be published in the air carrier's operations manual, and (iii) general regard for the safety of the air carrier's and other equipment which may be affected by taxiing, sailing, or docking operation.

(3) *Runup.* Attention to detail in the use of cockpit check list and cockpit procedure should be observed on all flight checks.

(4) *Takeoff.* The check pilot should observe the pilot's ability to maintain a constant heading during the takeoff run, his proficiency in using or directing the use of power, flaps, and gear operation, during the critical period between takeoff (off ground) and reaching 500 feet. If it becomes necessary for the pilot occupying the other control position to give other than routine assistance after becoming airborne, the maneuver should be considered as unsatisfactory.

(5) *Climbs and climbing turns.* Climbs and climbing turns should be performed in accordance with the airspeeds and power settings as prescribed by the air carrier or those set forth in the airplane flight manual. The use of proper climb speeds and designated rates of climb should be considered in determining the satisfactory performance of this phase of the equipment check flight.

(6) *Navigational facilities.* The pilot should be directed to use all en route navigational facilities in the proper sequence. Attention should be given to the pilot's ability to use all available airplane navigational equipment.

(7) *Loop orientation.* The pilot should be directed to obtain an en route position by the use of the radio compass. Attention should be given to the time involved in obtaining the fix and accuracy with which the airplane position is established on a proper chart.

(8) *Landing under regular approach conditions.* Landing under regular approach conditions should necessitate a path of flight around the landing area of not more than a 180° turn but not less than a 90° turn. The pilot should be judged on the basis of altitude and air-speed control and his ability to maneuver to a normal landing.

(9) *Judgment.* The pilot should demonstrate judgment commensurate with experience required of a co-pilot in air carrier aircraft.

(d) *Pilot records.* A record of the equipment check, including a report of any pilot deficiencies, should be maintained in the file of each pilot.

(1) The records of pilots, other than pilots in command, should include (i) the date, method used and grade received on the equipment examination set forth in paragraph (b) of this section and (ii) the date and grade received on the flight check set forth in paragraph (c) of this section.

(2) The records of pilots in command should include (i) the date, method used and grade received on the equipment examination set forth in paragraph (b) of this section and (ii) the date and grade received on the instrument checks prescribed in section 42.44–2.

(Published in 18 F. R. 1909, Apr. 7, 1953, effective Apr. 25, 1953.)

42.44–2 *Instrument checks (CAA policies which apply to sec. 42.44 (a) (3)).*

(a) *General.* A pilot in command on any large aircraft should successfully accomplish the instrument checks set forth in this section. Each pilot required under section 42.43 (c) to qualify as a pilot in command should successfully accomplish these instrument checks. The checks to be accomplished, and the observations to be made by the examining check pilot, are described as follows:

(b) *Taxiing, sailing, or docking.* Attention should be directed to (1) the manner in which the pilot in command conducts taxiing, sailing, or docking with reference to the taxi instruction as issued by airport traffic control or other

traffic control agency, (2) any taxi instruction which may be published in the air carrier's operations manual, and (3) general regard for the safety of the air carrier's and other equipment which may be affected by taxiing, sailing, or docking operation.

(c) *Runup.* Attention to detail in the use of cockpit check list and cockpit procedure should be observed on all instrument check flights.

(d) *Takeoff.* Whenever practicable, the pilot being examined should execute a takeoff solely by reference to instruments, or at the option of the check pilot, a contact takeoff may be made following which instrument conditions should be simulated at or before reaching 100 feet with the subsequent climb conducted solely by reference to instruments. The check pilot should observe the pilot's ability to maintain a constant heading during the takeoff run, his proficiency in handling power, flap and gear operation during the critical period between takeoff (off ground) and reaching 500 feet. If it becomes necessary for the check pilot to give other than routine assistance after becoming airborne, the maneuver should be considered as unsatisfactory.

(e) *Climbs and climbing turns.* Climbs and climbing turns should be performed in accordance with the airspeeds and power settings as prescribed by the air carrier or those set forth in the Airplane Flight Manual. The use of proper climb speeds and designated rates of climb should be considered in determining the satisfactory performance of this phase of the instrument check flight.

(f) *Steep turns.* Except as provided hereinafter, steep turns should consist of at least 45° of bank. The turns should be at least 180° of duration but need not be more than 360°. Smooth control application, and ability to maneuver aircraft within prescribed limits, should be the primary basis for judging per-

checked in all types of aircraft he is scheduled to fly. However, the following exceptions should be allowed:

(a) If a pilot is scheduled to fly 2-engine, 3-engine, and 4-engine aircraft or any combination thereof, and/or more than one type of such aircraft, he should take his instrument checks in one of the larger and more complicated types of aircraft; or if only one of the smaller type aircraft is available, he should take his instrument checks immediately due in that aircraft, but his next instrument checks should be accomplished in one of the larger and more complicated type of aircraft.

(b) If a pilot is scheduled to fly both land aircraft and seaplanes, his instrument checks should include a demonstration of competency in both land aircraft and seaplane in accordance with paragraph (a).

(Published in 18 F. R. 1912, Apr. 7, 1953, effective Apr. 25, 1953.)

42.44–4 *Use of flight simulator in instrument checks (CAA policies which apply to sec. 42.44 (a) (3)).* An air carrier using a flight simulator in its pilot training program may be approved to utilize such a device for certain maneuvers in conducting instrument checks when (a) the training device accurately simulates the flight characteristics and the performance of the applicable aircraft through all ranges of normal and emergency operation, (b) a description of the maneuvers to be conducted in the simulator, other than those specifically authorized in paragraphs (1), (m), (n), (o), (p), and (q) of section 42.44–2, is submitted to the Washington office for approval by the region in which the headquarters of the air carrier is located, and (c) certain critical maneuvers which demonstrate the instrument proficiency of a pilot are executed in an aircraft of the type flown by the pilot in air carrier service. The proficiency flight in the aircraft should include at least maneuvers (minimum speed), approach procedures, handling under regular approach conditions, and takeoff and landings, with engine failures as outlined in section 42.44–2, paragraphs (g), (q), (u), and (v) respectively.

(Published in 18 F. R. 1912, Apr. 7, 1953, effective Apr. 25. 1953.)

42.44–5 *Persons from whom the equipment and instrument checks must be received (CAA interpretations which apply to sec. 42.44).*

(a) "An authorized representative of the Administrator" as used in this section means a CAA [Flight Operations and Airworthiness Inspector].

(b) "A check pilot of the air carrier" as used in this section means a check pilot of the air carrier by which the pilot is presently employed. Therefore, checks given to a pilot by the check pilot of a previous employer within the preceding 6 months do not satisfy the experience requirements of subparagraphs (2) and (3) of section 42.44 (a).

(Published in 21 F. R. 450, Jan. 21, 1956, effective Jan. 21, 1956; amended effective June 15, 1957.)

42.44–6 *Flight engineer qualifications for duty (CAA interpretations which apply to sec. 42.44).* An airman assigned to flight-check other flight engineers must meet the recent experience requirements of this part before serving as a flight engineer in air transportation. However, the time spent in giving flight engineer checks may be applied toward the 50-hour recent experience requirement on a particular type of aircraft. Unless such experience has been obtained within the preceding 12-month period, a check by the air carrier or an authorized representative of the Administrator is required.

(Published in 21 F. R. 678, Jan. 31, 1956, effective Feb. 15, 1956; amended in 21 F. R. 2373, Apr. 12, 1956, effective upon publication.)

42.45 *Proficiency of crew members serving on large aircraft.* Each air carrier shall establish a training program sufficient to ensure that each crew member used by the air carrier is adequately trained and maintains adequate proficiency to perform the duties to which he is to be assigned.

(a) The training program shall consist of appropriate ground and flight training, including all subjects contained in the Operations Manual. Procedures for each crew function shall be standardized to the extent that each flight crew member will know the functions for which he is responsible.

(b) No air carrier shall initially assign an individual as a pilot unless he has satisfactorily accomplished a written examination by the car-

rier to ensure his familiarity with the contents of the Operations Manual and with all types of instrument approach and navigational facilities and procedures to be used. Thereafter, a pilot shall not be utilized by an air carrier unless during the preceding six months.

(1) He has satisfactorily accomplished such written examination, or

(2) He has been in the continuous employ of the air carrier and continuously participating in the training program of the air carrier.

(c) Each air carrier shall provide a sufficient number of check pilots to be able through its own personnel to give each pilot the checks necessary to comply with the requirements of section 42.44 (a). Check pilots shall make written reports of all pilot deficiencies disclosed by checks, and the carrier shall make provisions for such additional pilot training as may be required in each particular case.

42.45–1 *Training program (CAA policies which apply to sec. 42.45).*

(a) *Ground phase.* The ground phase of the air carrier's pilot training and instruction program shall include:

(1) A study of the regulations in this subchapter applicable to irregular air carrier operation and of the provisions of the air carrier's operating certificate, including methods and principles of determining weight limitations for landings and takeoffs;

(2) A study of the company's operations manual and procedures;

(3) Training in the duties and responsibilities of flight crew and crew members;

(4) Through familiarization with the aircraft to be flown including the engines and all major components, operation of cabin pressurization (if installed), oxygen system, standard operating procedures, a study of the CAA approved Airplane Flight Manual;

(5) A study of navigation, use of radio aids to navigation and such refresher courses necessary to keep airmen current in the application of any new developments;

(6) A study of meteorology sufficient to maintain a practical knowledge of the principles of icing, fog, thunderstorms and frontal systems, etc., and the best method of operating under these various conditions.

Training and instruction in synthetic-type training devices may be included in the ground phase of the training program. However, such training should be so planned that it will supplement the flight training phase and afford further training in specific instrument let-down procedures to be conducted by the pilot in irregular air carrier operations.

(b) *Flight phase.* The flight phase of the training program should be so planned as to insure adequate initial qualification of the pilot on the type aircraft on which he is to serve. It shall also provide for the continued maintenance of a high standard of pilot proficiency. This training shall include, but not be limited to:

(1) Takeoffs and landings under varying conditions of load, wind, low ceiling and visibility, inoperative engine, etc.;

(2) Flight with one or more engines inoperative, including flight with any one engine fully throttled at maximum authorized load, either at one-engine-inoperative service ceiling or at an altitude equivalent to 1,000 feet above the highest part of the terrain on the route or routes to be flown;

(3) Operating under normal and maximum limits of power and speed;

(4) Conduct instrument flight including navigation by low frequency radio ranges, VHF, and ADF, letting-down-through procedures utilizing radio range, ADF, ILS, GCA, etc., whichever is used by the air carrier in its normal operations.

(c) *Emergency procedures.* The training program shall include instruction in emergency procedures particularly with respect to engine failure, fire in the air or on the ground, evacuation of passengers, location and operation of all emergency equipment, power settings for maximum endurance and maximum range, etc.

(d) *Other.* Whenever flight engineers, flight radio operators, flight navigators, or cabin attendants are utilized, appropriate and adequate training and instruction shall be included in the air carrier's training program.

(Published in 14 F. R. 7039, Nov. 22, 1949, effective upon publication.)

42.46 *Logging flight time.*

(a) A pilot in command may log his total flight time.

(b) A second pilot holding an airline transport pilot certificate and rating for the aircraft flown may log the total time during which he is on duty on the flight deck.

(c) A second pilot not holding an airline transport pilot certificate and rating for the aircraft flown may log 50 percent of the total flight time during which he is on duty on the flight deck.

(d) A pilot may log as instrument flight time only such time as he is actually manipulating the controls when the aircraft is being flown solely by reference to instruments.

42.47 *Grace period for airman periodic checks.* Whenever this part requires an airman check at stated intervals, a grace period of 30 days shall be allowed: *Provided,* That the effective date of the check, if met within the grace period, shall be the same as if met on the day immediately preceding such grace period.

42.48 *Flight time limitations for pilots on large aircraft.* The following limitations shall be applicable to pilots serving on large aircraft.

(a) *Individual pilot limitations.*

(1) A pilot may be scheduled to fly 8 hours or less during any 24 consecutive hours without a rest period during such 8 hours.

(2) A pilot shall receive 24 hours of rest before being assigned further duty when he has flown in excess of 8 hours during any 24 consecutive hours.

(3) A pilot shall be relieved from all duty for not less than 24 consecutive hours at least once during any 7 consecutive days.

(4) A pilot shall not fly as a crew member in air carrier service more than 100 hours during any 30 consecutive days.

(5) A pilot shall not fly as a crew member in air carrier service more than 1,000 hours in any one calendar year.

(6) A pilot shall not do other commercial flying if his total flying time for any specified period will exceed the limits of that period.

(7) Time spent in any deadhead transportation shall in no case be considered as part of a required rest period.

(b) *Aircraft having a crew of two pilots.*

(1) A pilot shall not be scheduled to fly in excess of 8 hours during any 24-hour period unless he is given an intervening rest period at or before the termination of 8 scheduled hours of flight duty. Such rest period shall equal at least twice the number of hours flown since the last preceding rest period, and in no case shall such rest period be less than 8 hours. During such rest period the pilot shall be relieved of all duty with the air carrier.

(2) A pilot shall not be on duty for more than 16 hours during any 24 consecutive hours.

(c) *Aircraft having a crew of three pilots.*

(1) A pilot shall not be scheduled for duty on the flight deck in excess of 8 hours in any 24-hour period.

(2) A pilot shall not be scheduled to be aloft for more than 12 hours in any 24-hour period.

(3) A pilot shall not be on duty for more than 18 hours in any 24-hour period.

(d) *Aircraft having a crew of four pilots.*

(1) A pilot shall not be scheduled for duty on the flight deck in excess of 8 hours during any 24-hour period.

(2) A pilot shall not be scheduled to be aloft for more than 16 hours in any 24-hour period.

(3) A pilot shall not be on duty for more than 20 hours during any 24-hour period.

