Civil Aeronautics Manual 43

General Operation Rules

FEDERAL AVIATION AGENCY

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Introductory Note

This manual contains in consolidated form (1) Civil Air Regulations, Part 43, General Operation Rules, dated October 1, 1954, Amendments 43–1 through 43–11, and the editorial changes required by Special Regulation SR–430 effective December 31, 1958; and (2) any rules, policies, and interpretations issued by the Administrator of the Federal Aviation Agency in application to the various sections of the regulations.

FAA *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.

FAA *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.

FAA *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 Agency in determining 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 43 dated July 1, 1957. As amendments and other pertinent materials pertaining to Part 43 are issued, they will be included in this manual.

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General Operation Rules

General

43.1 *Scope.* This part governs the operation of civil aircraft in the United States.

(Part 43, 19 F.R. 6370, Oct. 2, 1954, effective Oct. 1, 1954.)

Aircraft Requirements

43.10 *Aircraft requirements.*

(a) No aircraft shall be operated unless an appropriate and valid airworthiness certificate or special flight permit, and a registration certificate issued to the owner of the aircraft, are carried in the aircraft.

(b) No aircraft shall be operated except in accordance with the operating limitations prescribed by the certificating authority of the country of registry.

(c) No aircraft, except foreign aircraft, shall be operated unless it is identified in accordance with the requirements of Part 1 of this subchapter.

[(d) No aircraft, except foreign aircraft, shall be operated unless the operating limitations prescribed for the particular aircraft are set forth in a current approved Aircraft Flight Manual, on placards, listings, instrument markings, or in any combination thereof. The flight manual, placards, listings, or markings shall be legible and accessible to the pilot at his station, and shall include limitations on each of the following items, which have been prescribed for a particular aircraft:

[(1) Airspeeds (e.g., normal operating speed, flaps extended speed, etc.);

[(2) Powerplant (e.g., rpm, manifold pressure, gas temperature, etc.);

[(3) Aircraft weight, center of gravity, and weight distribution, including the composition of the useful load in those combinations and ranges intended to insure that the weight and center of gravity position will remain within approved limits (e.g., combinations and ranges of crew, oil, fuel, passengers, and baggage);

[(4) Minimum flight crew;

[(5) Types of operation;

[(6) Maximum operating altitude;

[(7) Maneuvering flight load factors;

[(8) Rotor speed (for rotorcraft);

[(9) Limiting height-speed envelope (for rotorcraft); and,

[(10) Any other limitations prescribed for a particular aircraft.]

(Part 43, 19 F.R. 6370, Oct. 2, 1954, effective Oct. 1, 1954; as amended by Amdt. 43-3, 22 F.R. 181, Jan. 9, 1957, effective Feb. 7, 1957, Amdt. 43-15, 27 F.R. 3004, Mar. 30, 1962, effective May 3, 1962.)

43.11 *Transport category airplane weight limitations.*

(a) No transport category airplane or airplane certificated in accordance with the transport category performance requirements shall be taken off from any airport located at an elevation outside of the altitude range for which maximum take-off 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 take-off shall not exceed the authorized maximum take-off weight for the elevation of the airport from which the take-off is to be made.

(c) The weight at take-off 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.

(Added by Amdt. 43-7, 22 F.R. 5863, July 24, 1957, effective Aug. 23, 1957.)

Maintenance

43.20 *General.* No person shall operate an aircraft unless it is in an airworthy condition. Maintenance shall be performed in accordance with Part 18 of this subchapter.

(Part 43, 19 F.R. 6370, Oct. 2, 1954, effective Oct. 1, 1954; as amended by Amdt. 43-2, 21 F.R. 2587, Apr. 20, 1956, effective July 17, 1956.)

Discussion of the Policies Relating to the Requirements of Section 43.20-1

The purpose of this policy is to delineate the responsibilities of the aircraft owner or operator, and the pilot. These responsibilities have been recognized by the industry for years; however, until this time, have not been established in any formal manner.

43.20-1 *General (FAA policies which apply to sec. 43.20).*

(a) Primary responsibility for maintaining the aircraft in an airworthy condition is that of the aircraft owner or operator. The owner or operator must have the aircraft inspected, as required by section 43.22 of this part, and must maintain the airworthiness of the aircraft during the time between the required inspections by having any defects corrected or repaired in accordance with Part 18 of this subchapter during this interim. Various types of aircraft will require different degrees of maintenance. Factors such as kind of operation, climatic conditions, storage facilities, and age of the aircraft will influence the maintenance requirements. Experience has indicated that most aircraft will require some type of preventive maintenance every 25 hours or less, and minor maintenance at least every 100 hours. The owner or operator must also make sure that maintenance personnel have made appropriate entries in the aircraft and maintenance records to indicate that the aircraft has been released to service.

(b) The pilot, however, must assume responsibility for determining that an aircraft is in condition for safe flight or discontinuing the flight when unairworthy mechanical or structural conditions occur. In this connection, the pilot is expected to make a preflight inspection. The preflight inspection should include, but not be limited to, a visual inspection of the aircraft and its components for general condition and state of repair, a functional check of controls, powerplants, instruments, and a determination that sufficient fuel and oil are aboard for the proposed flight.

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

43.21 *Flight tests.* When an aircraft has undergone any repair or alteration which may have appreciably changed its flight characteristics or substantially affected its operation in flight, such aircraft, prior to carrying passengers, shall be test flown by at least a private pilot appropriately rated for the aircraft, and a notation to that effect shall be entered by such pilot in the aircraft log.

(Part 43, 19 F.R. 6370, Oct. 2, 1954, effective Oct. 1, 1954.)

43.21-1 *Flight tests on aircraft prior to carrying passengers—determination of repairs or alterations which may have appreciably changed flight characteristics or substantially affected operation in flight (FAA policies which apply to sec. 43.21).*

(a) The flight test requirement of this section is not necessary where ground tests and/or inspections of an aircraft have been made which conclusively show that the repairs and alterations have not appreciably changed the flight characteristics or substantially affected its operation in flight.

(b) Because of the many types and variations of aircraft repairs or alterations, including engine changes, it is recognized that it is difficult to determine whether or not a repair or alteration has appreciably changed the flight characteristics of an aircraft, therefore an air carrier or other persons accomplishing repairs pursuant to air carrier maintenance rules, will include in the air carrier's or operator's maintenance man-

ual a detailed outline, for the guidance of all personnel, which specifies the procedures and circumstances under which flight tests will or will not be required.

(c) When repairs or alterations are made to aircraft other than air carrier aircraft, persons authorized under section 18.11 of this subchapter to approve such repairs or alterations as airworthy should determine whether or not a flight test is required. In making such flight test determination, such persons should consider the following: the nature of the repair or alteration, adequacy of ground test and inspection procedures, adequacy of facilities and equipment for the performance of such tests or inspections and the service experience with a particular repair or alteration.

(Published in 20 F.R. 4002 on June 9, 1955, effective June 30, 1955.)

43.22 ***Inspections.***

(a) ***Periodic and one-hundred-hour inspections.***

(1) No aircraft shall be operated, except when it carries a special flight authorization or a currently effective experimental certificate, unless within the preceding 12 calendar months it has been given a periodic inspection in accordance with the requirements of Part 18 of this subchapter and has been approved for return to service by a person authorized by section 18.12(b) of Part 18 of this subchapter. Additionally, an aircraft shall not carry passengers for hire or be used for flight instruction for hire unless within each 100 hours of time in service it has been inspected in accordance with the requirements of Part 18 of this subchapter and has been approved for return to service by a person authorized in section 18.12(a) of Part 18 of this subchapter: *Provided,* That this interval may be exceeded by not more than 10 hours when necessary to reach a point at which the inspection may be accomplished, in which event such time must be included in the next 100-hour interval.

(2) The periodic inspection required by subparagraph (1) of this paragraph will be acceptable as a 100-hour inspection. The inspection conducted for the issuance of an airworthiness certificate will be accepted as a periodic inspection.

(b) *Progressive inspection.* An aircraft shall be exempt from the provisions of paragraph (a) of this section if the owner or operator provides or makes arrangements for suitable procedures, personnel, and facilities for progressive inspection as prescribed by the Administrator in accordance with Part 18 of this subchapter.