42.48–1 *"Scheduled to fly," "scheduled to be aloft," and "scheduled for duty on the flight deck" (CAA interpretations which apply to sec. 42.48).* The phrases "scheduled to fly" and "scheduled to be aloft," as used in this section, refer to the estimated "block-to-block time" for a particular flight under normal operating conditions. The phrase "scheduled for duty on the flight deck," as used in this section, refers to that portion of such "block to-block time" during which the airman is scheduled for flight duty on the aircraft.

(Published in 14 F. R. 7040, Nov. 22, 1949, effective upon publication.)

42.48–2 *Scheduled type operations (CAA policies which apply to sec. 42.48).* An operator conducting a scheduled type operation (e. g., scheduled cargo-only service, regular flights between points pursuant to a military contract, etc.) may establish flight operations schedules for a particular route or route segment in order

to determine compliance with the scheduling provisions of the flight time limitations.

(Published in 21 F. R. 4312, June 20, 1956, effective July 1, 1956.)

42.49 *Assignment of emergency evacuation functions for each crew member.* **After May 31, 1956, each air carrier shall assign all necessary emergency functions for each crew member to perform in the event of circumstances requiring emergency evacuation. The air carrier shall show that functions so assigned are practicable of accomplishment. These functions shall be described in the air carrier manual.**

Flight Operation Rules

42.51 *Pilot responsibilities.*

(a) *Pilot in command.* **The pilot in command of the aircraft shall be designated by the air carrier.**

(b) *Preflight action.* **Prior to commencing a flight the pilot in command shall familiarize himself with the latest weather reports pertinent to the flight issued by the United States Weather Bureau or if unavailable, by the most reliable source, and with the information necessary for the safe operation of the aircraft en route, and on the airports or other landing areas to be used, and determine that the flight can be completed with safety.**

(c) *Charts and flight equipment.* **The pilot in command shall have in his possession in the cockpit proper flight and navigational facility charts, including instrument approach procedures when instrument flight is authorized, and such other flight equipment as may be necessary to properly conduct the particular flight proposed.**

(d) *Emergency decisions.*

(1) When required in the interest of safety, a pilot may make any immediate decision and follow any course of action which in his judgment appears necessary, regardless of prescribed methods or requirements. He shall, where practicable, keep the proper control station fully informed regarding the progress of the flight.[6]

(2) In an emergency requiring either the dumping of fuel or a landing at a weight in excess of the authorized landing weight, a pilot may elect to follow whichever procedure he considers safer.

(e) *Serviceability of equipment.* **Prior to starting any flight, the pilot shall determine that the aircraft, all engines and propellers, appliances and required equipment, including all instruments, are in proper operating condition. If during the flight any such engine, propeller, appliance, or equipment malfunctions or becomes inoperative, the pilot in command shall determine whether the flight can be continued with safety. Unless he believes that flight can be continued safely, he shall hold or cancel it until satisfactory repairs or replacements are made.**

(f) *Pilots at controls.* **In the case of aircraft requiring two or more pilots, two pilots shall remain at the controls at all times while taking off, landing and while the aircraft is en route except when the absence of one is necessary in connection with his regular duties or when he is replaced by a person authorized under the provisions of paragraph (g) of this section.**

(g) *Admission to pilot compartment.* **In aircraft having a separate pilot compartment, no person other than a crew member, a check pilot, an authorized representative of the Administrator or the Board in pursuance of official duty, or a person whose admission is approved by the pilot in command may be admitted to the pilot compartment. In the latter case, the pilot in command shall remain at the controls.**

42.51–1 *Preflight responsibilities (CAA interpretations which apply to sec. 42.51 (a) and (b)).* In complying with section 42.51 (a) and (b)—particularly that portion requiring the pilot in command to familiarize himself with "the information necessary for the safe operation of the aircraft enroute and on the airports or other landing areas to be used"—the pilot in command must, prior to origination of each flight review the en route procedures, radio navigational facilities, holding patterns, approach procedures, and letdown procedures for the airport of destination and the alternate airports, if any, for the proposed flight.

[6] See section 42.94 for the report to be filed by the pilot where the authority granted by this section is exercised.

Under the provisions of section 42.60–5, an air carrier using a large aircraft is required to establish a procedure in its operations manual whereby the pilot in command will under certain conditions certify on an appropriate form provided by the air carrier that the specified preflight action has been taken, and whereby such certification will be maintained as a part of its flight records.

(Published in 17 F. R. 5811, June 28, 1952, effective upon publication; amended in 18 F. R. 172, Jan. 9, 1953, effective Jan. 31, 1953.)

42.51–2 *Responsibilities of the pilot-in-command (CAA policies which apply to sec. 42.51).* In addition to the responsibilities prescribed in this section, the pilot-in-command is responsible for:

(a) Safe and efficient conduct of the flight to which assigned;

(b) Proper performance of duties by other assigned members of the crew;

(c) Conducting the flight in accordance with the provisions of the air carrier's irregular air carrier operating certificate and the applicable Civil Air Regulations;

(d) The exercise of good judgment in the planning of the flight;

(e) Proper loading of the aircraft, stowage of cargo, and adequacy of tie-down facilities;

(f) Determining that there are sufficient approved seats and safety belts for the number of persons aboard the aircraft, and that safety belts are fastened when required;

(g) Proper servicing of the aircraft, including sufficient fuel, oil, and other items, such as de-icer fluid, etc., as may be necessary for the safety of the flight.

(Published in 14 F. R. 7040, Nov. 22, 1949, effective upon publication; amended in 17 F. R. 5810, June 28, 1952, effective upon publication.)

42.51–3 *Time of reporting for duty (CAA policies which apply to sec. 42.51 (b)).* Each pilot should report in sufficient time prior to the start of the flight to permit reading of pilot's bulletins, current NOTAMS, studying of weather forecasts and reports, and other items pertinent to the proposed flight.

(Published in 14 F. R. 7040, Nov. 22, 1949, effective upon publication; amended in 17 F. R. 5810, June 28, 1952, effective upon publication.)

(Rev. 6/15/57)

42.51–4 *Flight equipment (CAA policies which apply to sec. 42.51 (c)).* Flight equipment shall include, but not be limited to, a navigation computer or calculator; current Airman's Guide; Flight Information Manual; International Flight Information Manual, if foreign flight is contemplated; and when night flight is contemplated, two satisfactory flashlights in good working order.

(Published in 14 F. R. 7040, Nov. 22, 1949, effective upon publication; amended in 17 F. R. 5810, June 28, 1952, effective upon publication.)

42.51–5 *Serviceability of equipment (CAA policies which apply to sec. 42.51 (e)).*

(a) The pilot, as the authorized representative of the air carrier, is held responsible for the airworthiness of the aircraft and all its component parts or assemblies during its operation. Prior to starting any flight, the airworthiness of the aircraft will normally be determined through an inspection of the log book and maintenance records to make sure that all required maintenance functions and inspections have been accomplished and that the previously reported mechanical difficulties have been corrected. In addition, the pilot shall test the radio equipment and such instruments as may be ground checked for satisfactory operation. The pilot's responsibility also includes that of determining that refueling procedures and equipment are safe in all respects; such as, determination that water has been eliminated from the fuel, that sumps are drained on the aircraft, etc.

(b) When a malfunction or other difficulty is experienced with any component of the aircraft during the flight, the pilot should determine that a reasonable margin of safety will exist with those components which remain in good operating condition. If the situation exists where an additional failure would cause a hazardous condition the pilot should not continue flight, but should land at the nearest available landing area where a safe landing can be made.

(c) If any required instrument having functions which are not compensated for becomes inoperative during flight, a landing shall be made at the first airport where proper facilities to permit a safe landing are available.

(d) If unable to maintain two-way radio communications, the pilot in command shall:

(1) If operating under VFR conditions, proceed under VFR and land as soon as practicable, or

(2) Proceed according to the latest air traffic clearance to the radio facility serving the airport of intended landing, maintaining the minimum safe altitude or the last acknowledged assigned altitude, whichever is higher. Descent shall start at the expected approach time last authorized or, if not received and acknowledged at the estimated time of arrival indicated by the elapsed time specified in the flight plan.

(Published in 14 F. R. 7040, Nov. 22, 1949, effective upon publication; amended in 17 F. R. 5810, June 28, 1952, effective upon publication.)

42.52 *Fuel supply.* The following minimum fuel requirements shall be applicable as specified:

(a) *United States.* Within the continental limits of the United States the following requirements shall be met unless the Administrator finds, after considering the character of the terrain being traversed, the available airports, and the category of aircraft being operated, that the safe conduct of the flight normally requires a greater quantity of fuel.

(1) No flight in small aircraft under VFR shall be started unless the aircraft carries sufficient fuel and oil, considering the wind and other weather conditions forecast, to fly to the point of intended landing, and thereafter for a period of at least 30 minutes at normal cruising consumption.

(2) No flight in large aircraft under VFR shall be started unless, considering the factors enumerated in subparagraph (1) of this paragraph, the aircraft carries sufficient fuel and oil to fly to the point of intended landing, and thereafter for a period of at least 45 minutes at normal cruising consumption.

(3) No flight in large or small aircraft under IFR shall be started unless, considering the factors set forth in subparagraph (1) of this paragraph, sufficient fuel and oil are carried aboard the aircraft (i) to reach the point of intended landing, (ii) thereafter to fly to the alternate airport, and (iii) thereafter to fly for a period of 45 minutes at normal cruising consumption.

(b) *Outside the United States.* Outside the continental limits of the United States, the following requirements shall be met unless the Administrator finds, after considering the character of the terrain being traversed, the available airports, and the category and type of aircraft being operated, that the flight may be safely conducted with a lesser quantity of fuel.

(1) No flight shall be started unless, considering the wind and other weather conditions expected, the aircraft carries sufficient fuel and oil (i) to fly to the next point of landing specified in the flight plan, (ii) thereafter to fly to and land at the most distant alternate airport designated in the flight plan, and (iii) thereafter to fly for a period of at least 2 hours at normal cruising consumption.

(2) No flight shall be returned to the point of departure or to an alternate airport for that point unless the aircraft has sufficient fuel to return to such point and thereafter to fly for a period of at least 2 hours at normal cruising consumption.

(3) No flight shall be started to a destination for which there is no available alternate unless the aircraft carries sufficient fuel, considering wind and other weather conditions expected, to fly to that point and thereafter to fly for at least 3 hours at normal cruising consumption.

42.52–1 *Operations in the Territory of Alaska (CAA policies which apply to sec. 42.52 (a)).* For operations in the Territory of Alaska, the minimum fuel requirements specified for operations within the continental limits of the United States shall apply, except as indicated in section 42.52–2.

(Published in 14 F. R. 7040, Nov. 22, 1949, effective upon publication.)

42.52–2 *Operations in the Territory of Alaska (CAA policies which apply to sec. 42.52 (b)).* The minimum fuel requirements specified for operations outside the continental limits of the United States shall apply to all off-airway overwater operation into or out of the Territory of Alaska, and to all instrument operation to or

from points north of latitude 67° N. or to or from points in the Aleutian and Pribiloff Islands west of longitude 160° W.

(Published in 14 F. R. 7040, Nov. 22, 1949, effective upon publication.)

42.53 *Minimum flight altitude rules.* Except during takeoff and landing, the flight altitude rules prescribed in paragraphs (a) and (b) of this section, in addition to the applicable provisions of Section 60.17 of this subchapter, shall govern air carrier operations: *Provided,* That other altitudes may be established by the Administrator for any area where he finds, after considering the character of the terrain being traversed, the quality and quantity of meteorological service, the navigational facilities available, and other flight conditions, that the safe conduct of flight permits or requires such other altitudes.

(a) *Day VFR operations.* No aircraft shall be flown at an altitude less than 500 feet above the surface or less than 1,000 feet from any mountain, hill, or other obstruction to flight.

(b) *Night VFR or IFR operations.* No aircraft shall be flown at an altitude less than 1,000 feet above the highest obstacle located within a horizontal distance of 5 miles from the center of the course intended to be flown or, in mountainous terrain designated by the Administrator, 2,000 feet above the highest obstacle located within a horizontal distance of 5 miles from the center of the course intended to be flown: *Provided,* That in VFR operations at night in such mountainous terrain aircraft may be flown over a lighted civil airway at a minimum altitude of 1,000 feet above such obstacle.

42.54 *Flight into known icing conditions.* No aircraft shall be flown into known or probable heavy icing conditions. Aircraft may be flown into light or moderate icing conditions only if the aircraft is equipped with an approved means for de-icing the wings, propellers, and such other parts of the aircraft as are essential to safety.

42.54–1 *Other parts of the aircraft (CAA interpretations which apply to sec. 42.50).* The other parts of the aircraft referred to in this section include, but are not limited to, carburetors, windshields, pitot-static tubes, and empennage surfaces.

(Published in 14 F. R. 7040, Nov. 22, 1949, effective upon publication.)

42.55 *Weather minimums.* No flight shall be started unless the takeoff, en route operation, and landing at destination can be conducted in accordance with the weather requirements of Part 60 of this subchapter,[7] but in no case less than the minimums specified below:

[7] See Parts 609 and 610 of the regulations of the Administrator, or refer to the Approach and Landing Charts and Radio Facility Charts of the Coast and Geodetic Survey, and to the Airman's Guide for specific en route, takeoff, and landing minimums for particular routes and airports

(a) For VFR takeoff, en route operation, or landing, the weather minimums shall be a ceiling of 1,000 feet and visibility of 1 mile for day and 2 miles for night, unless otherwise authorized by an air traffic clearance obtained from air traffic control.

(b) For IFR operations the weather minimums, including alternate airport requirements, shall not be less than those specified in Parts 609 and 610 of the regulations of the Administrator, or as otherwise specified or authorized by the Administrator. These weather minimums, including alternate airport requirements, also may be found in the Approach and Landing Charts and Radio Facility Charts of the Coast and Geodetic Survey and in the Airmen's Guide.

42.55–1 Deleted.

(Published in 20 F R. 4148, June 15, 1955, effective June 30, 1955.)