(c) *Other exemptions.* An aircraft shall be exempt from the provisions of paragraphs (a) and (b) of this section if:

(1) It is an aircraft operated in accordance with the provisions of Part 40 or Part 41 of this subchapter; or

(2) It is an aircraft of more than 12,500 pounds maximum certificated take-off weight and is operated in accordance with the provisions of Part 42 of this subchapter.

Discussion Relating to Maintenance Requirements in Section 43.22

This section provides the aircraft owner with two methods of inspection whereby the continued airworthiness of an aircraft may be assured.

The first method is the use of the periodic inspection, and the 100-hour inspection if passengers are carried for hire. Both the periodic and 100-hour inspections are complete inspections of the aircraft—identical in scope. The periodic inspection must be accomplished by a mechanic with an inspection authorization, a repair station, or the aircraft manufacturer; whereas the 100-hour inspection may be performed by any certified rated mechanic as well as the aforementioned agencies.

The second method, or alternative method, is the progressive inspection which is a formal plan for continuous or progressive inspection of an aircraft whereby the inspection workload may be adjusted or equalized to suit the operation of the aircraft or the need of the owner. Its purpose is to permit greater utilization of the aircraft. The owner electing to employ the progressive inspection must provide proper personnel, procedures, and facilities prior

to commencing such inspection. The use of progressive inspection eliminates the need for periodic and 100-hour inspections during the period that the progressive inspection is followed.

43.22–1 Deleted.

(Deletion published in 24 F.R. 7637, Sept. 23, 1959, effective Sept. 17, 1959.)

43.22–2 *Progressive inspections (FAA rules which apply to sec. 43.22(b)).*

(a) If a registered aircraft owner or lessee elects to use the progressive inspection he shall provide the following inspection personnel, inspection procedures manual, facilities and technical information; and submit a statement to this effect to the local General Safety District Office (see appendix A for example) prior to using such inspection:

(1) The services of an authorized mechanic, an airframe repair station, or the manufacturer of the aircraft to supervise or conduct the progressive inspection.

(2) An inspection procedures manual which must be maintained in a current condition at all times. It shall be available to and in a form that is readily understood by pilot and maintenance personnel. It shall contain the following information in detail:

(i) An explanation of the progressive inspection outlining continuity of inspection responsibility including responsibility for submission of reports and maintenance of records and technical reference material.

(ii) An inspection schedule including instructions for exceeding an interval by not more than 10 hours while en route and for amending any interval on the basis of service experience.

(iii) Sample routine and detailed inspection forms, including instructions for their use.

(iv) Sample reports and records and instructions for their use.

(3) Sufficient housing and equipment for the necessary disassembly and proper inspection of the aircraft undergoing progressive inspection.

(4) Appropriate and current technical information for the aircraft undergoing progressive inspection shall be available to inspection personnel.

(b) Upon discontinuance of a progressive inspection the registered owner or lessee shall submit immediately to the local General Safety District Office a written statement to this effect (see appendix A for example).

(Published in 17 F.R. 7676, Aug. 21, 1952, effective Aug. 25, 1952; amended in 21 F.R. 3183, May 15, 1956, effective July 17, 1956.)

43.23 *Aircraft and engine maintenance records.* The registered owner or operator shall maintain a maintenance record in a form and manner prescribed by the Administrator which shall include a current and accurate record of the total time in service on the aircraft and on each engine, a record of inspections, and the record of maintenance required by Part 18 of this subchapter. Such records shall be:

(a) Presented for required entries each time inspection or maintenance is accomplished on the aircraft or engine,

(b) Transferred to the new registered owner or operator upon disposition of the aircraft or engine involved, and

(c) Made available for inspection by authorized representatives of the Administrator or Board.

43.23–1 *Aircraft and engine maintenance records (FAA rules which apply to sec. 43.23).* The maintenance records prescribed in section 43.23 of this part shall provide a separate, current, and permanent record of the maintenance accomplished on the aircraft and each engine and shall be suitably identified as to the make, model, serial number, and, if applicable, registration number of the aircraft or engine involved. Each record shall be of sufficient size to accommodate the following basic information for the aircraft, and where applicable, each engine:

(a) *Maintenance.* The record of maintenance shall include the type and extent of maintenance, alterations, repair, overhaul, or inspection and reflect the time in service and date when completed.

(b) *Compliance with mandatory notes.* Chronological listing of compliance with service bulletins, airworthiness directives, etc., including a description of the method of compliance.

(c) *Weight and balance record.* Current empty weight, empty center of gravity and useful load.

(d) *Equipment list.* Entries shall be made to reflect optional equipment which has been added or removed. Required equipment shall not be listed except when exchanged or replaced by optional equipment.

(e) *Record of major repairs and major alterations.* Reference to repair and alteration Form FAA–337 by date or work order by number and approving agency is sufficient.

(Published in 15 F.R. 768, Feb. 11, 1950, effective Feb. 11, 1950, amended in 21 F.R. 3183, May 15, 1956, effective July 17, 1956.)

43.23–2 *Maintenance of engine maintenance records (FAA interpretations which apply to sec. 43.23).* A record of the previous operating time and history of all engines overhauled, repaired, or reassembled to standards other than those for rebuilt engines, as defined in section 43.24–1 of this part shall be retained in the engine maintenance records.

(Published in 21 F.R. 3184, May 15, 1956, effective July 17, 1956.)

43.24 *Rebuilt engine logs.* A new record without previous operating history may be used for an aircraft engine rebuilt by the manufacturer or any agency approved by the manufacturer for such work, provided such new record contains a signed statement by such manufacturer or agency giving the date the engine was rebuilt and such other information as the Administrator may require.

43.24–1 *Rebuilt engine (FAA interpretations which apply to sec. 43.24).* A rebuilt engine is defined as a used engine which has been completely disassembled, inspected, repaired as necessary, reassembled, tested, and approved in the same manner and to the same tolerances and limits as a new engine. Component parts of such engines may be either used parts or new parts. The used parts may be either the parts from the same engine or from other service engines, but they must conform to production drawing tolerances and limits to which new parts must conform. In addition, all parts, either new or used, meeting approved oversize and undersize dimensions acceptable for new engines are also eligible.

(Published in 15 F.R. 768, Feb. 11, 1950, effective Feb. 11, 1950.)

43.24–2 *Approval of rebuilt aircraft engines (FAA rules which apply to sec. 43.24).*

(a) *Logbook entries.* Other information which must be entered in the logbook of a rebuilt engine consists of a notation when (1) any mandatory changes required by Airworthiness Directives have been incorporated, and (2) any changes have been incorporated as a result of compliance with manufacturers' service bulletins, where such recording is requested specifically in the bulletin.

(b) *Compliance date.* All manufacturers who grant zero time to rebuild engines, and all agencies approved by the manufacturer to do such work must apply paragraph (a) as soon as possible, but not later than November 1, 1949.

(Published in 15 F.R. 768, Feb. 11, 1950, effective Feb. 11, 1950.)

Aircraft Instruments and Equipment

43.30 *Instruments and equipment for NC powered aircraft or powered aircraft with standard airworthiness certificates.* The following instruments and equipment, or instruments and equipment which the Administrator has found to be the equivalent, are required for the particular category of operation specified:

***Note:* Instrument and equipment installations are required to comply with the applicable airworthiness parts of the Civil Air Regulations.**

(a) *Contact flight rules (day).*

(1) Airspeed indicator.

(2) Altimeter.

(3) Magnetic direction indicator.

(4) Tachometer for each engine.

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

(6) Temperature gauge for each liquid-cooled engine.

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

(8) Manifold pressure gauge, or equivalent, for each altitude engine.

(9) Fuel gage indicating the quantity of fuel in each tank.

(10) Position indicator, if aircraft has retractable landing gear.

(11) Approved flotation gear readily available for each occupant and a Very pistol or equivalent signal device, if the aircraft is operated for hire over water beyond gliding distance from shore without the aid of power.

(12) *Safety belts for all occupants.* Safety belts shall be of an approved type. 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.

(b) *Contact flight rules (night).*

(1) Equipment specified in paragraph (a) of this section.

(2) Set of certificated forward and rear position lights.

(3) An approved anti-collision light system for aircraft having a maximum certificated weight of more than 12,500 pounds and for all aircraft which are required to have anti-collision light systems installed by the terms of their airworthiness certificate; except that, in the event of failure of any light of such system, the aircraft may continue flight to the next stop where repairs or replacements can be made without undue delay.

(4) One electric landing light, if the aircraft is operated for hire.

(5) Rescinded.

(6) An adequate source of electrical energy for such electrical and radio equipment as is installed.

(7) One spare set of fuses or 3 spare fuses of each magnitude.

(c) *Instrument flight rules.*

(1) Equipment specified for contact flight rules in paragraph (a) of this section and for night flight, equipment specified in paragraph (b) 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) Sensitive altimeter adjustable for change in barometric pressure.

(6) Clock with a sweep second hand.

(7) Generator of adequate capacity.

(8) Gyroscopic bank and pitch indicator (artificial-horizon).

(9) Gyroscopic direction indicator (directional gyro or equivalent).

43.30–1 *Instrument flight rules (FAA interpretations which apply to sec. 43.30(c)(2)).* Two-way radio communications systems and navigational equipment, which will normally provide continuous coverage from any point along the routes flown, will be considered to be appropriate to the ground facilities to be used. Where either an LF/MF or VOR system will not provide continuous route coverage, a combination of LF/MF and VOR systems which will provide two-way radio communications and reception of navigational signals from any point along the routes to be flown will also be considered as complying with section 43.30(c)(2).

(Published in 19 F.R. 5305, Aug. 20, 1954, effective Sept. 15, 1954.)

43.31 *Aircraft electronic navigation equipment accuracy.* Except for aircraft in which the omnidirectional radio range (VOR equipment is maintained, checked, and inspected in accordance with a procedure approved [1] by the Administrator, no person shall operate an aircraft under instrument flight rules using the VOR system of radio navigation unless the aircraft VOR equipment has been operationally checked, both within the preceding ten hours of aircraft flight time and

[1] An approved continuous maintenance and inspection program specified in Operations Specifications issued by or approved by the Administrator or any equivalent maintenance and inspection system specifically approved by the Administrator.

within the preceding ten days, and found to be within the limits of the indicated bearing error specified in this section for the particular check. The checks shall be conducted in accordance with either paragraph (a) or (b) of this section as follows:

(a)

(1) If an FAA operated or approved test signal [2] is available at the airport of intended departure, a check of the VOR equipment shall be accomplished using this test signal. The maximum permissible indicated bearing error is plus or minus 4°.

[2] FAA operated or approved test signals, and ground check points on an airport surface and airborne check points designated by the Administrator, will be shown in the Airman's Guide.

(2) If an FAA operated or approved test signal is not available at the airport of intended departure, a check shall be accomplished using a point on an airport surface designated [2] by the Administrator as a VOR system check point. The maximum permissible indicated bearing error is plus or minus 4°.[3]

[3] In making this check, caution should be exercised to head the aircraft in a direction to prevent the aircraft structure from interfering with the ground signal.

(3) If neither an FAA operated or approved test signal nor a designated check point on the airport surface is available, a check shall be accomplished using an airborne check point designated [2] as such by the Administrator. The maximum permissible indicated bearing error is plus or minus 6°.

(4) In the event none of the checks prescribed in subparagraphs (1), (2), and (3) of this paragraph can be accomplished, because of the unavailability of a check signal or point, the following airborne procedure shall be accomplished.

(i) Select the VOR radial which lies along the center line of an established VOR airway,

(ii) Choose a prominent ground point along the selected radial preferably more than 20 miles from the VOR ground facility and maneuver the aircraft directly over the point at a reasonably low altitude, and

(iii) Note the VOR bearing indicated by the receiver when over the point. The maximum permissible difference between the published radial and the indicated bearing is plus or minus 6°.

(b) If dual systems (defined as VOR units independent of each other with the exception of the antenna) are installed in the aircraft, one system may be checked against the other in the following manner in lieu of the check procedures specified above: Both systems shall be tuned to the same VOR ground facility and the indicated bearings to that station noted. The maximum permissible variation between the two indicated bearings is 4°.

(c) The person making the VOR operational check as specified in paragraphs (a) or (b) of this section shall make an entry of such check in the aircraft log or other permanent record showing the date, place, bearing error, and his signature.

43.32 Flight recorders.

(a) The holder of an air carrier or commercial operator certificate shall not operate any of the following airplanes in the conduct of flights (other than a ferry flight conducted for the purpose of delivering a newly acquired airplane from the place where an air carrier or commercial operator takes possession to a base where a flight recorder is to be installed), unless there is installed on the airplane an approved flight recorder which records at least time, altitude, airspeed, vertical acceleration, and heading:

(1) Airplanes of more than 12,500 pounds maximum certificated takeoff weight which are certificated for operations above 25,000 feet altitude;

(2) Turbine-powered airplanes of more than 12,500 pounds maximum certificated takeoff weight.

(b) When an air carrier or commercial operator conducts a flight with an airplane which has a flight recorder installed as required by paragraph (a) of this section, the flight recorder shall be operated continuously from the instant the pilot commences the takeoff roll until he has completed the landing roll at a place of landing, subject to the following exceptions:

(1) If an airplane with an inoperative flight recorder is located at a place where facilities for the repair or replacement of the recorder are not available, the airplane may be ferried with the flight recorder inoperative to a base where the recorder can be repaired or replaced.

(2) If the flight recorder becomes inoperative after the airplane has become airborne, the particular flight may be continued and completed as originally planned.

(3) During an airworthiness flight test, the flight recorder may be turned off for any period of time necessary to conduct tests of the operation of the recorder, or any communication or electrical equipment, installed in the airplane.

(c) Recorded information shall be retained by the air carrier or commercial operator for a period of at least 60 days. For a particular flight or series of flights, the information shall be retained for a longer period if requested by an authorized representative of the Administrator or the Civil Aeronautics Board.

(Amendments 43–13, published in 26 F.R. 3985, May 9, 1961, effective June 6, 1961.)

Piloting Rules (General)

[43.40 Deleted effective November 1, 1962.]

The provisions of section 43.40 have been transferred to Part 61 [New].*

[43.41 Deleted effective November 1, 1962.]

The provisions of section 43.41 have been transferred to Part 61 [New].

[43.41–1 Deleted effective November 1, 1962.]

The provisions of section 43.41–1 have been transferred to Part 61 [New].

[43.42 Deleted effective November 1, 1962.]

The provisions of section 43.42 have been transferred to Part 61 [New].

43.45 *Use of liquor, narcotics, and drugs.* No person shall pilot an aircraft or serve as a member of the crew while under the influence of intoxicating liquor or use any drug which affects his faculties in any manner contrary to safety. A pilot shall not permit any person to be carried in the aircraft who is obviously under the influence of intoxicating liquor or drugs, except a medical patient under proper care or in case of emergency.

43.46 *Towing by aircraft.* No pilot shall tow anything by aircraft unless authority for such operation has been issued by the Administrator.

43.46–1 *Authorization (FAA policies which apply to sec. 43.46).* Authority for towing objects by aircraft is issued by the Administrator in the form of a Certificate of Waiver or Authorization, Form FAA–663. This certificate is issued to the operator of the aircraft by the local General Aviation District Office.

(Published in 18 F.R. 6871, Oct. 31, 1953, effective Nov. 25, 1953.)

43.46–2 *Application (FAA policies which apply to sec. 43.46).* An application will be made by the operator of the aircraft in the following manner:

(a) *Application form.* Obtain three copies of Form FAA–400, Application for Certificate of Waiver, from the local General Aviation District Office, and fill out all copies as follows:

(1) Type, or print, in ink.

(2) Give complete information on items 1 through 7.

(3) Sign all copies of the application on the reverse in the space provided for the applicant's signature.

(b) *Application procedure.*

(1) Submit all copies of the application to the local General Aviation District Office, and

(2) Arrange with the local agent for inspection of the aircraft, and equipment to be used, and the aircraft records.

(c) *Inspection.* Inspection of aircraft and equipment will include:

(1) Hitches, release mechanisms, and type of rope or cable used.

(2) Loading conditions of the aircraft.

(3) Area and procedure for dropping the tow or cable.

*Available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., for 30 cents.

(4) Proper lighting for aircraft and tow when night operations are involved.

(5) General airworthy condition of the aircraft and tow.

(Published in 18 F.R. 6871, Oct. 31, 1953, effective Nov. 25, 1953.)