42.55–2 *Air traffic clearance (CAA interpretations which apply to sec. 42.55 (a)).* An air traffic clearance obtained from air traffic control is an approval for the flight, or portion thereof, only with regard to known traffic conditions and does not authorize a pilot to violate the Civil Air Regulations pertaining to weather minimums. Regardless of any air traffic clearance obtained from air traffic control, the minimum visibility shall be not less than 1 mile for day and 2 miles for night in control zones, and 3 miles in control areas.

(Published in 14 F. R. 7040, Nov. 22, 1949, effective upon publication.)

423764 O—57——4

42.55–3 *IFR takeoff and landing minimums (CAA policies which apply to sec. 42.55)*

(a) The basic IFR takeoff minimums and landing minimums for each type of instrument approach procedure are prescribed in the operations specifications issued to an air carrier or commercial operator under the authority of this part. Frequently, these minimums are higher than those published in Part 609 of the Regulations of the Administrator. However, by application to the local [inspector] having certificate responsibility, minimums down to the lowest minimums prescribed in Part 609 for a particular airport may be authorized if such airport is regularly used by an air carrier or commercial operator (e. g., main operations base). To obtain such authorization, the air carrier or commercial operator will be required to demonstrate that its pilot training program and overall operating proficiency is adequate for the use of lower minimums. Such lower minimums, when approved, will be applicable only to those pilots-in-command who (1) have served as a pilot or as an observer member of the crew on the flight deck during operations conducted into the particular airport within the previous twelve months, (2) have been checked in accordance with section 42.44–2 of this subchapter on the type of facility for which the lower minimums are authorized, and (3) have been so certified by a company check pilot as being qualified to operate at the lower minimums.

(Published in 20 F. R 4148, June 15, 1955, effective June 30, 1955; amended effective June 15, 1957.)

42.56 *Instrument approach.* No instrument approach procedure shall be executed or landing made at an airport when the latest United States Weather Bureau report for that airport indicates the ceiling or visibility to be less than that prescribed by the Administrator for landing at such airport: *Provided,* That, if an instrument approach procedure is initiated when the current U. S. Weather Bureau report indicates that the prescribed ceiling and visibility minimums exist and a later weather report indicating below minimum conditions is received after the aircraft (a) is on an ILS final approach and has passed the outer marker, or (b) is on a final approach using a radio range station or comparable facility and has passed the appropriate facility and has reached the authorized landing minimum altitude, or (c) is on GCA final approach and has been turned over to the final approach controller, such approach may be continued and a landing may be made in the event weather conditions equal to or better than the prescribed minimums for the airport are found to exist by the pilot in command of the flight upon reaching the authorized landing minimum altitude.

42.56–1 *Standard instrument approach procedures (CAA rules which apply to sec. 42.56).* Standard instrument approach procedures prescribed by the Administrator are published in part 609 of this title (i. e. Regulations of the Administrator).

(Published in 16 F. R. 7351, July 27, 1951, effective upon publication.)

42.56–2 *Takeoff and landing weather minimums (CAA rules which apply to sec. 42.56).*

(a) *General.* The ceiling and visibility contained in the main body of the latest weather report furnished by the U. S. Weather Bureau or a source approved by the Weather Bureau shall be used for instrument approach and landing or takeoff for all runways of an airport except as provided in paragraph (b).

(b) *Runway visibility.* Whenever the latest weather report furnished by the U. S. Weather Bureau or a source approved by the Weather Bureau, including an aural report from the control tower, contains a visibility value specified as runway visibility for a particular runway of an airport, such visibility shall be used for a straight-in approach and landing or takeoff for that runway only.[9]

(Published in 20 F. R. 9039, Dec. 9, 1955, effective Dec. 15, 1955.)

42.57 *Airport lighting for night operations.* No air carrier shall use an airport for the takeoff or landing of an aircraft at night unless such airport is adequately lighted.

42.57–1 *Minimum facilities (CAA policies which apply to sec. 42.57).* The minimum facilities and equipment for airport lighting

[9] Information respecting the official runway visibility observations reported by the control tower operator may be obtained from the Office of the U. S. Weather Bureau for the airport concerned. Such office maintains a continuous graph recording of the runway visibility shown on the visibility meter in the control tower.

where night operations are authorized and conducted shall include at least the following:

(a) Adequate boundary lights defining the boundaries of the usable area and/or adequate contact (runway marker) lights identifying the outer limits of the runways. Lights of the open-flame type (flare pots) are not considered adequate contact lights, except in an emergency. Range lights (aviation green) shall be installed and operating in conjunction with the boundary or contact (runway marker) lights.

(b) Floodlights, either of a permanent or portable type, shall be provided and operated to illuminate the ramp, apron, and passenger-loading area.

(c) Obstructions on and in the vicinity of the landing area should be obstruction lighted. The criteria for determining obstructions to air navigation and for the lighting of obstructions to air navigation are contained in Technical Standard Orders available from the [Printing Services Branch], Civil Aeronautics Administration, Washington 25, D. C.

(d) An illuminated wind direction indicator shall be provided and located so as to be clearly visible from the ground and the air.

(Published in 18 F. R. 1719, Mar. 27, 1943, effective Apr. 15, 1953; amended effective June 15, 1957.)

42.58 *Navigational aids for IFR flight.* IFR operations shall be conducted only over civil airways and at airports equipped with radio ranges or equivalent facilities, unless the Administrator has found that instrument navigation can be conducted by the use of radio direction finding equipment installed in the aircraft or by other specialized means and has approved or otherwise authorized such operation in the air carrier operating certificate.

42.58–1 *Off-airway instrument operation (CAA rules which apply to sec. 42.58).*

(a) Off-airway instrument operation may be authorized provided the aircraft is properly equipped, and the flight crew demonstrates they are capable of navigating along a predetermined flight path over a proposed route without deviating more than 5 miles or 5 degrees on either side (whichever is the lesser) from a straight line drawn between the point of departure and the next point of arrival.

(Published in 14 F. R. 7040, Nov. 22, 1949, effective upon publication; amended in 21 F. R. 4312, June 20, 1956, effective July 1, 1956.)

(Rev. 6/15/57)

42.59 *Briefing of passengers.* After May 31, 1956, each air carrier engaged in extended overwater operations shall assure that all passengers are briefed orally concerning the location and method of operation of life vests and emergency exits and the location of life rafts. The procedure to be followed in presenting this briefing shall be described in the air carrier manual. Such a briefing shall include a demonstration of the method of donning and inflating a life vest. Where the airplane proceeds directly over water after takeoff, the briefing on location of the life vests and emergency exits shall be accomplished prior to takeoff, and the remainder of the briefing shall be accomplished as soon thereafter as practicable. Where the airplane does not proceed directly over water after takeoff, no part of the briefing need be accomplished prior to takeoff but the entire briefing shall be accomplished prior to reaching the overwater portion of the flight.

42.59–1 *Placement of established procedures (CAA policies which apply to sec. 42.59).* The procedures required by this section shall be contained in the air carrier's operations manual.

(Published in 14 F. R. 7040, Nov. 22, 1949, effective upon publication.)

42.60 *Operations manual for large aircraft.*

(a) When operations are conducted in large aircraft the air carrier shall prepare and maintain for the use and guidance of operations personnel an operations manual which contains full information necessary to guide flight and ground personnel in the conduct of safe flight operations and to inform such personnel regarding their duties and responsibilities. The manual shall also contain a copy of the air carrier operating certificate. The form and content shall be acceptable to the Administrator. Copies and revisions shall be furnished to all persons designated by the Administrator. All copies in the hands of company personnel shall be kept up to date.

(b) A copy of the operations manual shall be kept at the principal operations base. Those portions of the manual pertinent to safe operation of the aircraft, including the copy of the air carrier operating certificate, shall be carried therein.

(c) Any changes prescribed by the Administrator in the interest of safety shall be promptly incorporated in the manual. Other changes not inconsistent with any Federal regulation, the air carrier operating certificate, or a safe operating practice may be made without the prior approval of the Administrator.

(d) No operation shall be conducted by the air carrier contrary to the safety provisions of the operations manual.

42.60–1 *Form of operations manual (CAA rules which apply to sec. 42.60).* The operations manual shall be loose leaf in form with letter-size pages, and shall be numbered and indexed in a manner to facilitate its use as reference material by the personnel concerned. Each page shall include a space in which the date of last revision will be indicated. Existing manuals may be utilized if they are found to fulfill the requirements of this section and are considered acceptable by the local [inspector.]

(Published in 14 F. R. 7040, Nov. 22, 1949, effective Nov. 22, 1949; amended effective June 15, 1957.)

42.60–2 *Content of operations manual (CAA rules which apply to sec. 42.60 (a)).*

(a) Table of contents. In preparing the manual the arrangement outlined below shall be followed.

TABLE OF CONTENTS

Chapter I.—General.
- Section 1—A copy of the air carrier's operating certificate and operations specifications, including the operations authorizations.
- Section 2—Part 42 of the Civil Air Regulations and CAM 42.
- Section 3—Instrument Approach Procedure Charts for all airports which the air carrier intends to utilize.
- Section 4—Other publications deemed necessary or applicable.

Chapter II.—Organization and Company Personnel.

Chapter III.—Operations Instructions. General policies for the guidance of operations personnel

Chapter IV.—Operating Procedures, including loading instructions and copies of cockpit check lists.

Chapter V.—Accident and Emergency Procedures, including list of emergency equipment.

Chapter VI.—Training Program.

Chapter VII.—Foreign Operations Instructions (if foreign operations are authorized).

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication.)

42.60–3 [Deleted.]

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication, deleted effective June 15, 1957.)

42.60–4 *Copy of operations manual in aircraft (CAA policies which apply to sec. 42.60 (b)).* In order that flight personnel of the air carrier may have more effectual use of the manual required by this section, the pilot in command shall have readily available in the cockpit a current copy of the manual required by this section, including a copy of the air carrier operating certificate and operations specifications. This manual shall contain such operations instructions as are necessary for the type of operations and aircraft concerned, and interpreting the air carrier's procedures to be followed in complying with the operations requirements of this part and the operations specifications.

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication.)

42.60–5 *Preflight certification (CAA rules which apply to sec. 42.60 (a) and (c)).* In the interest of safety, the air carrier shall establish in all operations manuals maintained for the use and guidance of operations personnel a procedure whereby the pilot in command, who has not flown over the route and into the airport of destination within the preceding 60 days, will certify on an appropriate form provided by the air carrier that he has taken the preflight actions specified in section 42.51–1. The manual shall also contain a procedure for maintaining such certification as part of the air carrier flight records.

(Published in 18 F. R. 172, Jan. 9, 1953, effective Jan. 31, 1953.)

42.60*a* *Airplane flight manual.*

(a) The air carrier shall keep current an approved Airplane Flight Manual for each type of transport category airplane which it operates.

(b) An approved Airplane Flight Manual or a manual complying with section 42.60 and containing information required for the Airplane Flight Manual shall be carried in each transport category airplane.

42.61 *Flight plan for large aircraft.* No large aircraft shall be taken off unless a VFR or IFR flight plan containing the appropriate information required by Part 60 of this subchapter is filed by the air carrier with the nearest CAA communications station or, when outside the United States, with the appropriate authority. In the event communications facilities are not readily available, such flight plan shall be filed as soon as practicable after becoming air-borne. An IFR or VFR flight plan must thereafter be in effect for all portions of the flight.

42.61–1 *IFR operation in control zone or control area (CAA policies which apply to sec. 42.61).* Prior to takeoff from a point within a control zone, or prior to entering a control area or control zone when operating under IFR conditions, an IFR flight plan shall be filed and an air traffic control clearance shall be obtained from air traffic control.

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication.)

42.62 *Flight manifest for large aircraft and passenger-carrying aircraft operating under IFR conditions.* For all large aircraft, or any aircraft carrying passengers under IFR conditions, a flight manifest form shall be prepared and signed for each flight by qualified personnel of the air carrier charged with the duty of supervising the loading of the aircraft and the preparation of the flight manifest form. The form and contents of this manifest shall be in accordance with the instructions contained in the air carrier's operations manual and shall include the names and addresses of the passengers carried, points of departure and destination, the weight of the cargo and passengers, and the distribution of such weight in the aircraft in accordance with the weight control system prescribed in the operations manual. The weight of the passengers may be determined in accordance with a weight control system prescribed by the Administrator. In the event passengers are picked up at points other than the principal operations base or discharged at points other than as shown on the latest manifest, the pilot shall, before starting the flight, cause a duplicate copy of the revised manifest to be mailed to such base, unless other requirements are set forth in the carrier's operations manual.[8]

[8] See section 42.95 for record-keeping requirements for the flight manifest.

42.62–1 *Content of flight manifest (CAA policies which apply to sec. 42.62).* The flight manifest required by this section shall include at least the following information:

(a) Company or organization name.
(b) Date of flight.
(c) Flight or trip number.
(d) Point of departure.
(e) Destination (via route, etc.).
(f) Make, model, and registration number of aircraft.
(g) Names and addresses of passengers.
(h) Location and weight of crew, gasoline, oil, passengers, cargo, and ballast (if any).
(i) Empty, gross, and useful aircraft weights.
(j) Aircraft c. g. limits.
(k) C. g. of aircraft as loaded.
(l) Signature of pilot or authorized loading officer.

Extra manifest forms should be carried aboard the aircraft in order to meet the requirements in regard to discharging or picking up passengers or cargo at other than the principal operations base.

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication.)

42.62–2 *Weight control system (CAA interpretations which apply to sec. 42.62).* The weight control system as mentioned in this section includes the loading procedures as prescribed in the Operations Manual as well as the data derived from the weighing procedures or approved weight control system set forth in the Maintenance Manual.

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication.)

42.63 *Night VFR operations for large passenger-carrying aircraft; special rules.*

(a) Night VFR passenger operations in large aircraft shall be conducted only over civil airways or over off-airway routes for which the Administrator has established minimum en route instrument altitudes. Night VFR operations over such off-airway routes shall be conducted at or above such established altitudes. In addition, night VFR operations may be conducted only at airports equipped with satisfactory radio navigational facilities for which the Administrator has established approach procedures: *Provided* That the Administrator may authorize operations at other airports upon finding that safe transition between the route and the airport may be made visually under weather minimums which he may establish, but which will in no case be lower than those provided in section 42.55 (a).

NOTE: Minimum en route instrument altitudes which have been established by the Administrator are published in the Flight Information Manual.

(b) During night VFR passenger operations in large aircraft the pilot-in-command of the aircraft shall ensure that a continuous watch is maintained on the appropriate radio frequencies and shall report by radio as soon as possible the time and altitude of passing each designated reporting point together with weather conditions and any other information which the pilot considers important to the safety of flight. In addition, in operations over off-airway routes the pilot-in-command shall report as soon as possible the time and altitude of passing over each check point specified in the flight plan.

Operating Limitations for Large Passenger-Carrying Airplanes

42.70 *Operating limitations for transport category airplanes.*

(a) In operating any passenger-carrying transport category airplane the provisions of sections 42.71 through 42.78 shall be complied with unless deviations therefrom are specifically authorized by the Administrator on the ground that the special circumstances of a particular case make a literal observance of the requirements unnecessary for safety.

(b) For transport category aircraft the data contained in the Airplane Flight Manual shall be applied in determining compliance with these provisions. Where conditions differ from those for which specific tests were made, compliance shall be determined by interpolation or by computation of the effects of changes in the specific variables where such interpolations or computations will give results substantially equalling in accuracy the results of a direct test.

(c) No airplane shall be taken off at a weight which exceeds the allowable weight for the runway being used as determined in accordance with the takeoff runway limitations of the transport category operating rules, after taking into account the temperature operating correction factors required by sections 4a.749a-T or 4b.117 of this subchapter, and set forth in the Airplane Flight Manual for the airplane.

42.70–1 *Deviations (CAA rules which apply to sec. 42.70 (a)).* An application for any deviation shall include all supporting data and shall be forwarded to the [district office] charged with the over-all inspection of the air carrier's operations.

(Published in 19 F. R. 2168, Apr. 15, 1954, effective Apr. 25, 1954; amended effective June 15, 1957.)

42.70–2 *Accuracy of data (CAA policies which apply to sec. 42.70 (b)).* The charts and data prepared by the air carrier for use of flight and operations personnel should be prepared with sufficient accuracy and clarity that the gross weight and runway length values for specific operating conditions can be reproduced within a tolerance of one-half of 1 percent by an independent recheck.

(Published in 19 F. R. 2168, Apr. 15, 1954, effective Apr. 25, 1954.)

42.70–3 *Temperature accountability (CAA policies which apply to sec. 42.70 (c)).* The maximum permissible weight for a given takeoff should be equal to the lowest of three values determined separately by consideration of (a) accelerate-stop, (b) takeoff and climb out to a 50-foot height and (c) the obstacle clearance condition. The established temperature accountability correction factors appearing in the Airplane Flight Manuals are applied to the takeoff weights determined by the accelerate-stop and climb out to a 50-foot height. These values may be used individually or in combination, i. e., if a runway is considerably longer

than is required to meet the accelerate-stop and climb out to 50-foot requirements at standard temperature, then at temperatures higher than standard, takeoff weight need not be reduced as long as additional runway length is available. When the temperature reaches a value at which no additional runway length remains, then a reduction in weight would be necessary. These factors do not apply to weights determined by obstacle clearance considerations. If the takeoff weight at standard temperature is limited by obstruction clearance rather than by the climb out to 50 feet or by the accelerate-stop distance, a weight reduction need not be made for temperatures higher than standard until the temperatures reach a high enough value to use up the existing runway between that used for standard temperature (limited to less than the full runway because of obstacles) and the actual length.

(Published in 19 F. R. 2168, Apr. 15, 1954, effective Apr. 25, 1954.)

42.71 *Weight limitations.*

(a) No airplane shall be taken off from any airport located at an elevation outside of the altitude range for which maximum takeoff weights have been determined, and no airplane shall depart for an airport of intended destination, or have any airport specified as an alternate, which is located at an elevation outside of the altitude range for which maximum landing weights have been determined.

(b) The weight of the airplane at takeoff shall not exceed the authorized maximum takeoff weight for the elevation of the airport from which the takeoff is to be made.

(c) The weight at takeoff shall be such that, allowing for normal consumption of fuel and oil in flight to the airport of intended destination, the weight on arrival will not exceed the authorized maximum landing weight for the elevation of such airport.

42.71–1 *Weight limitations (CAA policies which apply to sec. 42.71).* The limitations imposed by section 42.71 take into account only one operating variable, i. e., the elevation of the airport to be used as it affects the weight of the aircraft during takeoff or landing. Other operating variables, such as runway length, gradient, wind and temperature, are considered in other sections of this part. Compliance with this section does not present a particular problem since the Airplane Flight Manual provides performance data for airports over a wide range of elevations. However, most manuals do not provide data for operations at airports below sea level. Section 42.71 should not be construed as prohibiting operations from airports below sea level, since sea level data in the Airplane Flight Manual, being conservative, may be applied to such airports.

(Published in 19 F. R. 2168, Apr. 15, 1954, effective Apr. 25, 1954.)

42.72 *Takeoff limitations to provide for engine failure.* No takeoff shall be made except under conditions which will permit compliance with the following requirements:

(a) It shall be possible, from any point on the takeoff up to the time of attaining the critical-engine-failure speed to bring the airplane to a safe stop on the runway, as shown by the accelerate-stop distance data.

(b) It shall be possible, if the critical engine should fail at any instant after the airplane attains the critical-engine-failure speed, to proceed with the takeoff and attain a height of 50 feet, as indicated by the takeoff path data, before passing over the end of the takeoff area. Thereafter, it shall be possible to clear all obstacles, either by at least 50 feet vertically, as shown by the takeoff path data, or by at least 200 feet horizontally within the airport boundaries and by at least 300 feet horizontally after passing beyond such boundaries.

(1) In determining the allowable deviation of the flight path in order to avoid obstacles by at least the distances above set forth, it shall be assumed that the airplane is not banked before reaching a height of 50 feet, as shown by the takeoff path data, and that a maximum bank thereafter does not exceed 15°.

(c) In applying the requirements of paragraphs (a) and (b) of this section, corrections shall be made for any gradient of the takeoff surface. To allow for wind effect, takeoff data based on still air may be corrected by not more than 50 percent of the reported wind component along the takeoff path if opposite to the direction of takeoff, and shall be corrected by not less than 150 percent of the reported wind component if in the direction of takeoff.

42.72-1 *Takeoff limitations to provide for engine failure (CAA policies which apply to sec. 42.72).*

(a) *Takeoff flight path.* Diagram 1 is a pictorial representation of the relationship required between the dimensions of an airport and its surroundings, and the performance of the airplane. It illustrates the takeoff flight path defined by the airworthiness requirements.

(b) *Airport data.* Complete data concerning the airport dimensions and characteristics, such as runway lengths, runway gradients, obstruction heights and location, airport elevation, and the nature and condition of airport areas other than paved runways from which takeoffs might be made, are necessary for the determination of permissible takeoff weights. The most nearly complete and satisfactory source of such data is the series of Airport Obstruction Plans prepared by the United States Department of Commerce Coast and Geodetic Survey. However, their Airport Obstruction Plan series does not yet completely cover the airports used by air carrier operators of Transport Category airplanes, and in addition, the Obstruction Plans do not present any data showing the nature or condition of runway surfaces or other airport areas suitable for use in takeoff and landing. Furthermore, the Obstruction Plans necessarily contain data which may be several months old and which may not completely conform to the existing obstructions. Therefore, it may be necessary, for the air carrier operator, to supplement its data with information obtained from other sources. However, gross weight data calculated on the basis of such data should be rechecked or recalculated as soon as appropriate data from the Coast and Geodetic Survey becomes available.

(c) *Runways.*

(1) Normally, only paved runways will be approved for use in takeoff. However, in some cases there may be a defined rectangular area hereinafter designated as a stopway at the end of a runway in the direction of takeoff, selected and approved as a suitable area, in which the aircraft can be stopped after an interrupted takeoff. The stopway should have the same width as the runway it augments. The stopway should be so prepared or constructed as to enable the aircraft to come to a stop on it without hazard at the operating speeds that might be expected in this area after an interrupted takeoff. If it is desired to use a stopway to meet the "climb to a 50-foot height" requirement, the stopway should be suitable for the aircraft to traverse it at takeoff speeds without hazard.

(2) In all cases the takeoff should be assumed to begin on the paved runway and not on an unpaved area. No allowance need be made for the length of the airplane in determining what should be considered to be the proper point for beginning the takeoff. Limitations established by the airport operator may make it necessary to stipulate that the beginning of the takeoff area be at some point down the runway from the actual end of the paving.

(d) *Turns to avoid obstructions.*

(1) Section 42.72 provides that after reaching a height of 50 feet, the aircraft may be turned with a bank not exceeding 15° to comply with the obstruction clearance criteria. Only one turn to a definite heading should be considered in detailing the takeoff path.

(2) The radius of turn resulting from a banked turn of 15° may be determined from the following formula:

Radius of turn $= V^2 \times 0.25$ feet where V = climb speed in mph, TAS

For example: at a climb speed of 120 mph., the radius of turn for a 15° banked turn would be,

$$120 \times 120 \times 0.25 = 3{,}600 \text{ feet.}$$

The effects of wind in altering a flight path need not be considered unless they are large (one-fourth climb speed) and the angle of turn is more than 45° from the runway heading.

(e) *Effects of runway gradient.*

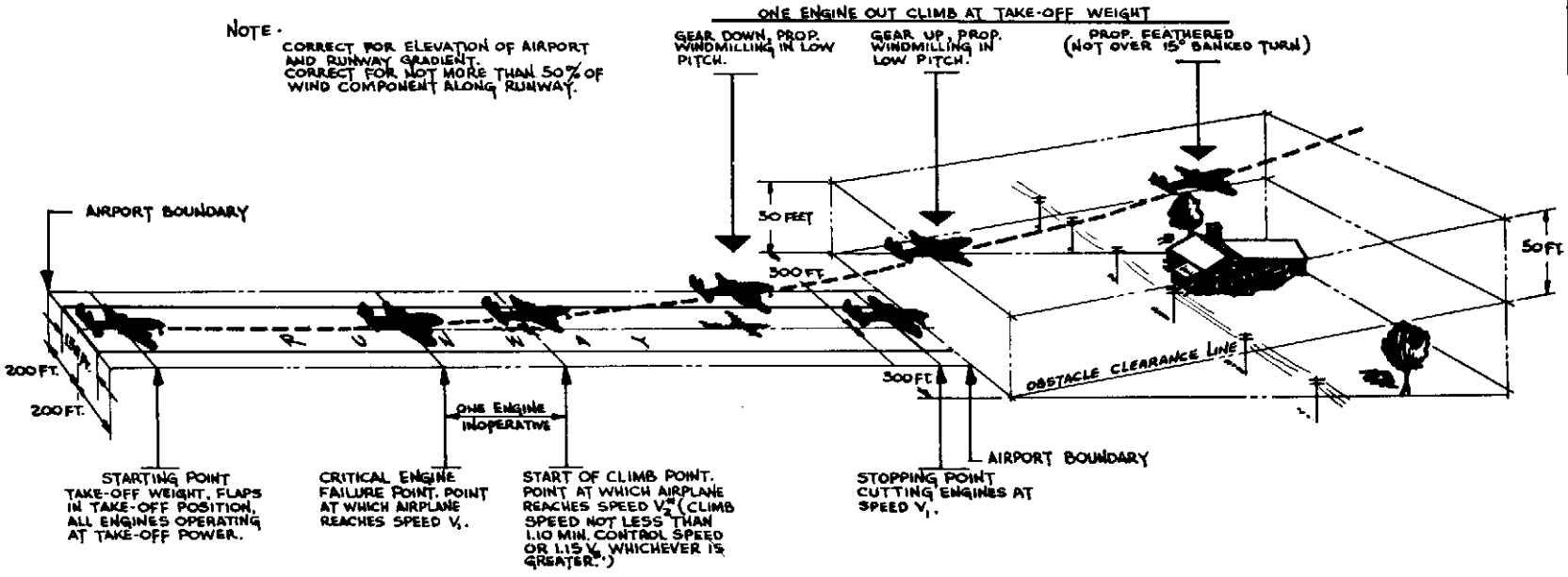
(1) The gradient effect on the ground run may be calculated from the following formula:

$$S_G = S\left[\frac{1}{1-\left(\frac{2Sg \sin \alpha}{V_2^2}\right)}\right]$$

where S_G = length of ground run with gradient.
S = length of ground run without gradient.
g = acceleration of gravity = 32.2 (ft./sec.^{2}).

(Rev. 6/15/57)

TAKE-OFF · AIRPORT LIMITATIONS



THE AIRPLANE SHALL RUN UP TO A SPECIFIED SPEED AND FROM THERE BE ABLE TO:

1. STOP WITHIN THE AIRPORT BOUNDARIES.
2. CONTINUE WITH ONE ENGINE INOPERATIVE AND CLEAR OBSTACLES AS SHOWN.

* $1.2V_s$ FOR AIRPLANES WITH TWO ENGINES
$1.15V_s$ FOR AIRPLANES WITH MORE THAN TWO ENGINES.
} V_s = STALL SPEED WITH TAKE-OFF CONFIGURATION.

Diagram 1

V_2=climb out speed, feet per second, true air speed.

α=angle of grade with horizontal, uphill (+), downhill (−).