43.46–3 *Certificate conditions (FAA policies which apply to sec. 43.46).* A Certificate of Waiver or Authorization for towing objects by aircraft will be issued subject to the following conditions and limitations:

(a) *Operations authorized.* Operations will be limited to those specified on the certificate. No authorization will be issued unless the operation:

(1) Will not create a hazard to other air traffic, or persons or property on the ground.

(2) In a control zone, can be controlled by air traffic control, or other air traffic can be advised of the operation.

(3) On airways, or in the vicinity of busy airports, can be made known to affected air traffic.

(4) Can be conducted in accordance with such special provisions which the approving agent deems necessary.

(b) *Duration.* The certificate will contain an expiration date which will allow ample time to complete the operation, but may be surrendered by the holder or cancelled by the Administrator at any time.

(c) *Special provisions.* The certificate will contain such special provisions as the approving agent may deem necessary in the interest of safety. *Examples illustrating such provisions are:*

(1) A thorough inspection of the aircraft, engine, and special equipment shall be made prior to each day's operations.

(2) A planned course of action shall be followed with emphasis on selection of available emergency landing areas.

(3) A capable and experienced pilot holding at least a commercial rating will be used.

(4) Air traffic control and appropriate officials of the community shall be notified prior to beginning operations.

(5) Any other specific precaution the agent may assign.

(Published in 18 F.R. 6872, Oct. 31, 1953, effective Nov. 25, 1953.)

43.47 ***Dropping objects or persons.***

(a) No person piloting an aircraft shall permit any object to be dropped from such aircraft in flight which creates a hazard to persons or property.

Note: **This rule prohibits neither aerial application operations, such as seeding, spraying or dusting, nor the dropping of newspapers, periodicals, circulars, or objects of any other kind, provided reasonable precautions are taken to avoid injury or damage to persons or property.**

[(b) Except in an emergency, no person piloting an aircraft may allow a parachute jump to be made from that aircraft contrary to the provisions of Part 105 [New].]

(Sec. 43.47(b) amended by preamble to Part 105 [New] published in 27 F.R. 11635, on Nov. 27, 1962, effective Feb. 26, 1963.)

43.48 ***Aerobatic flight.*** **No pilot shall intentionally fly an aircraft in aerobatic flight carrying passengers unless all occupants are equipped with approved parachutes.**

43.48–1 *Aerobatic flight (FAA interpretations which apply to sec. 43.48).* Aerobatic flight, insofar as it concerns the wearing of parachutes, must be deemed to exist when any maneuver intentionally performed results in the following:

(a) A bank in excess of 60° relative to the horizon, or

(b) A nose up or nose down attitude in excess of 30° relative to the horizon.

An example of the application of this interpretation is that parachutes are not required when stalls, lazy eights, etc., are performed within these limits, while these same maneuvers performed with attitudes in excess of the limits would require the wearing of parachutes. Stalls as practiced for the private pilot flight test normally would not exceed the prescribed limits.

Consideration must be given to the fact that these limits are not intended to insure that all

maneuvers which could be performed within them are also within the safe operating limits of the aircraft. It is reasonably certain that a prolonged full power descent in a nose down attitude of less than 30° would exceed placarded speeds, and that sudden full application of elevators at cruising speed could produce stresses sufficient to cause structural failure.

This interpretation is intended only to define the circumstances under which parachutes must be worn in accordance with section 43.48, and does not in any way modify the definition of aerobatic flight as it applies to other sections of the Civil Air Regulations.

(Published in 15 F.R. 5843, Aug. 30, 1950, effective Aug. 30, 1950.)

43.49 *Parachutes.* No pilot shall carry on an aircraft a parachute which is available for emergency use unless:

(a) It is an approved chair-type (canopy in back) parachute which has been packed by a qualified parachute rigger within the preceding 120 days; or

(b) It is an approved-type, other than a chair-type (canopy in back) parachute which has been packed by a qualified parachute rigger within the preceding 60 days.

43.50 *Transportation of explosives and other dangerous articles.* No person piloting an aircraft shall permit explosives or other dangerous articles such as inflammable liquids or solids, oxidizing material, corrosive liquid, inflammable or noninflammable compressed gas, poison gas or liquid, poisonous liquid or solid, or tear gas to be carried in aircraft, except as provided for in Part 49 of this chapter. Small arms ammunition for personal use, necessary aircraft signaling devices, and equipment necessary to safe operation of the aircraft are permitted.

43.51 *Fuel supply.* Aircraft operated under IFR conditions shall carry sufficient fuel, considering weather reports and forecasts of wind and other weather conditions, to complete the flight to the point of first intended landing, to fly from there to the alternate airport, and to fly thereafter for 45 minutes at normal cruising speed.

Student Pilot Limitations Deleted

The provisions of *Student Pilot Limitations* have been transferred to Part 61 [New] effective November 1, 1962.

43.52 Deleted effective November 1, 1962.

The provisions of section 43.52 have been transferred to Part 61 [New].

43.55 Deleted effective November 1, 1962.

The provisions of section 43.55 have been transferred to Part 61 [New].

43.56 Deleted effective November 1, 1962.

The provisions of section 43.56 have been transferred to Part 61 [New].

Private and Commercial Pilot Privileges and Limitations

43.60 Deleted effective November 1, 1962.

The provisions of section 43.60 have been transferred to Part 61 [New].

43.61 Deleted effective November 1, 1962.

The provisions of section 43.61 have been transferred to Part 61 [New].

43.62 Deleted effective November 1, 1962.

The provisions of section 43.62 have been transferred to Part 61 [New].

43.63 Deleted effective November 1, 1962.

The provisions of section 43.63 have been transferred to Part 61 [New].

43.64 *Flight instruction limitations.* This section governs flight instructions:

(a) *Aircraft.* Aircraft shall be equipped with fully functioning dual controls.

(b) Deleted effective November 1, 1962.

(c) Deleted effective November 1, 1962.

(d) Deleted effective November 1, 1962.

The provisions of paragraphs (b), (c), and (d) of section 43.64 have been transferred to Part 61 [New].

43.65 Deleted effective November 1, 1962.

The provisions of section 43.65 have been transferred to Part 61 [New].

43.67 *Simulated instrument flight.* Aircraft shall not be flown under simulated instrument flight conditions unless:

(a) Fully functioning dual controls are installed in the aircraft.

(b) An appropriately rated pilot occupies the other control seat as safety pilot, and

(c) Such safety pilot at all times has adequate vision forward and to either side of the aircraft, or a competent observer occupies a position in the aircraft so that his field of vision adequately supplements that of the safety pilot.

[43.68 Deleted effective November 1, 1962.]

The provisions of section 43.68 have been transferred to Part 61 [New].

Definitions

43.70 *Definitions.* As used in this part terms shall be defined as follows:

Aircraft. An aircraft means any contrivance now known or hereafter invented, used, or designed for navigation of or flight in the air, including airframe, powerplant, propeller, and appliances.

Category. Category shall indicate a classification of aircraft such as airplane, helicopter, glider, etc.

Class. Class shall indicate a difference in basic design of aircraft within a category, such as single-engine land, multiengine sea, etc.

Copilot. Copilot shall mean a pilot serving in any piloting capacity other than as pilot in command on aircraft requiring two pilots for normal operations, but excluding a pilot who is on board the aircraft for the sole purpose of receiving dual instruction.

Dual instruction time. Dual instruction time shall mean that portion of the flight time during which a person is receiving flight instruction from a rated flight instructor on board the aircraft.

Flight instructor. Flight instructor means a pilot who is qualified to instruct other pilots and who has received a flight instructor rating.

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.[4]

[4] For example, a pilot taxies to the warmup apron and holds there for several minutes before taking off to permit the engine to warmup. Such taxi and warmup time is not considered flight time. Flight time begins when the aircraft leaves the warmup apron and ends when the pilot returns to parking apron and turns the switches off.

Maintenance. Maintenance, which includes preventive maintenance, means the inspection, overhaul, repair, upkeep, and preservation of airframes, powerplants, propellers, and appliances, including the replacement of parts.

Operate. Operate means to cause or authorize the operation of aircraft, whether with or without the right of legal control (in the capacity of owner, lessee, or otherwise) of the aircraft.

One-hundred-hour inspection. A 100-hour inspection is an inspection of an aircraft required within each 100 hours of time in service and is a complete airworthiness inspection of such aircraft and its various components and systems in accordance with procedures prescribed by the Administrator.