(2) The above formula is based on several simplifying assumptions, i. e., that a uniform grade exists, that the airplane is accelerated uniformly throughout the ground run, and that the speed V_2 may be used where the difference between V_1 and V_2 is not large. None of these assumptions may be exactly correct, but the errors introduced by making such assumptions are small provided the airplane acceleration and the actual point-to point grade do not depart from the average values of those quantities by any great amount.

(3) The effect of gradient during the climb-out should be determined by comparing the airplane rate of climb with the change in runway elevation, to determine first the weight or wind condition at which the airplane clears the end of the runway and all obstacles by an actual 50 feet and second, that the airplane clears all points on the runway after takeoff.

(4) For purposes of simplification in calculating the effect of runway gradient on the takeoff flight path, an average gradient consisting of the difference in elevation of the two ends of the runway divided by the runway length may be used, provided that no intervening point on the runway lies more than 5 feet above or below a straight line joining the two ends of the runway. In this case, the gradient effects on the acceleration portion of the takeoff flight path and for the accelerate-stop portion may be presented together in simple chart form without introducing excessive errors. However, the actual gradient should be used for the climbout segments of the flight path and in no case should the gradient be greater than the first segment climb.

(5) In those cases in which intermediate points on the runway depart more than 5 feet from the mean line, the gradient effects on the acceleration portions, the deceleration portion, and the climb portion of the flight path should be computed separately. An average gradient may be assumed for the ground run portion of the problem because the error resulting therefrom is so small that a more rigorous treatment is not justified, provided a truly representative gradient is chosen. Where there are no reversals or significant changes in the runway slope during the ground run, the average may be taken to be the difference in elevation between the starting point and the point of attaining takeoff climb speed, V_2, divided by the distance between the two points. However, if the gradient is not essentially constant, an average gradient should be assumed that more nearly parallels the high-speed portion of the acceleration run, since the gradient has a greater effect on the distance traversed at high speed. The average gradient selected in this way will usually serve for determining gradient effects on the acceleration distance in either the takeoff flight path or the accelerate-stop distance. An average gradient should be determined in the same way in determining the gradient effects on the stopping distance, while the actual gradient should be determined in checking the climb segment to the 50-foot point.

(6) The operator may take advantage of the favorable effect of a down-hill gradient on the takeoff flight path, if he wishes, but the unfavorable effect of such a gradient on the stopping distance should be accounted for in all cases.

(f) *Effects of wind.*

(1) Section 42.72 permits the use of 50 percent of the headwind component and requires consideration of 150 percent of any tailwind component.

The effect of wind on runway requirements can be determined by use of the following equation:

(i) For all headwind components, and tailwind components of 10 miles per hour or less.

$$S_w = S\left(\frac{V_2 - V_w}{V_2}\right)^{1.85}$$

where S_w=runway required with wind.

S=runway required, zero wind.

V_2=takeoff safety speed (miles per hour)

V_w=+(.5×headwind component) or, −(1.5×tailwind component).

(ii) If tailwind components in excess of 10 miles per hour are approved, the equation will be:

$$S_w = S\left(\frac{V_2 - V_w}{V_2}\right)^2$$

Alternately, the exponent can be that which is determined to be appropriate to the separation of deceleration characteristics of the airplane type, as applicable.

(2) For steady wind conditions, the wind velocity and direction will be used in computing the effective headwind and tailwind components and the maximum gust velocity and most unfavorable direction will be used in computing the crosswind component.

(Published in 19 F. R. 2169, Apr. 15, 1954, effective Apr. 25, 1954.)

42.73 *En route limitations; all engines operating.* **No airplane shall be taken off at a weight in excess of that which would permit a rate of climb (expressed in feet per minute), with all engines operating, of at least $6V_{s_0}$ (when V_{s_0} is expressed in miles per hour) at an altitude of at least 1,000 feet above the elevation of the highest ground or obstruction within 10 miles of either side of the intended track. Transport category airplanes certificated under Part 4a of this subchapter are not required to comply with this section. For the purpose of this section it shall be assumed that the weight of the airplane as it proceeds along its intended track is progressively reduced by the anticipated consumption of fuel and oil.**

42.74 *En route limitations; one engine inoperative.*

(a) No airplane shall be taken off at a weight in excess of that which would permit a rate of climb (expressed in feet per minute), with one engine inoperative, of at least $\left(0.06-\frac{0.08}{N}\right)V_{s_0}^2$ (when N is the number of engines installed and V_{s_0} is expressed in miles per hour) at an altitude of at least 1,000 feet above the elevation of the highest ground or obstruction within 10 miles on either side of the intended track, except that for transport category airplanes certificated under Part 4a of this subchapter, the rate of climb shall be $0.02\ V_{s_0}^2$.

(b) As an alternative to the provisions of paragraph (a) of this section, an aircarrier may utilize an approved procedure whereby its airplanes are operated at an all-engine-operating altitude such that in the event of an engine failure the airplane can continue flight to an alternate airport where a landing can be made in accordance with the provisions of section 42.78, the flight path clearing all terrain and obstructions along the route within 5 miles on either side of the intended track by at least 2,000 feet. In addition, if such a procedure is utilized, subparagraphs (1) through (6) shall be complied with:

(1) The rate of climb (as presented 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 $\left(0.06-\frac{0.08}{N}\right)V_{s_0}^2$ (when N is the number of engines installed and V_{s_0} is expressed in miles per hour) for airplanes certificated under Part 4b of this subchapter, and by $0.02\ V_{s_0}^2$ for airplanes certificated under Part 4a of this subchapter.

(2) The all-engine-operating altitude shall be such that, in the event the critical engine becomes inoperative at any point along the route, the flight will be capable of proceeding to a predetermined alternate airport by use of this procedure. For the purpose of determining the takeoff weight, the airplane shall be 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: *Provided:* That the Administrator may authorize a procedure established on a different basis where adequate operational safeguards are found to exist.

(3) The airplane shall 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 shall include an approved method of accounting for winds and temperatures which would otherwise adversely affect the flight path.

(5) In complying with this procedure fuel jettisoning shall be permitted if the Administrator finds that the air carrier has an adequate training program, proper instructions are given to the flight crew, and all other precautions are taken to insure a safe procedure.

(6) The alternate airport shall be specified in the dispatch release and shall meet the provisions of section 42.55.

(c) For the purposes of this section it shall be assumed that the weight of the airplane as it proceeds along its intended track is pro-

gressively reduced by normal consumption of fuel and oil.

42.75 *En route limitations; two engines inoperative.* The provisions of this section shall apply only to airplanes certificated in accordance with the performance requirements of Part 4b of this subchapter. No airplane having four or more engines shall be flown along an intended track except under the conditions of either paragraph (a) or paragraph (b) of this section.

(a) No place along the intended track shall be more than 90 minutes away from an available landing area at which a landing can be made in accordance with the requirements of section 42.78, assuming all engines to be operating at cruising power.

(b) The takeoff weight shall not be greater than that which would permit the airplane, with the two critical engines inoperative, to have a rate of climb in feet per minute equal to 0.01 $V_{s_0}^2$ (V_{s_0} being expressed in miles per hour) along all points of the route, from the point where the two engines are assumed to fail simultaneously to the lending area, either at an altitude of 1,000 feet above the elevation of the highest ground or obstruction within 10 miles on either side of the intended track or at an altitude of 5,000 feet, whichever is higher. The point where the two engines are assumed to fail shall be that point along the route which is most critical with respect to the takeoff weight. In showing compliance with this prescribed rate of climb, the following shall apply:

(1) It shall be permissible to consider that the weight of the airplane as it proceeds along its intended track is progressively reduced by normal consumption of fuel and oil with all engines operating up to the point where the two engines are assumed to fail and with two engines operating beyond that point.

(2) 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 an altitude at which the rate of descent becomes zero, if the latter is sufficiently above the prescribed minimum altitude to assure compliance with the prescribed rate of climb at the prescribed minimum altitudes during the subsequent portion of the flight.

(3) If fuel jettisoning is provided, the airplane's weight at the point where the two engines are assumed to fail shall be considered to be not less than that which would include sufficient fuel to proceed to an available landing area at which a landing can be made in accordance with the requirements of section 42.78 and to arrive there at an altitude of at least 1,000 feet directly over the landing area.

42.76 *En route limitations; where special air navigational facilities exist.* The 10-mile lateral distance specified in sections 42.73 through 42.76 may, for a distance of no more than 20 miles, be reduced to 5 miles: *Provided,* That special air navigational facilities provide a reliable and accurate identification of any high ground or obstruction located outside of such 5-mile lateral distance but within the 10-mile distance.

42.76–1 *En route limitations; where special air navigational facilities exist (CAA policies which apply to sec. 42.76).* No attempt is made to classify specific types of navigational facilities as acceptable or unacceptable for the purposes of section 42.76, but each case will be examined on its own merits. In general, however, the facility should be of a type that gives the pilot a continuous fix of his position with an error of not more than 2 miles, or a continuous on course indication with an error of not more than 2 miles, or a continuous indication of the bearing and distance of the obstacle from the airplane, with an accuracy adequate to allow the pilot to turn away from the obstacle with ample clearance. Any mechanical or electrical facilities that are to be acceptable should be thoroughly reliable regardless of weather or other operating conditions. Such considerations apply only for IFR operations.

(Published in 19 F. R. 2170, Apr. 15, 1954, effective Apr. 25, 1954.)

42.77 *Landing distance limitations; airport of destination.* No airplane shall be taken off at a weight in excess of that which, under the conditions stated in paragraphs (a) and (b) of this section, would permit the airplane to be brought to rest at the field of in-

tended destination within 60 percent of the effective length of the runway from a point 50 feet directly above the intersection of the obstruction clearance line and the runway. For the purpose of this section it shall be assumed that the takeoff weight of the airplane is reduced by the weight of the fuel and oil expected to be consumed in flight to the field of intended destination.

(a) It shall be assumed that the aircraft is landed on the most favorable runway and direction without regard to wind.

(b) It shall be assumed, considering every probable wind velocity and direction, that the aircraft is landed on the most suitable runway, taking due account of the ground handling characteristics of the airplane and allowing for the effect on the landing path and roll of not more than 50 percent of the favorable wind component.

(c) If the airport of intended destination will not permit full compliance with paragraph (b) of this section, the aircraft may be taken off if an alternate airport is designated which permits compliance with section 42.78.

42.77–1 *Landing distance limitations; airport of destination (CAA policies which apply to sec. 42.77).*

(a) Section 42.77 establishes two major considerations in determining the permissible landing weight at the airport of destination. The first is that the aircraft weight will be such on arrival that it can be landed within 60 percent of the effective landing length of the most favorable (normally the longest) runway in still air. This maximum weight for an airport/aircraft configuration, once established, remains constant and cannot be exceeded, regardless of wind conditions.

(b) The second is that consideration be given to the maximum weight that will be permitted due to the necessity of using another runway because of the probable wind condition, ground handling characteristics of the aircraft, landing aids, etc. This consideration may result in a lower gross weight than permitted in paragraph (a) of this section, in which case, dispatch must be based on this lesser weight.

(c) The probable wind referred to in paragraph (b) of this section, is the wind forecasted to exist at the time of arrival.

(d) If the forecast conditions are such that consideration of the requirements in section 42.77 (b) would preclude a landing at the intended destination, the aircraft may be dispatched if an alternate airport is designated which permits compliance with section 42.78.

(e) (1) If a flight has been properly dispatched, but arrives at the destination with a weight higher than anticipated due to unexpected wind conditions or fuel consumption, section 42.77 (b) should not be construed as prohibiting a landing at the overweight condition, provided the crosswind and/or tailwind operating limitations are not exceeded. (2) If conditions are such that the crosswind and/or tailwind limitations will be exceeded, the flight must proceed to its alternate, if one has been named to meet the requirements of section 42.77 (b). However, if an alternate was not provided, and upon arrival the wind conditions were such that the crosswind and/or tailwind limitations would be exceeded, the pilot should exercise the authority granted him in section section 42.51 (d).

(f) For application of the wind components as allowed in section 42.77 (b), refer to section 42.72–1 (f).

(Published in 19 F. R. 2170, Apr. 15, 1954, effective effective Apr. 25, 1954.)

42.78 ***Landing distance limitations; alternate airports.*** **No airport shall be designated as an alternate airport in a flight plan unless the aircraft at the weight at takeoff can comply with the requirements of section 42.77 (a) and (b) at such airport: *Provided,* That the aircraft can be brought to rest within 70 percent of the effective length of the runway.**

42.80 ***Operating limitations for aircraft not certificated in the transport category.*** **In operating any passenger-carrying, large, nontransport category airplanes after January 1, 1950, the provisions of sections 42.81 through 42.83 shall be complied with. Prior to that date, such aircraft shall be operated in accordance with such operating limitations as the Administrator determines will provide a safe relation between the performance of the aircraft and the airports to be used and the areas to be traversed. Performance data published by the Administrator for each such nontransport**

category type aircraft shall be used in determining compliance with such provisions.

42.80-1 *Performance data on Curtiss model C46 aircraft certificated for maximum weights of 45,000 pounds to 48,000 pounds (CAA rules which apply to sec. 42.80).* The following performance limitations data, applicable to the Curtiss model C46 aircraft shall be used in determining compliance with section 42.80. These data are presented in the tables and figures of this section.

TABLE 1.—*Takeoff limitations*

(a) "Effective length" of runway required when effective length is determined in accordance with section 42.1. (Distance to accelerate to 93 knots TIAS, and stop, with zero wind and zero gradient.

Standard altitude in feet	Airplane weight in pounds			
	39,000	42,000	45,000	[1] 48,000
	Distance in feet			
S. L.	4,110	4,295	4,570	4,950
1,000	4,250	4,450	4,725	5,130
2,000	4,400	4,600	4,880	5,300
3,000	4,650	4,890	5,190	5,680
4,000	4,910	5,170	5,500	6,050
5,000	5,165	5,450	5,810	6,430
6,000	5,420	5,730	6,120	6,805
7,000	5,685	6,000	6,440	(2)
8,000	5,940	6,280	6,750	(2)

[1] For use with Curtiss model C46 airplanes when approved for this weight.
[2] Limited by sec. 42.82.

(b) 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.	4,835	5,050	5,375	5,825
1,000	5,000	5,235	5,555	6,035
2,000	5,175	5,410	5,740	6,235
3,000	5,470	5,750	6,105	6,680
4,000	5,775	6,080	6,470	7,120
5,000	6,075	6,410	6,830	7,565
6,000	6,375	6,740	7,200	8,005
7,000	6,690	7,060	7,575	(2)
8,000	6,990	7,390	7,940	(2)

[1] For use with Curtiss model C46 airplanes when approved for this weight.
[2] Limited by sec. 42.82.

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 [1] (feet)	Blower setting
45,000	6,450	Low.
44,000	7,000	Do.
43,000	7,550	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 airplane may be operated in compliance with sec. 42.82

(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 [1] (based on a climb speed of 113 knots (TIAS)).

Weight (pounds)	Terrain clearance [2] (feet)	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] Engine installations having P & W. R-2800-27, -43, -51, -71, -75, -79 engines can be approved for 1,700 brake horsepower in low blower. See engine specification chap. 19. p. 30.02 revised Oct. 10, 1949
[2] Highest altitude of terrain over which airplane may be operated in compliance with sec. 42.82

42.81 *Takeoff limitations.* No takeoff shall be made except under conditions which will permit the airplane to be brought to a safe stop within the effective length of the runway from any point on takeoff up to the time of attaining, with all engines operating at normal takeoff power, 105 percent of the minimum control speed or 115 percent of the power-off stall speed in the takeoff configuration, whichever is greater, as shown by the accelerate-stop distance data.

(a) In applying this requirement, takeoff data shall be based upon still-air conditions, and no correction shall be made for any uphill gradient of 1 percent or less when such percentage is measured as the difference between elevation at the end points of the runway divided by the total length. For all uphill gradients greater than 1 percent, the effective takeoff length of the runway shall be reduced 20 percent for each 1 percent grade.

42.82 *En route limitations; one engine inoperative.* No airplane shall be taken off at a weight in excess of that which, with the critical engine inoperative, would permit a rate of climb of at least 50 feet per minute at an altitude of at least 1,000 feet above the elevation of the highest ground or obstruction within 10 miles of either side of the intended track or at an altitude of 5,000 feet, whichever is higher. For the purpose of this section it shall be assumed that the weight of the airplane as it proceeds along its intended track is progressively reduced by the anticipated consumption of fuel and oil; that the propeller of the inoperative engine is in the minimum drag position; that the wing flaps and landing gear are in the most favorable positions; and that the remaining engine or engines are operating at the maximum continuous power available. The 10-mile lateral distance specified herein may, for a distance of no more than 20 miles, be reduced to 5 miles, provided that special air navigational facilities provide a reliable and accurate identification of any high ground or obstruction located outside of such 5-mile lateral distance but within the 10-mile distance.

42.83 *Landing distance limitations; airport of destination.* No airplane shall be taken off at a weight in excess of that which, under the conditions stated in paragraphs (a) and (b) of this section, would permit the airplane to be brought to rest at the field of intended destination within 70 percent of the effective length of the runway from a point 50 feet directly above the intersection of the obstruction clearance line and the runway. For the purpose of this section it shall be assumed that the takeoff weight of the airplane is reduced by the weight of the fuel and oil expected to be consumed in flight to the field of intended destination.

(a) It shall be assumed that the aircraft is landed on the most favorable runway and direction without regard to wind.

(b) It shall be assumed, considering every probable wind velocity and direction, that the airplane is landed on the most suitable runway, taking due account of the ground handling characteristics of the airplane type involved and other conditions (e. g., landing aids, terrain, etc.) and allowing for the effect on the landing path and roll of not more than 50 percent of the wind component along the landing path if opposite to the direction of landing, or not less than 150 percent of the wind component if in the direction of landing.

(c) If the airport of intended destination will not permit full compliance with paragraph (b) of this section, the aircraft may be taken off if an alternate airport is designated which permits compliance with paragraphs (a) and (b) of this section.

Required Records and Reports

42.91 *Maintenance records.*

(a) Each air carrier shall, except as provided in paragraph (b) of this section, keep at its principal operations base the following current records with respect to all aircraft, aircraft engines, propellers, and, where practicable, appliances used in air transportation: (1) Total time and service, (2) time since last overhaul, (3) time since last inspection, and (4) mechanical failures.

(b) In the case of a propeller for which there is no previous operating history, the Administrator may authorize the use of a new record if the hub is rebuilt and is fitted with blades which are free from defects and within the manufac-

turer's production tolerances. Such rebuilding of the propeller shall be accomplished by the manufacturer or by a certificated repair station having the proper rating. The new record shall be signed by the manufacturer or by the repair agency, giving the date the propeller hub or blade was rebuilt and such other information as the Administrator may require.

42.91–1 *Content of maintenance records (CAA policies which apply to sec. 42.91).* The basic requirement of the above records is to provide a means for determining that overhaul, inspection, and check of the various units or components is performed within the prescribed time limitations. In the case of appliances, any method which will accomplish this result, other than keeping of individual time records on the units themselves, will be satisfactory.

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication.)

42.91–2 *Principal maintenance base (CAA policies which apply to sec. 42.91).* When the principal maintenance base is at a location other than the principal operations base, the term "Principal operations base," when applied to maintenance matters, shall be considered to mean the principal maintenance base. Copies of the necessary records shall also be maintained at the principal operations base if it is in a region other than the one in which the principal maintenance base is located.

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication.)

42.91–3 *Retention of records (CAA policies which apply to sec. 42.91).* The records required by this section shall be preserved and retained by the air carrier for a period of 2 years. For additional requirements pertaining to preservation of records, see Part 249 of this chapter (i. e. the Economic Regulations).

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication.)

49.92 *Airman records.* An air carrier shall maintain at its principal operations base, or at such other location used by the air carrier as the Administrator may designate, current records of every airman utilized as a member of a flight crew. These records shall contain such information concerning the qualifications of each airman as is necessary to show compliance with the appropriate requirements prescribed by the regulations in this subchapter. No air carrier shall utilize any airman as a flight crew member unless records are maintained for such airman as required in this section.

42.92–1 *Content of airman records (CAA policies which apply to sec. 42.92).*

(a) *General.* The following pertinent information is considered the minimum necessary in the airman records required by this section:

(1) Name (in full).

(2) Current duties and date of assignment (pilot, engineer, navigator, etc.).

(3) Airman certificates (type, number, and ratings).

(4) Date, result, and class of last physical examination.

(5) Date and result of last 6-month instrument competency flight check for each pilot in command.

(6) Record of each pilot's flight time including trip time, instrument, night flight time, and flight time in the make and model of aircraft on which he is currently qualified.

(7) Records of company training for all crewmen, including actual flight, synthetic flight, and maintenance of proficiency training.

(8) Any check pilot authorization.

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication.)

42.92–2 *Availability of records (CAA policies which apply to sec. 42.92).* The above information shall be made available at any time for inspection by an authorized representative of the Administrator or Board.

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication.)

42.92–3 *Retention of records (CAA policies which apply to sec. 42.92).* The disposition of any flight crew member released from the employ of the air carrier, or who becomes physically or professionally disqualified must be so indicated in these records and such records shall be retained by the company for at least 1 year. For additional requirements pertaining to preservation of records see Part 249 of this chapter (i. e. the Economic Regulations).

(Published in 14 F. R. 7041, Nov. 22, 1949, effective upon publication.)

42.93 *Emergency flight reports.* In the case of emergencies necessitating the transportation of persons or medical supplies for the protection of life or property, the rules contained herein regarding type of aircraft, equipment, and weather minimums to be observed will not be applicable: *Provided,* That within 48 hours after any such flight returns to its base the air carrier shall file a report with the Administrator setting forth the conditions under which the flight was made, the necessity therefor, and the names and addresses of the crew and passengers.

42.93–1 *Submission of emergency flight reports (CAA policies which apply to sec. 42.93).* The report referred to in this section shall be submitted in duplicate to the local [inspector,] and a copy shall be retained by the air carrier for at least 1 year.

(Published in 14 F. R. 7042, Nov. 22, 1949, effective Nov. 22, 1949; amended effective June 15, 1957.)

42.94 *Pilot's emergency deviation report.* Where pursuant to authority granted in section 42.51 (d) a pilot has deviated from established methods or requirements, he shall, within 7 days after completion of the trip, file with the Administrator a report thereof giving a brief statement concerning the circumstances of the emergency and the nature of the deviation.

42.94–1 *Submission of pilot's emergency deviation report (CAA policies which apply to sec. 42.94).* The report referred to in this section shall be submitted in duplicate to the local [inspector,] and a copy shall be retained by the air carrier for at least 1 year.

(Published in 14 F. R. 7042, Nov. 22, 1949, effective Nov. 22, 1949; amended effective June 15, 1957.)

42.95 *Flight manifest record.* A signed copy and any revision of the flight manifest required by section 42.62 shall be retained in the personal possession of the pilot for the duration of the flight, and a duplicate copy thereof shall be retained by the air carrier at its principal operations base, or at such other location used by the air carrier as the Administrator may designate, for at least 1 year after completion of the flight.

42.96 *Reporting of malfunctioning and defects.* An air carrier shall report in a manner prescribed by the Administrator all malfunctioning and defects occurring during operation or discovered during inspection which cause or may be reasonably expected by the air carrier to cause an unsafe condition in any aircraft, engine, propeller, or appliance. The corrective action taken by the air carrier to prevent recurrence of the malfunctioning or defect shall be indicated.

42.96–1 *Mechanical hazard and difficulty reports (CAA rules which apply to sec. 42.96).*

(a) *General.* The following reporting procedure will apply to all certificated irregular air carriers which operate large aircraft and eliminates the necessity for submission of form ACA–1226 by these operators.

(b) *Daily mechanical reports.*

(1) *Submission of reports.* Whenever a failure, malfunction, or other defect[10] is detected in flight or on the ground in an aircraft or aircraft component, which may reasonably be expected by the air carrier to cause a serious hazard in the operation of any aircraft, notice thereof is to be transmitted to the nearest [district] or regional office in the area in which the aircraft is being operated.

(2) *Times of submission.* Such daily reports should be submitted only where mechanical hazards have been detected; should be submitted within the 24-hour period from midnight to midnight of the day of occurrence; and should be transmitted to the nearest [district] office before noon of the following working day when possible, except for reports for Fridays, Saturdays, and Sundays should be submitted not later than noon of the following Monday. When it is impossible to furnish the report before noon due to scheduling, it should be reported as early as possible, but in no case later than 24 hours after the period for which the report is submitted. It is not necessary that the operator's personnel personally appear

[10] Failures, malfunctions, or other defects not covered by Part 62 of this subchapter (i. e. the Civil Air Regulations), which are to be reported under these rules, comprise generally the following basic items: Fire hazards, structural hazards, serious system or component malfunctions or failures, unsafe procedures or conditions, and defects in design or quality of parts and materials found installed on aircraft or intended for such installation.

423764 O—57——5

at the [district] office since such reports may be transmitted by telephone, wire, or other rapid means of communication.

(3) *Method of transmission.* Such reports may be transmitted in a manner or on a form convenient to the air carrier's system of communications and procedures.

(i) *Suggested form for transmission.* Whenever practicable, the following guide for each aircraft type should be used by the air carrier in submission of the daily reports:

(*a*) Type, CAA identification number of aircraft, air carrier, and date:

(*b*) Emergency procedure effected (unscheduled landing, dumping fuel, etc.);

(*c*) Nature of condition (fire, structural failure, etc.);

(*d*) Identification of part and system involved, including the model designation of the major component (e. g., P & WR–2800–34);

(*e*) Apparent cause of trouble (wear, cracks, design, personnel error, etc.);

(*f*) Disposition (repaired, replaced, aircraft grounded, etc.);

(*g*) Brief narrative summary to supply any other pertinent data required for more complete identification, determination of seriousness, corrective action, etc.

(4) *Supplementary information.* The daily reports should not be withheld pending presentation of all specific details pertaining to such items of information. As soon as the additional information is obtained, it is to be submitted in an expedited supplement to the original report, making reference to the date and place of submission of the first report.

(c) *Monthly report of chronic mechanical difficulties.* As soon as practicable after the end of each calendar month, each certificated irregular air carrier operating large aircraft shall submit three copies of a report covering the mechanical difficulties experienced during the preceding month which they consider chronic or otherwise particularly significant from a safety standpoint. The report is to fully identify all components (manufacturer, model, type, etc.) and contain sufficient information so as to enable a determination of the trend of failures and defects and to provide information on which to base corrective action. The detailed information from which such reports are prepared shall be kept current and available for examination at the air carrrier's main headquarters by any authorized representative of the Administrator or Board.

The reports shall be submitted to the office of the assigned [inspector.]

(Published in 14 F. R. 7042, Nov. 22, 1949, effective upon publication; amended in 18 F. R. 1719, Mar. 27, 1953, effective Apr. 15, 1953; amended effective June 15, 1957.)

42.97 *Change in exclusive use of large aircraft.* When, for any reason whatsoever, an air carrier shall cease to have the exclusive use of any large aircraft, an immediate report of such fact shall be filed with the Administrator in such form and manner and containing such information as the Administrator may prescribe.

Appendix A

Special Civil Air Regulations Which Affect Part 42

SPECIAL CIVIL AIR REGULATION NO. SR–368A

Effective: August 1, 1954
Adopted: July 29, 1954

Authorization for Scheduled Air Transportation of Cargo Under the Provisions of Part 42 of the Civil Air Regulations

Any air carrier authorized by the Board pursuant to Title IV of the Civil Aeronautics Act of 1938, as amended, to engage in scheduled air transportation of cargo outside the continental limits of the United States may conduct such transportation under the air carrier certification and operation rules prescribed in Part 42 of the Civil Air Regulations.