Passenger. A passenger is an occupant of the aircraft in flight other than a crew member.

Periodic inspection. A periodic inspection is an inspection of an aircraft required once each 12 calendar months and is a complete airworthiness inspection of such aircraft and its various components and systems in accordance with procedures prescribed by the Administrator.

Pilot. A pilot is a person holding a valid pilot certificate issued by the Administrator.

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.

Progressive inspection. A progressive inspection is a continuing airworthiness inspection of an aircraft and its various components and systems at scheduled intervals in accordance with procedures prescribed by the Administrator.

Solo flight time. Solo flight time shall mean the flight time during which a pilot is the sole occupant of an aircraft.

Time in service. Time in service, as used in computing maintenance and inspection time records, is the time from the moment an aircraft leaves the ground until it touches the ground at the end of a flight.

To pilot. To pilot means to be in command of the aircraft during take-off, in flight, or landing.

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.

Note: The reporting and/or record-keeping requirements contained herein have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

Appendix B

Special Civil Air Regulations
(Which Affect Part 43)

SPECIAL CIVIL AIR REGULATION NO. SR-330

Effective: February 28, 1949
Adopted: February 28, 1949

Special Flight Instruction for Military Personnel of Foreign Governments

Section 43.1010 of the Civil Air Regulations provides that no aircraft shall be operated in violation of its prescribed operating limitations. The operating limitations referred to are those prescribed by requirements of the Civil Air Regulations for various civilian uses including flight instruction. Certain aircraft currently being used for flight instruction by CAA certificated flight schools are training aircraft released as surplus by our armed services. Some of these schools have contracted to give flight instruction to personnel of foreign governments whose officials desire such personnel to be given a similar course of instruction to that given United States military personnel in the same model aircraft. However, due to differences between military and civilian requirements, the military surplus aircraft used by the CAA certificated schools are, by virtue of the airworthiness requirements placarded against certain intentional acrobatic maneuvers which are part of the military instruction program.

We have been advised that the aforementioned requirement is impeding instruction of the aviation cadets of a foreign government and we have been requested to authorize use of war surplus aircraft for the training of personnel of foreign governments on a basis similar to that used by our own armed services. It is our opinion that international considerations warrant the granting of such a request.

For the reasons stated above the Board finds that notice and public procedures are impractical and contrary to the public interest and that good cause exists for making this regulation effective without prior notice.

In consideration of the foregoing, the Civil Aeronautics Board hereby makes and promulgates the following Special Civil Air Regulation effective immediately:

Notwithstanding the provisions of section 43.1010 of the Civil Air Regulations, military personnel of a foreign government being trained in a CAA certificated school may receive special training in maneuvers not within the approved airplane operating limitations: *Provided,* That

(1) an official request for such special training has been made to the Administrator by an accredited representative of the foreign government concerned; and

(2) the Administrator finds that such training can be done with a standard of safety equivalent to that maintained by the United States Air Force and Navy. There shall be no violation of the United States Air Force or Navy Technical Orders pertinent to the phase of the training for which approval is being given.

(3) such aircraft shall not be used to demonstrate compliance with any acrobatic maneuver required in a flight test for the issuance of an airman certificate or rating, against which it has been placarded.

SPECIAL CIVIL AIR REGULATION NO. SR-389B

Effective: January 30, 1959
Adopted: December 24, 1958

Emergency Exits for Airplanes Carrying Passengers for Hire

Special Civil Air Regulation No. SR-389A, effective September 13, 1957, superseded Special Civil Air Regulation No. SR-389. All of the provisions of SR-389 were retained in SR-389A. However, the latter special regulation as amended on October 17, 1957, contained an addition to the occupant/exit table which permitted the Viscount 700 series airplanes to carry 53 occupants when 7 exits were provided.

Special Civil Air Regulation No. SR-389, effective October 27, 1952, superseded Special Civil Air Regulation No. SR-387. Except for correcting some minor errors with respect to the number of exits authorized by the Civil Aeronautics Administration, there was no difference between the two special regulations.

Special Civil Air Regulation No. SR-387, effective October 27, 1952, was adopted in order to make applicable to the then operating transport airplanes more stringent rules regarding the number of occupants permitted per exit. SR-387 required, among other things, that all large airplanes (more than 12,500 pounds maximum certificated takeoff weight) comply with either 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, or with the specific requirements set up in SR-387. Subsequently, the provisions of section 4b.362 (a), (b), and (c) of Part 4b were revised by Amendment 4b-5, effective April 9, 1957.

Special Civil Air Regulation No. SR-389A permits the airplanes listed in the occupant/exit table to carry additional occupants if additional exits are provided, except that in no case shall more than 8 additional occupants be carried for any one additional exit. The preamble to Civil Air Regulations Draft Release No. 58-11 stated that the intent of this provision was that no more than 8 additional occupants could be authorized if the most effective exit for emergency evacuation were provided, which, by reference to the rule proposed in the draft release, is seen to be one comparable to a Type I exit as prescribed in section 4b.362. As herein set forth, it is intended that as many as 8 additional occupants may be authorized with the addition of an exit of reasonably high effectiveness and that a lesser number of occupants would be authorized with the addition of a less effective exit. For the purpose of this regulation, it has been established that the addition of an exit, approximating a Type II or IV exit as prescribed in section 4b.362, would possibly permit the addition of 8 occupants. This relaxation over the rule proposed in Draft Release 58-11 was prompted by comments received to the draft release and the fact that a number of airplanes had already received approval to carry 8 additional occupants with the addition of an exit com-

parable to a Type IV based on the Administrator's interpretation of SR–389A. Justification for the relaxation is based upon the current requirements of section 4b.362(c) wherein it may be seen that for the addition of a Type IV exit on each side, an increase of 30 passengers is permitted. While such a ratio is not advocated for airplanes covered by this special regulation because of other factors considered in establishing these values for section 4b.362, permitting 8 occupants to be added for a Type IV exit represents a more reasonable and realistic view than that proposed in Draft Release 58–11. Therefore, it is expressly provided herein that since the effectiveness of the exit varies with the type, size, and location, 8 additional occupants shall be authorized only when an exit comparable to a Type II or a Type IV exit as prescribed in section 4b.362 is provided.

Special Civil Air Regulation No. SR–389A does not contain provisions regarding the required reduction in occupancy when the number of exits is reduced. In order to cover such cases, it is provided herein that upon removal of any exit the maximum number of occupants shall be reduced by at least 8.

The occupant/exit table has been modified by listing the "L–1049 Series" in lieu of the "L–1049," and the "CV–340 and CV–440" in lieu of the "CV–340."

Interested persons have been afforded an opportunity to participate in the making of this regulation (23 F.R. 3275), and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, the Civil Aeronautics Board hereby makes and promulgates the following Special Civil Air Regulation, effective January 30, 1959.

1. Contrary provisions of the Civil Air Regulations notwithstanding, no large airplane (more than 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–5, effective April 9, 1957, 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.

2. 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 8 additional occupants be carried for any one additional exit. For the addition of exits comparable to at least a Type II or Type IV exit as prescribed in section 4b.362, a maximum of 8 additional occupants may be authorized and for exits not comparable to at least a Type II or Type IV exit, the Administrator after consideration, among other factors, of the type, size, and location of the exit, may authorize a lesser number of additional occupants.

3. For airplanes which have a ratio (as computed from the table in this special regulation) of maximum number of occupants to number of exits 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 is such an exit on each side of the fuselage.

4. The maximum number of occupants authorized (listed in the table) shall be reduced where the number of approved exits is less than that shown in the table. The reduction in the maximum number of occupants for each exit eliminated shall be determined by the Administrator taking due account of the effectiveness of the remaining exits for emergency evacuation, except that the maximum number of occupants shall be reduced by at least 8 for each eliminated exit. In no case, when exits are deleted, shall the resulting ratio of occupants to exits be greater than 14:1, and there shall be at least one exit on each side of the fuselage irrespective of the number of occupants.

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 and CV–440	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 series	96	9
M–202	53	6
M–404	53	7
Viscount 700 series	53	7

*The DC–6A, if converted to a passenger transport configuration, will be governed by the maximum number applicable to the DC–6B.

This regulation supersedes Special Civil Air Regulation No. SR–389A as amended by Amendment No. 1 and shall remain effective until superseded or rescinded by the Board or the Administrator of the Federal Aviation Agency, as appropriate.