This regulation shall supersede Special Civil Air Regulation SR–368 and shall terminate July 31, 1957, unless sooner terminated or rescinded by the Board.

SPECIAL CIVIL AIR REGULATION NO. SR–389

Effective: October 27, 1952
Adopted: October 27, 1952

Emergency Exits for Airplanes Carrying Passengers for Hire

Contrary provisions of the Civil Air Regulations notwithstanding, no large airplane (above 12,500 pounds maximum certificated take-off weight) while carrying passengers for hire shall be operated with occupants in excess of the number permitted by applying the provisions of section 4b.362 (a), (b), and (c) of Part 4b of the Civil Air Regulations as amended by Amendment 4b–4, effective December 20, 1951, except that airplane types listed in the following table may be operated with the listed maximum number of occupants (including all crew members) and the listed corresponding number of exits (including emergency exits and doors) heretofore approved by the Administrator for emergency egress of passengers. Additional occupants above the values listed in the table may be carried if additional exits are provided, except that in no case shall more than eight additional occupants be carried for any one additional exit. The type, size and location of such additional exits shall be approved by the Administrator. For airplanes which have a ratio of maximum number of occupants to number of exits (as listed in the following table) greater than 14:1 and for airplanes which do not have installed at least one full-size door-type exit in the side of the fuselage in the rearward portion of the cabin, the first additional exit approved by the Administrator for increased occupancy shall be a floor-level exit not less than 24 inches wide by 48 inches high located in the

side of the fuselage in the rearward portion of the cabin. In no case shall an occupancy greater than 115 be allowed unless there are two full-size door-type exits in the rearward portion of the cabin, one on each side of the fuselage.

Airplane type	Maximum number of occupants including all crew members	Corresponding number of exits authorized for passenger use
B–307	61	4
B–377	96	9
C–46	67	4
CV–240	53	6
CV–340	53	6
DC–3	35	4
DC–3 (Super)	39	5
DC–4	86	5
DC–6	87	7
DC–6B*	112	11
L–18	17	3
L–049, L–649, L–749	87	7
L–1049	96	9
M–202	53	6
M–404	53	7

*The DC–6A, if converted to a passenger transport configuration, will be governed by the maximum number applicable to the DC–6B.

SPECIAL CIVIL AIR REGULATION NO. SR–392B

Effective: February 25, 1957
Adopted: February 25, 1957

Facilitation of Experiments With Exterior Lighting Systems

Contrary provisions of the Civil Air Regulations notwithstanding, experimental exterior lighting equipment which does not comply with the relevant specifications contained in the Civil Air Regulations may, subject to the approval of the Administrator, be installed and used on aircraft for the purpose of experimentation intended to improve exterior lighting for a period not to exceed six months: *Provided,* That

(1) The Administrator may grant approval for additional periods if he finds that the experiments can be reasonably expected to contribute to improvements in exterior lighting;

(2) Not more than 15 aircraft possessing a U. S. certificate of airworthiness may have installed at any one time experimental exterior lighting equipment of one basic type;

(3) The Administrator shall prescribe such conditions and limitations as may be necessary to insure safety and avoid confusion in air navigation;

(4) The person engaged in the operation of the aircraft shall disclose publicly the deviations of the exterior lighting from the relevant specifications

contained in the Civil Air Regulations at times and in a manner prescribed by the Administrator; and

(5) Upon application for approval to conduct experimentation with exterior lighting, the applicant shall advise the Administrator of the specific purpose of the experiments to be conducted; and at the conclusion of the approved period of experimentation, he shall advise the administrator of the detailed results thereof.

This regulation supersedes Special Civil Air Regulation No. SR–392A and shall terminate February 25, 1962, unless sooner superseded or rescinded.

SPECIAL CIVIL AIR REGULATION NO. SR–395A

Effective: February 20, 1955
Adopted: February 17, 1955

Authorization for Air Taxi Operators to Conduct Operations Under the Provisions of Part 42 of the Civil Air Regulations—Extension of Expiration Date for Air Taxi Operator Certificates

Notwithstanding the provisions of Parts 40 and 41 of the Civil Air Regulations, any air taxi operator as defined in section 298.1 (a) (2) of Part 298 of the Board's Economic Regulations shall be certificated and shall conduct operations in air transportation in accordance with the provisions of Part 42 of the Civil Air Regulations: *Provided,* That any air carrier operating certificate issued for air taxi operations which is in effect on, or issued after, the effective date of this regulation shall remain in effect until the expiration of this special regulation, unless such certificate is sooner surrendered, suspended, or revoked.

This regulation supersedes Special Civil Air Regulation SR–395 and shall remain in effect until such time as new air taxi certification and operation rules become effective, unless sooner terminated or rescinded by the Board.

SPECIAL CIVIL AIR REGULATION NO. SR–399A

Effective: October 26, 1955
Adopted: October 25, 1955

Provisional Maximum Takeoff Weights for Certain Airplanes Operated By Alaskan Air Carriers and by the Department of the Interior

1. The Administrator is hereby authorized to establish a maximum authorized weight for airplanes type certificated under the provisions of Aeronautics Bulletin No. 7–A of the Aeronautics Branch of the U. S. Department of Commerce, dated January 1, 1931, as amended, or under the normal category of Part 4a, which are operated entirely within the Territory of Alaska by Alaskan air carriers as designated by Part 292, as amended, of the Board's Economic Regulations or by the U. S. Department of the Interior in the conduct of its game and fish law enforcement activities and its management, fire detection, and fire suppression activities with respect to public land.

(Rev. 6/15/57)

2. The maximum authorized weight herein referred to shall not exceed any of the following:

(a) 12,500 pounds,

(b) 115 percent of the maximum weight listed in the CAA Aircraft Specification,

(c) The weight at which the airplane meets the positive maneuvering load factor requirement for the normal category specified in section 3.186 of the Civil Air Regulations, or

(d) The weight at which the airplane meets the climb performance requirements under which it was type certificated.

3. In determining the maximum authorized weight the Administrator shall also consider the structural soundness of the airplane and the terrain to be traversed in the operation.

4. The maximum authorized weight so determined shall be added to the airplane's operation limitations and identified as the maximum weight authorized for operations within the Territory of Alaska.

This regulation supersedes Special Civil Air Regulation No. SR–399, and shall terminate October 25, 1960, unless sooner superseded or rescinded.

SPECIAL CIVIL AIR REGULATION NO. SR–401A

Effective: August 25, 1955
Adopted: July 20, 1955

Smoke and Fire Detectors

1. Effective until April 1, 1957, notwithstanding the provisions of Parts 40, 41, and 42 of the Civil Air Regulations, no person shall be required to install or maintain smoke or fire detectors in airplane cargo compartments unless otherwise directed by the Administrator.

2. Upon application by an air carrier prior to April 1, 1957, the Administrator may authorize an air carrier to operate without full compliance with the fire detector requirements of Parts 40, 41, or 42 for a temporary period after April 1, 1957, where the Administrator finds that the air carrier has made a diligent effort to comply with the necessary fire detector requirements by April 1, 1957, and that the air carrier has shown that it will comply by a date certain.

This regulation supersedes Special Civil Air Regulation SR–401 and shall terminate on April 1, 1959, unless sooner superseded or rescinded by the Board.

SPECIAL CIVIL AIR REGULATION NO. SR–406C

Effective: July 1, 1956
Adopted: June 28, 1956

Application of transport category requirements to C–46 type airplanes

1. Contrary provisions of the Civil Air Regulations notwithstanding (in particular the provisions of section 42.15 (b) of Part 42), C–46 airplanes may be used in passenger operations conducted under Part 42 of the Civil Air

Regulations. Such airplanes shall be operated in accordance with section 42.15 (a) of Part 42 and the provisions of this special regulation.

2. C–46 type airplanes, when used in passenger operations in accordance with paragraph 4 of this regulation, shall not be operated at weights exceeding those which are demonstrated to the Administrator will allow compliance with the performance requirements of Part 4b, except that in determining the maximum takeoff weight, such weight shall be limited only to a value at which the airplane has a rate of climb equal to 0.035 $V_{s_1}^2$ in the takeoff configuration at sea level with the landing gear retracted but with the propeller of the inoperative engine feathered rather than windmilling.

3. Provisionally, pending a determination by the Administrator of the weights at which C–46 airplanes will meet the standards prescribed by paragraph 2 of this regulation, the maximum takeoff weight of such airplanes, when used in the manner herein referred to, shall not exceed 44,300 pounds: *Provided,* That in the case of C–46 airplanes equipped with Hamilton Standard propellers with blades Model Number 6491A–9 or approved equivalent which have been clipped in accordance with specifications approved by the Administrator, such provisional maximum weight shall be increased by 1,000 pounds until such time as the Administrator shall have determined by suitable tests another value to correspond to the additional efficiency obtainable by the use of such propellers, and thereafter by such other value.

4. The Administrator of Civil Aeronautics may authorize continued operation of C–46 airplanes in passenger service in accordance with paragraphs 2 and 3 of this regulation until January 1, 1957, if he finds that the applicant for such authorization has a bona fide, firm contract with the holder of a type certificate indicating that the required modifications will be completed prior to January 1, 1957, except that the Administrator may authorize during the period July 1, 1956, through July 15, 1956, such continued operation without a showing of such firm contract where the Administrator has previously permitted such operations based on genuine and diligent efforts to complete the required modifications. Such type certificate shall indicate that it meets the transport category requirements of Part 4b of the Civil Air Regulations in effect on July 20, 1950, with the exceptions authorized in SR–406A.

5. On and after July 1, 1956 (except as provided in paragraph 4), C–46 airplanes in passenger service shall comply with the provisions of Part 4b as in effect on July 20, 1950, except as otherwise provided hereinafter:

a. The provisions of sections sections 4b.0 through 4b.19 of Part 4b, effective May 18, 1954, shall be complied with.

b. The provisions of sections 4b.100 through 4b.190 need not be complied with.

c. The birdproof windshield requirements of section 4b.352 need not be complied with.

d. The provisions of sections 4b.480 through 4b.490 effective May 16, 1953, shall be complied with in lieu of sections 4b.480 through 4b.489 effective July 20, 1950, with the exception of subparagraph 4b.484 (a) (1) which shall be applicable as effective July 20, 1950, and paragraph 4b.487 (e) which has no counterpart in the 1950 regulations.

6. On and after January 1, 1957, C–46 airplanes in passenger service shall be recertificated in the transport category in accordance with paragraph 5 of this regulation, and shall comply with the provisions of sections 4b.100 through 4b.190 with the following exception: In determining the takeoff path

in accordance with section 4b.116 and the one engine-inoperative climb in accordance with section 4b.120 (a) and (b), the propeller of the inoperative engine may be assumed to be feathered if there is installed 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.

7. In applying the provisions of paragraphs 5 and 6 of this regulation, where literal compliance with the requirements of sections 4b.130 through 4b.190 of Subpart B and Subparts C, D, E, and F of Part 4b is extremely difficult to accomplish, and where the Administrator finds that service experience with the C–46 type airplane so justifies, the Administrator may authorize deviations from specific details of these requirements, taking into account the effect of design changes.

8. On or after January 1, 1957, C–46 airplanes in passenger service shall be operated in accordance with the performance operating limitations applicable to transport category airplanes.

9. C–46 airplanes which comply with the provisions of paragraphs 5 and 6 of this regulation may be used in passenger operations conducted under the provisions of Parts 40 and 41 provided they are operated in accordance with paragraph 8.

10. This Special Civil Air Regulation supersedes Special Civil Air Regulation SR–406B.

SPECIAL CIVIL AIR REGULATION NO. SR–410

Effective: April 18, 1955
Adopted: April 18, 1955

Flight Time Limitations for Transcontinental Nonstop Irregular Air Carrier Interstate Operations

Notwithstanding the requirements of section 42.48 of the Civil Air Regulations, air carriers in the conduct of interstate transcontinental nonstop flights, in accordance with Part 42, may schedule flight crew members for more than eight but not more than ten hours of continuous duty aloft without an intervening rest period: *Provided,* That the flight is conducted in pressurized airplanes with a flight crew of at least two pilots and a flight engineer: *And provided further,* That the carrier utilize in the conduct of such operations an air/ground communications service independent of systems operated by the Federal Government, and a dispatch organization, both of which have been approved by the Administrator as adequate to serve the terminal points concerned. This regulation shall terminate with the effective termination of SR–405.

SPECIAL CIVIL AIR REGULATION NO. SR-411

Effective: July 1, 1955
Adopted: June 30, 1955

Trail Operation of Transport Category Airplanes in Cargo Service at Increased Zero Fuel and Landing Weights

Notwithstanding the applicable structural provisions of the Civil Air Regulations, any air carrier may operate transport category airplanes which were certificated under the provisions of Part 4a or 4b in cargo service only, subject to the conditions hereinafter set forth:

(1) The air carrier shall submit an application to the Administrator indicating its desire to operate its airplane(s) under the provisions of this special regulation, and indicating which airplane(s) would be involved.

(2) The air carrier shall furnish a statement from each manufacturer for each type of airplane involved indicating in each case that the airplane manufacturer approves the operation of such type of airplane under the provisions of this regulation and that the airplane manufacturer will establish the inspection procedure prescribed in paragraph (4) of this Special Civil Air Regulation and will supervise such inspection as necessary.

(3) 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 maxima approved in full compliance with the applicable Civil Air Regulations: *Provided,* That the Administrator of Civil Aeronautics finds that the increase in either such weight is not likely to reduce seriously the structural strength, that the probability of sudden fatigue failure is not noticeably increased, and that the flutter, deformation, and vibration characteristics do not fall below those required by the Civil Air Regulations: *And provided further,* That any increase in the zero fuel weight approved shall not exceed 5 percent and that the increase in the structural landing weight shall not exceed the amount, in pounds, of the increase in the zero fuel weight.

(4) Airplanes for which the increased weights become effective shall be subject to inspections in addition to those normally performed, such inspections to be established by the manufacturer of the type airplane concerned, subject to the approval of the Administrator of Civil Aeronautics and to be supervised as found necessary by that manufacturer, to safeguard against possible structural distress resulting from the higher operating stress levels. Results of such inspections shall be reported to the Administrator of Civil Aeronautics at such times as he shall establish.

(5) Airplanes for which the increased weights become effective shall be operated in accordance with the transport category performance operating limitations prescribed in Part 40, 41, or 42 of the Civil Air Regulations, whichever is applicable.

(6) The air carrier shall keep and make available, upon request, to the Civil Aeronautics Board, the Administrator of Civil Aeronautics, or the manufacturer of the type airplane concerned, records of all flights conducted with airplanes for which the increased weights become effective, such records to include the actual takeoff, zero fuel, and landing weights.

(Rev. 6/15/57)

(7) The Airplane Flight Manual of each airplane operating under the provisions of this special regulation shall be appropriately revised so as to include the necessary operating limitations and operating information.

(8) An airplane which has been operated at increased weights under the provisions of this regulation shall not be used for the carriage of passengers, except under the following conditions:

(a) Special inspections established by the manufacturer and approved by the Administrator of Civil Aeronautics shall have been accomplished.

(b) The effects of the operations at increased weights on structural fatigue shall have been evaluated by the airplane manufacturer and taken into account in any fatigue limitations established for the airplane.

This regulation shall terminate on June 30, 1957, unless sooner superseded or rescinded.

SPECIAL CIVIL AIR REGULATION NO. SR-415

Effective: January 1, 1956
Adopted: December 29, 1955

Supplemental Air Carrier Certification and Operation Rules

Contrary provisions of the Civil Air Regulations notwithstanding, any air carrier holding valid authority issued by the Board to perform air transportation as a supplemental air carrier in charter services and individual services, as defined in Appendix A attached to Board Order No. E-9744, shall be certificated and shall conduct such operations in accordance with the provisions of Part 42 of the Civil Air Regulations. An air carrier operating certificate presently issued by the Civil Aeronautics Administration to a large irregular air carrier shall, until its stated expiration date, be valid as a supplemental air carrier operating certificate for supplemental air carrier operations, unless sooner surrendered, suspended, or revoked. Such certificate may be renewed as an air carrier operating certificate for supplemental air carrier operations.

This regulation shall remain in effect until such time as new supplemental air carrier certification and operation rules become effective, unless sooner superseded or rescinded by the Board.

SPECIAL CIVIL AIR REGULATION NO. SR-416

Effective: February 23, 1956
Adopted: February 23, 1956

Voluntary Pilot Report of Near Mid-Air ("Near-Miss") Collision

Contrary provisions of the Civil Air Regulations notwithstanding, information from a report voluntarily submitted to the Civil Aeronautics Board by any pilot of any aircraft, or by any other person, giving the facts, conditions, and circumstances surrounding any near mid-air collision of aircraft, wherever it might occur, shall not be used to initiate, aid, or abet any enforcement, remedial, or disciplinary proceeding under the Civil Air Regulations promul-

gated by the Board pursuant to the Civil Aeronautics Act of 1938, as amended. The identity of the pilot or person making such report, if known, and any information which might be used to establish such identity, shall be held in strict confidence by the Civil Aeronautics Board, and the information derived therefrom shall be used by the Board in the development of corrective safety measures only, notwithstanding that a violation of the Civil Air Regulations is disclosed by such report: ***Provided,*** That where information of such violation of a Civil Air Regulation is obtained by other means, the fact that the violation was voluntarily reported will not preclude enforcement, remedial, or other disciplinary proceedings that are initiated on the basis of such other information.

SPECIAL CIVIL AIR REGULATION NO. SR-419

Effective: January 17, 1957
Adopted: January 17, 1957

Authority To Deviate From Certain Provisions of the Civil Air Regulations in the Conduct of Military Contract Operations

Subject to conditions hereinafter set forth, the operators listed in Appendix A, and any other operator authorized by the Administrator to be added to such list pursuant to this regulation, may, while conducting operations under an Air Force contract known as LOGAIR, carry the persons listed in subparagraph 1 in aircraft without complying with the passenger-carrying rules prescribed in Part 42 of the Civil Air Regulations and Special Civil Air Regulation No. SR-406C, subject to such terms and conditions as the Administrator may find are necessary in the interest of safety.

1. Military couriers, route supervisors, and LOGAIR flight crew members of other LOGAIR contractors.

2. Each operator shall furnish the Administrator, prior to the carriage of such persons, with a list showing the type aircraft, registration number, and an authorization from the Air Force for the transportation of such persons.

3. The operator shall be responsible for the issuance of appropriate instructions to insure that the persons authorized to be carried will not create any interference with the control of the aircraft.

4. Upon notification by any other bona fide contractors acting pursuant to the above-specified LOGAIR contracts, the Administrator of Civil Aeronautics is authorized to add to the list in Appendix A any such operator who he determines meets the requirements of this Special Civil Air Regulation.

This Special Civil Air Regulation shall remain in effect until superseded or rescinded by the Board.

APPENDIX "A" TO SPECIAL CIVIL AIR REGULATION NO. SR-419

Operator

AAXICO AIRLINES, INC.
CAPITOL AIRWAYS, INC.
RIDDLE AIRLINES, INC.

(Rev. 6/15/57)

Appendix B

Air Taxi Operators

42.0–2 *Provisions of Part 42 which are applicable to air taxi operators (CAA interpretations which apply to sec. 42.0 and [SR–395A)]*.

(a) Under [SR–395A], the following sections of the certification and operation rules of Part 42 apply to air taxi operators:

42.0 Applicability of Part 42 (a).
42.1 Definitions.
42.5 Certificate issuance.
42.7 Display.
42.8 Inspection.
42.11 Aircraft required.
42.14 Minimum performance requirements for all aircraft.
42.16 Aircraft limitations for IFR and land aircraft over water operations.
42.21 Basic required instruments and equipment for aircraft.
[42.24a First aid kits and emergency equipment.
[42.24b Equipment for overwater operations.
[42.24c Emergency evacuation equipment.]
42.25 Cockpit checklist.
42.26 Supplemental oxygen.
42.28 Equipment standards.
42.29 Protective breathing equipment for the flight crew.
42.30 General. (Maintenance requirements.)
42.31 Inspections and maintenance. (a) (2), (b).
42.40 Airman requirements.
42.41 Composition of flight crew. (a), (b), (c).
42.42 Pilot qualification for small aircraft.
42.44 Recent flight experience requirements for flight crew members.
42.46 Logging flight time.
42.47 Grace period for airman periodic checks.
42.51 Pilot responsibilities.
42.52 Fuel supply. (a) (1), (3), (b).
42.53 Minimum flight altitude rules.
42.54 Flight into known icing conditions.
42.55 Weather minimums.
42.56 Instrument approach.
42.57 Airport lighting for night operations.
42.58 Navigational aids for IFR flight.
42.59 Passenger use of emergency equipment.
42.62 Flight manifest for large aircraft and passenger-carrying aircraft operating under IFR conditions.
42.91 Maintenance records.
42.92 Airman records.
42.93 Emergency flight reports.
42.94 Pilot's emergency deviation report.
42.95 Flight manifest record.
42.96 Reporting of malfunctioning and defects.

(b) The following sections of CAM 42 are applicable to the provisions of Part 42 listed in paragraph (a):

42.1–1 Flight time (*CAA interpretations which apply to sec. [42.1).]*
42.1–2 Twilight (*CAA interpretations which apply to sec. [42.1).]*
42.11–1 Listing of aircraft (*CAA rules which apply to sec. 42.11 (a)*).
42.21–1 Seats and safety belts (*CAA rules which apply to sec. 42.21 (a) (11)*).
42.21–2 Fire extinguishers (*CAA rules which apply to sec. 42.21 (a) (12)*).

42.21–3 Altimeter (*CAA policies which apply to sec. 42.21 (b) (1)*).
[42.24a–1 First-aid kits and emergency equipment (*CAA policies which apply to sec. 42.24a*).
[42.24b–1 Survival kit for overwater operations (*CAA policies which apply to sec. 42.24 (b)*).]
42.25–1 Cockpit check list (*CAA policies which apply to sec. 42.25*).
42.25–2 Minimum standard cockpit check list (*CAA policies which apply to sec. 42.25*).
42.30–1 General (Maintenance) (*CAA policies which apply to sec. 42.30*).
42.31–2 Maintenance and inspection—small aircraft (*CAA policies which apply to sec. 42.31 (a) (2)*).
41.31–3 Maintenance and inspection; all aircraft (*CAA policies which apply to sec. 42.31 (a) (1)* and *(2)*). (c) (1), (2).
42.31–4 Maintenance and inspection records (*CAA policies which apply to sec. 42.31 (b)*).
42.51–1 Responsibilities of the pilot in command (*CAA policies which apply to sec. 42.51*).
41.51–2 Time of reporting for duty (*CAA policies which apply to sec. 42.51 (b)*).
42.51–3 Flight equipment (*CAA policies which apply to sec. 42.51 (c)*).
42.51–4 Serviceability of equipment (*CAA policies which apply to sec. 42.51 (e)*).
42.52–1 Operation in the Territory of Alaska (*CAA policies which apply to sec. 42.52 (b)*).
42.54–1 Other parts of the aircraft (*CAA interpretations which apply to sec. 42.54*).
42.55–1 En route weather minimums (*CAA interpretations which apply to sec. 42.55 (a)*).
42.55–2 Air traffic clearance (*CAA interpretations which apply to sec. 42.55 (a)*).
42.56–1 Standard instrument approach procedures (*CAA rules which apply to sec. 42.56*).
42.57–1 Minimum facilities (*CAA policies which apply to sec. 42 57*).
42.58–1 Off-airway instrument operation (*CAA rules which apply to sec. 42.58*).
42.62–1 Content of flight manifest (*CAA policies which apply to sec. 42.62*).
42.91–1 Content of maintenance records (*CAA policies which apply to sec. 42.91*).
42.91–3 Retention of records (*CAA policies which apply to sec. 42.91*).
42.92–1 Content of airman records (*CAA policiesjwhich apply to sec. 42.92*).
42.92–2 Availability of records (*CAA policies which apply to sec. 42.92*).
42.92–3 Retention of records (*CAA policies which apply to sec. 42.92*).
42.93–1 Submission of emergency flight reports (*CAA policies which apply to sec. 42.93*).
42.94–1 Submission of pilot's emergency deviation report (*CAA policies which apply to sec. 42.94*).

(c) In addition to the items listed in (a) and (b), air taxi operators are governed by the following regulations:

(1) Economic Regulations Part 298.

(2) Economic Regulations Part 242, if aircraft having more than five passenger seats are used.

42.0–3 *Operations for which an Air Taxi Operator Certificate is not required* (*CAA interpretations which apply to sec. 42.0 and* [*SR–395A*).] The following operations which may involve remuneration are not considered as coming within the meaning of carriage by aircraft of persons or property as an air taxi operator:

(a) Student instruction.

(b) Local sightseeing flights which return to the point of departure without landing at other points.

(c) Any crop dusting, spraying, seeding, pest control, or other agricultural operations.

(d) Any industrial aviation operations such as patrol, photography, banner towing, etc.

(e) Any other aviation operation when the carriage of persons or materials is incidential to the main purpose of the flight.

42.5–5 *Application for an Air Taxi Operator Certificate* (*CAA rules which apply to sec. 42.5 and* [*SR–395A*).] Application for an Air Taxi Operator Certificate shall be made in triplicate on form ACA–1602, provided for this purpose by the Administrator. The application form may be obtained by contacting the local [inspector] or district office. When the requirements, as prescribed in this part, have been met (see sec. 42.0–2), the applicant shall present his application to the local [inspector] and arrange for an inspection of his flight equipment and all ground facilities.

Where inspection indicates that the applicant is capable of conducting the proposed operation in accordance with the provisions of 42.0–2, an Air Taxi Operator Certificate, form ACA–1603, will be issued, together with operations specifications. The operations specifications which have been approved on the application form become a part of the certificate, and specify the carriage of passengers, cargo, or both; the category and class of aircraft (e. g., aircraft single-engine land); and the flight conditions under which operations are authorized (e. g., VFR (day), VFR (night), IFR (day), IFR (night).

42.5–6 *Amendment and reissuance of Air Taxi Operator Certificates (CAA rules which apply to sec. 42.5).* Application for amendment and reissuance of an Air Taxi Operator Certificate shall be made, in accordance with procedure for original issuance, when the operator desires a change in:

(a) Name of address of operator.
(b) Ownership.
(c) Area of operations.
(d) Base of operations.
(e) Type of operations.

In cases of (a), (b), and (c) the [inspector] may elect to inspect the aircraft as for original issuance.

In cases of (d) the [inspector] may elect to inspect the aircraft if the base of operations is not moved out of the region of previous certification. Inspection will be made and a new certificate and number will be issued when the base is moved to another region.

In casses of (e) inspection as for original issuance will be made.

[42.5–8 *International air taxi operations (CAA policies which apply to sec. 42.5 and SR–395A).* (a) Air taxi operators who wish to conduct commercial operations into, or over, foreign countries should obtain prior authorization to conduct such operations from all of the foreign countries involved.

[NOTE: For commercial operations into Canada, or Mexico, requests for authorization should be directed as follows:

[Canada: Department of Transport
Air Transport Board
Ottawa, Canada

[Mexico: Director
General Civil Aviation
Mexico, D. F.]

(Published effective June 15, 1957.)

42.11–2 *Listing of small aircraft (CAA interpretations which apply to sec. 42.11).* An air taxi operator is required to have the exclusive use of at least one aircraft. However, such aircraft are not required to be listed on the operations specifications of air carrier operating certificates issued to air taxi operators. Therefore, no amendment of the certificate is required when an air taxi operator changes aircraft.

U. S. GOVERNMENT PRINTING OFFICE: 1957 O—423764