AMENDMENT I TO SPECIAL CIVIL AIR REGULATION NO. SR-389B

Effective: September 11, 1959
Adopted: September 11, 1959

Emergency Exits for Airplanes Carrying Passengers for Hire

Special Civil Air Regulation No. SR-389B, adopted by the Civil Aeronautics Board on December 24, 1958, and effective January 30, 1959, specified in part that no large airplane 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-5 effective April 9, 1957, except for those airplanes listed in the table in SR-389B. Special Civil Air Regulations SR-389A, which preceded SR-389B, contained a similar provision but referred to Amendment 4b-4 effective December 20, 1951. The effect of SR-389B was to apply the current Part 4b exit requirements referenced in SR-389A.

A review of the history of the development of SR-389B indicates that such retroactive application of current Part 4b requirements was included inadvertently and that it would impose an unnecessary burden on the operators of certain airplanes. SR-389B is therefore being amended to eliminate this retroactive provision.

Since this amendment imposes no additional burden on any person, notice and public procedure hereon are unnecessary, and the amendment is made effective immediately.

In consideration of the foregoing, Paragraph 1 of Special Civil Air Regulation No. SR-389B is hereby amended to read as follows, effective September 11, 1959.

1. Contrary provisions of the Civil Air Regulations notwithstanding, no large airplane (more than 12,500 pounds maximum certificated take-off weight) type certificated under Civil Air Regulations effective prior to April 9, 1957, 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 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 the emergency egress of passengers.

SPECIAL CIVIL AIR REGULATION NO. SR–392C

Effective: Feb. 3, 1962
Adopted: Jan. 30, 1962
Published: Feb. 3, 1962
(27 F.R. 1008)

Facilitation of Experiments With Exterior Lighting Systems

Special Civil Air Regulation No. SR–392B, adopted on February 25, 1957, permits experimentation with exterior lighting systems, which do not comply with the standards prescribed in the Civil Air Regulations, on aircraft with standard airworthiness certificates. Several conditions are imposed to insure that the number of aircraft engaged in the experiments is reasonably limited; that the experimental exterior lights are in fact installed for bonafide experimentation; and that the results of such experimentation become generally available. This special regulation expires on February 25, 1962.

In a notice of proposed rule making contained in Draft Release No. 61–27 and published in the Federal Register, December 23, 1961 (26 F.R. 12294), the Agency gave notice that it has under consideration the termination of SR–392B and requested comments from interested persons concerning this matter. In response to such request, the Agency has received numerous reports, arguments and other evidence. However, the volume of the comments received is such that there is not sufficient time remaining to review and evaluate such comments prior to the termination of SR–392B. Therefore, in order to afford the Agency the opportunity to fully consider all the relevant matter presented and to take whatever additional rule making action that may be indicated, it is necessary to extend the termination date of SR–392B to June 25, 1962.

Since this regulation continues in effect the provisions of the previous regulation and imposes no additional burden upon any person, compliance with the notice and public procedure provisions of the Administrative Procedure Act is unnecessary and good cause exists for making this regulation effective on less than 30 days' notice.

In consideration of the foregoing, the following Special Civil Air Regulation is adopted to become effective on February 3, 1962:

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 6 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–392B and shall terminate June 25, 1962, unless sooner superseded or rescinded.

SPECIAL CIVIL AIR REGULATION NO. SR-392D

Effective: June 25, 1962
Adopted: June 22, 1962
Published: June 26, 1962
(27 F.R. 5979)

Display of Experimental Exterior Lighting Systems Approved for Use on Aircraft

Special Civil Air Regulation No. SR-392B, adopted on February 25, 1957, and superseded by SR-392C on February 3, 1962, permitted experimentation with exterior lighting systems that did not comply with the standards prescribed in the Civil Air Regulations on aircraft with standard airworthiness certificates. Several conditions were imposed to insure that the number of aircraft engaged in the experiments was reasonably limited; that the experimental exterior lights were in fact installed for bona fide experimentation; and that the results of such experimentation became generally available.

In a notice of proposed rule making contained in Draft Release No. 61-27 and published in the Federal Register, December 23, 1961 (26 F.R. 12294), the Agency gave notice that it had under consideration the termination of SR-392B, which was then in effect, and requested comments from interested persons. However, the nature of the comments received was such that there was not sufficient time remaining, before the February 25, 1962, termination date specified in SR-392B, for their proper review and evaluation. To provide the time needed, the Agency adopted SR-392C which superseded SR-392B without revision other than extension of the termination date from February 25, 1962, to June 25, 1962.

On April 3, 1962, the Agency convened a public conference (previously announced by a notice of conference dated February 12, 1962) to give persons interested in SR-392C an opportunity to supplement their written comments with oral presentations, to make additional evidence available, and to participate in direct discussions with government-industry technical people in the aircraft lighting field.

From a study of all comments made on the issue, those who support the need for an extension of SR-392C contend essentially as follows: (1) Experimental lighting systems now operating under SR-392C are more effective than the system prescribed in the Civil Air Regulations; (2) much money and time has been invested in the experiments, which would be wasted if SR-392C were terminated; (3) extension would continue grass-roots cooperation between experienced FAA inspectors and inventors, and stimulate inventive initiatives; (4) unrestrictive field testing would insure reliability of new lighting equipment by exposing it to actual service conditions; (5) a new lighting concept cannot attract financing, or interest manufacturing management, unless its sales potential is established by flight demonstrations to prospective customers; and (6) there is no satisfactory alternative to extension of SR-392C.

After more than 10 years of experimentation under the provisions of SR–392C and predecessor special regulations, the evidence supporting the contention that various experimental lighting systems surpass the standard system now prescribed in the Civil Air Regulations remains inconclusive. For the most part, reports submitted by experimenters contain subjective evaluations of proposed systems without the use of experimental controls to insure a valid basis for comparison. Tests and studies conducted by the Navy Department and by the Agency's National Aviation Facilities Experimental Center have not corroborated the advantages claimed by private experimenters for their respective systems.

The experiments were no doubt expensive and time-consuming, but the persons who undertook them did so voluntarily and with no assurance of success. In any case, the costs incurred in such experiments do not justify the indefinitely prolonged display of experimental lighting systems, since these systems necessarily introduce some degree of ambiguity and confusion in night operations.

Termination of SR–392C would not prevent further lighting experimentation since such experiments could still be performed under the terms of an experimental airworthiness certificate. There appears to be no reason why cooperation between FAA inspectors and inventors would necessarily diminish if further lighting experiments were conducted only on that basis.

The point that unrestricted field testing insures reliability of experimental lighting equipment is largely irrelevant since the objective of SR–392C was to facilitate experiments with new lighting concepts rather than to achieve component reliability. Component technology is not in question; and, in any case, there is no evidence that unusual problems exist. Further, reliability can be attained to a large extent by laboratory tests in a simulated environment, a practice which has worked satisfactorily in the past.

It may be true that the privileges granted by SR–392C (as opposed to the generally more restrictive terms of experimental airworthiness certificates) make it easier to finance new lighting concepts, but similar privileges are not granted to those who experiment with aircraft in other ways. This preference for one class of experimenters over all other classes has not been justified in terms of safety improvements achieved to date.

Reasonable alternatives to SR–392C are, in fact, open to experimenters. Experiments may be conducted under the terms of an experimental airworthiness certificate; and the Agency's well-equipped experimental facilities, with trained personnel, are now available for cooperative evaluation of new lighting concepts developed by inventors.

For these reasons, the Agency concludes that the arguments offered in support of an extension of SR–392C are not persuasive; and SR–392C will not be continued in effect beyond June 25, 1962. However, the Agency believes that a reasonable transition period of not less than one year should be established. This would permit 6 months for completion of experiments begun before June 25, 1962, the maximum period of experimentation permitted under SR–392C without special permission, and

would allow not less than an additional 6 months for airplane modifications that may be necessitated by the termination of experimentation hereunder.

The various experiments which were conducted under the provisions of SR–392C and predecessor special regulations, although inconclusive, have, nevertheless, helped to crystallize the Agency's position on the need for revisions of the currently effective exterior lighting regulations. Therefore, a proposed rule concerning these requirements is under study by the Agency. If rule making action is initiated as a result of this study, it may ultimately affect some of the details of the lighting systems now required to be installed on aircraft. Moreover, if such rule making action is initiated it may not be completed before December 25, 1962. In such case, a requirement to accomplish the necessary modifications within one year after the termination of SR–392C, i.e., by June 25, 1963, may not provide the operator with a period of 6 months in which to accomplish the modifications, if any, required by the regulation.

In order to permit an adequate transition period for the accomplishment of any necessary modifications, this regulation permits the current experimental lighting systems to be used until June 25, 1963, or 6 months after completion of the proposed rule making action in regard to exterior lighting systems, whichever date is later. If, however, the Agency finds at the conclusion of its studies that rule making action will not be adopted an appropriate notice thereof will be issued and published in the Federal Register. In such case this regulation also permits the experimental lighting systems to be used until June 25, 1963, or 6 months after such notice is published in the Federal Register, whichever date is later.

In consideration of the foregoing, the following Special Civil Air Regulation is adopted to become effective on June 25, 1962:

Contrary provisions of the Civil Air Regulations notwithstanding, experimental exterior lighting systems which do not comply with the Civil Air Regulations, and which were installed for the purposes of experimentation on aircraft with standard airworthiness certificates under the provisions of SR–392B or SR–392C, may be displayed until:

(1) 6 months after the date of publication in the Federal Register of either

(i) revised standards adopted by the Agency for exterior lighting systems, or

(ii) a notice that rule making action to revise such standards will not be adopted by the Agency; or

(2) June 25, 1963, if later than that specified in paragraph (1).

This Special Civil Air Regulation shall remain in effect until superseded or rescinded.

Appendix

SPECIAL CIVIL AIR REGULATION NO. SR-397

Effective: June 30, 1953
Adopted: June 30, 1953

Authorization for the United States Forest Service to Deviate from the Civil Air Regulations

The Forest Service of the United States Department of Agriculture uses both public and civil aircraft to carry personnel and equipment to fire areas. The aircraft and pilots are certificated and, where possible, Forest Service operations are conducted in accordance with the Civil Air Regulations. In order to deal effectively with fire control and other Forest Service specialized activities, however, it is often necessary to use uncertificated personnel as parachute riggers during peakload periods, to remove seats and safety belts from aircraft in which firefighters are carried, to drop equipment and supplies from aircraft, and to deviate from other provisions of the Civil Air Regulations such as minimum altitudes and visibility conditions. Due to the exigencies of the particular situation, it is usually impracticable for the Forest Service to seek authority in each particular instance to deviate from the provisions of the Civil Air Regulations. In view of the public service rendered by this organization and the well-organized supervisory control which the Forest Service exercises over its operations, it is considered desirable that the Board authorize the Forest Service to deviate from the Civil Air Regulations and normal practices thereunder when necessary for their operations.

This regulation authorizes the Chief of the Forest Service to permit aircraft and airmen, while engaged in Forest Service operations, to deviate from the Civil Air Regulations to the extent that he finds necessary for the expeditious conduct of such operations. The regulation also provides that the Administrator shall establish a procedure for notification by the Chief of the Forest Service of those deviations which he has authorized.

Interested persons have been afforded an opportunity to participate in the making of this regulation, and due consideration has been given to all relevant matter presented. Since this regulation imposes no additional burden on any person, it may be made effective without prior notice.

In consideration of the foregoing the Civil Aeronautics Board hereby makes and promulgates the following Special Civil Air Regulation, effective immediately:

Contrary provisions of the Civil Air Regulations notwithstanding, the Chief, Forest Service, United States Department of Agriculture, is authorized to permit aircraft and airmen, while engaged in operations conducted for the United States Forest Service, to deviate from the provisions of the Civil Air Regulations to the extent that he finds necessary for the expeditious conduct of such operations. The Chief, Forest Service, shall notify the Administrator of any deviation which he has authorized and the reasons therefor in accordance with a procedure established by the Administrator.

SPECIAL CIVIL AIR REGULATION NO. SR-399D

Effective: June 24, 1961
Adopted: June 20, 1961
Published: June 24, 1961
(26 F.R. 5673)

Provisional Maximum Certificated Weights for Certain Airplanes Operated by Alaskan Air Carriers, Air Taxi Operators in Alaska, and the Department of the Interior

Special Civil Air Regulation No. SR-399C, effective October 26, 1960 (25 F.R. 10423), authorized the Director, Bureau of Flight Standards, and his designated representative to establish increased maximum weights for certain airplanes of 12,500 pounds or less operated entirely within Alaska by Alaskan air carriers and Alaskan air taxi operators pursuant to Parts 292 and 293 of the Civil Aeronautics Board's Economic Regulations or by the United States Department of the Interior.

Effective January 1, 1961, the Civil Aeronautics Board rescinded Part 293 (25 F.R. 12908) which applied to Alaskan air taxi operators and concurrently adopted revised Part 298 (25 F.R. 12909) which applies to air taxi operators generally. Accordingly, the reference in SR-399C to Part 293 of the Civil Aeronautics Board's Economic Regulations is no longer appropriate.

Under Part 293, Alaskan air taxi operators were not permitted to operate aircraft weighing more than 7,900 pounds at increased maximum weights, notwithstanding the 12,500-pound limit in SR-399C. Although the action taken by the Board, i.e., the repeal of Part 293 and amendment of Part 298, no longer imposes the 7,900-pound limit, it is noteworthy that current Alaskan law does.

Since this regulatory action involves only a minor editorial change and imposes no additional burden upon any person, notice and public procedure hereon are unnecessary, and it may be made effective on less than 30 days' notice.

In consideration of the foregoing, the following Special Civil Air Regulation is hereby adopted to become effective June 24, 1961:

1. Notwithstanding any contrary provisions of the Civil Air Regulations, the Director, Bureau of Flight Standards, and any employee of such administrative unit as he shall designate may increase the maximum certificated weight for airplanes which are:

(a) Operated entirely within the State of Alaska by an Alaskan air carrier or an air taxi operator pursuant to Parts 292 and 298, respectively, of the Civil Aeronautics Board's Economic Regulations, or by the United States Department of the Interior in the conduct of its game and fish law enforcement activities and its management, fire detection, and fire suppression activities concerning public lands; and

(b) Type certificated under the provisions of Aeronautics Bulletin No. 7–A of the Aeronautics Branch of the United States Department of Commerce dated January 1, 1931, as amended, or under the normal category of Part 4a of the Civil Air Regulations.

2. The maximum certificated 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 FAA 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 certificated weight the structural soundness of the airplane and the terrain to be traversed in the operation will be considered.

4. The maximum certificated weight so determined will be added to the airplane's operation limitations and identified as the maximum weight authorized for operations within the State of Alaska.

This regulation supersedes Special Civil Air Regulation No. SR–399C, and shall terminate on October 25, 1965, unless sooner superseded or rescinded.

SPECIAL CIVIL AIR REGULATION NO. SR-422A

Adopted: July 2, 1958
Effective: July 2, 1958

Turbine-Powered Transport Category Airplanes of Current Design

On July 23, 1957, the Board adopted Special Civil Air Regulation No. SR-422 which sets forth airworthiness requirements applicable to the type certification and operation of turbine-powered transport category airplanes for which a type certificate is issued after August 27, 1957. Included in that regulation was a new set of performance requirements, with respect to which the Board indicated that consideration would be given to any changes found necessary as a result of further study and experience. The preamble to SR-422 contains the relevant considerations leading to its promulgation and is considered to provide the basic background for this regulation.

Since the adoption of SR-422, considerable study has been devoted to the new performance requirements by all interested parties. As a result of these studies and of further experience gained in the design, certification, and operation of turbine-powered airplanes, certain issues with respect to SR-422 require re-evaluation. This regulation reflects the resolution of most of the outstanding issues in the light of the best information presently available to the Board.

The following provisions of this regulation differ from, or are additional to, the provisions of SR-422; Introductory paragraph; item 1; sections 4T.111(c); 4T.112; 4T.114 (b), (b)(1), (b)(4), and (c); introductory paragraph of 4T.116; 4T.116 (b), (c), (e), and (g); 4T.117; 4T.117a; 4T.119; 4T.120 (a), (a)(1), (b), (b)(1), (c), (c)(2), (c)(3), (d), and (d)(3); 4T.121 (a) and (b); introductory paragraph of 4T.122; 4T.122 (b), (f), and (g); 4T.123 (a)(1), (a)(2), (a)(3), and (b); 4T.743(c); 40T.81 (b) and (c); 40T.82; 40T.83 (a)(2)(iii), (b)(2), and (b)(2)(ii); item 4; and item 5. Of these provisions, the following differ from those proposed in Civil Air Regulations Draft Release No. 58-6: sections 4T.111(c); 4T.112(a)(4); 4T.114 (b)(4), (c), (c)(2), (c)(3), and (c)(4); 4T.116 (c) and (e); 4T.117 (b)(1) and (b)(2); 4T.119(a); 4T.120(a); 40T.81(c) and 43T.11(c).

With respect to the applicability of this regulation, experience with certification under SR-422 indicates that a lead time of about two months between the date of adoption of the regulation and the date of issuance of the type certificate should provide a reasonable period of time within which to show compliance with this regulation. In view of this, and in the interest of having uniform regulations applicable to most of the turbine-powered airplanes, it is considered advisable to have this regulation apply to all such airplanes for which a type certificate is issued after September 30, 1958. Turbine-powered transport category airplanes for which a type certificate is issued on or prior to September 30, 1958, may comply with the provisions of this regulation in lieu of SR-422. If

this option is exercised, it is intended that compliance be shown with all the provisions of this regulation and it is not intended to permit a showing of compliance with portions of this regulation and portions of SR–422.

The provisions of this regulation involve the following technical issues:

A substantive change is made by introducing an all-engines-operating take-off in establishing the take-off distance. Presently, the take-off distance is based only on a one-engine-out take-off. To insure that an adequate margin of safety will exist for day-in and day-out operations, the minimum take-off distance is being related to both the one-engine-inoperative distance now prescribed and to the distance with all engines operating, with a factor of 1.15 being applied to the latter.

There are also included important changes with respect to the speeds applicable to the take-off path. The provisions of SR–422 prescribe that the airplane shall be accelerated on or near the ground to the speed V_2. This provision has been subject to varying interpretations having a marked difference in effect on the resultant level of performance. The issue in this matter is whether or not the airplane should be permitted to lift off the runway at some speed below V_2. Because of the increased acceleration of turbine-powered airplanes, the tendency to overshoot the lift-off speed will be greater than on piston-engine airplanes and this tendency increases with the reduction in weight of the airplane. To restrict lift-off to the minimum take-off safety speed V_2 would unduly extend the take-off distance in cases where such overshooting of speed occurs. Such a restriction would be unnecessarily conservative and would not reflect realistic take-off procedures. For these reasons this regulation permits the airplane to lift off the ground at a speed lower than the V_2 speed, but prescribes certain limiting conditions. The lift-off speed is related to a rotational speed V_R which must not be less than 95 percent of the minimum V_2 speed and must be 10 percent greater than a speed at which no hazardous characteristics are displayed by the airplane, such as a relatively high drag condition or a ground stall. The V_2 speed has been re-defined to take into account the increment in speed arising from overshoot tendencies. Under the new definition, the minimum V_2 speed corresponds with the minimum take-off safety speed as now defined in SR–422. With respect to the take-off path, the V_2 speed is required to be attained prior to reaching a height of 35 feet above the take-off surface and thus is related to the selection of the rotational speed. Further, there is a revision which requires V_2 to be maintained as close as practicable at a constant value from the 35-foot point to a height of 400 feet above the take-off surface. This speed is the speed at which the prescribed minimum take-off gradients must be met.

There is introduced in this regulation the concept of unbalanced take-off field lengths. SR–422 does not preclude unbalancing of field lengths, provided that the unbalancing is within the length of the runway. Other countries have employed unbalancing with respect to so-called "stopways" and "clearways." It appears that United States operators ultimately will find it advantageous to resort to the use of unbalancing, but probably not to the same extent as practiced in other countries. On the premise that only clearways will be utilized, the amendments have been formulated accordingly. Clearways, as defined herein, are areas not suitable

for stopping the airplane in the event of an aborted take-off, but adequate to provide additional take-off distance for climb-out. To safeguard operations utilizing clearways, there is introduced the concept of a take-off run which operationally relates to the determination of the minimum runway length required. The take-off run is defined as the greater of the horizontal distances along the take-off path to a given point with one engine inoperative or with all engines operating, with a margin of 15 percent being added to the latter. The take-off run is measured from the beginning of take-off to a point equidistant between the point where the airplane lifts off and the point where a height of 35 feet is reached. The required runway length must not be less than the take-off run nor less than the accelerate stop distance.

According to the definition given, a clearway is subjected to the control of the airport authorities. It is not intended, however, that there be ownership by the airport authorities of the area in which the clearway lies. The objective for requiring control by the airport authorities is to insure that no flight will be initiated using a clearway unless it is determined with certainty that no movable obstacle will exist within the clearway when the airplane flies over.

It is anticipated that the introduction of clearways will offer further possibilities of increasing the utility of existing airport facilities in this country. When such areas can be integrated into existing facilities, economical benefits will accrue to the community and the operators. In addition, since clearways are presently available at some of the airports in other countries, United States operators will have the opportunity of taking advantage of such facilities.

There are included changes with respect to the prescribed minimum altitude of 1,000 feet relative to the take-off path and to the one-engine-inoperative and two-engine-inoperative requirements applicable to the vicinity of the airport. Heretofore, the Civil Air Regulations have incorporated the reference altitude of 1,000 feet in respect of performance criteria over the airport. Obscure as is the significance of this altitude operationally, the altitude of 1,500 feet has worldwide precedent of being used as the altitude above the airport at which, generally, IFR approaches are initiated and go-around procedures executed. For this reason, the changes made extend the take-off path to a minimum altitude of 1,500 feet and make this altitude applicable to the prescribed performance criteria above the airport for the one- and two-engine-inoperative en route requirements. It is not anticipated that these changes will create any problems with respect to the en route stages of flight; however, it is realized that a further extension of the take-off path might add to the problem of obtaining accurate data on obstacles relatively distant from the airport. The Board finds that the extension of the flight path to 1,500 feet is warranted in light of the operational significance of this altitude and because the extended flight paths will provide more fully for adequate terrain clearance at the end of the take-off path.

There is included a change with respect to the take-off path whereby the take-off flight path is established as starting from a 35-foot height at the end of the take-off distance and a net take-off flight is prescribed for operational use. This latter change is for consistency with the specification of net flight paths for the en route stages of flight and to simplify

determination of obstacle clearances operationally. The net flight path is specified to be the actual flight path diminished by a gradient of 1.0 percent. It is intended that the net flight path be obtained from the gross flight path by simple geometric means.

The change in the altitude from 1,000 to 1,500 feet previously mentioned, as well as a re-evaluation in other respects of some of the climb gradients in SR-422, justify certain changes. The gradients of 1.4 and 1.8 applicable to the take-off path and the final take-off climb are being reduced to 1.2 and 1.7 for two-engine and four-engine airplanes, respectively. In addition, the gradients of 1.4 and 1.8 in the one-engine-inoperative en route case are being reduced to 1.1 and 1.6, respectively.

Changes are made with respect to the one-engine-inoperative take-off climb by interrelating more realistically the prescribed airplane configuration, weight, and power. These changes, in effect, permit meeting the prescribed gradients of climb at slightly higher airplane weights than would be possible under the presently effective provisions.

There is included a change to the provisions applicable to the one-engine-inoperative take-off climb with landing gear extended which increases the prescribed minimum gradient from substantially zero to 0.5 percent for four-engine airplanes. This change is made to attain consistency in the difference between gradients applicable to twins and fours.

Changes are incorporated in connection with the two-engine-inoperative en route requirement. Representations have been made that the gradient of 0.6 percent now prescribed is unduly conservative. On the other hand, it has been pointed out that the fuel requirements for this case are not realistically covered. Both of these contentions warrant consideration and changes are included which reduce the margin gradient from 0.6 to 0.5 percent, reduce the prescribed altitude from 5,000 to 2,000 feet, and require scheduling the flight so that there is sufficient fuel on board to reach the airport and subsequently to fly for 15 minutes at cruise power or thrust.

Changes are also made relative to the approach and landing stages of flight. There is a new provision which requires the establishment of procedures for the execution of missed approaches and balked landings. A question has been raised as to whether the speed limitation of 1.5 V_s applicable to the approach condition is realistically related to the normal day-in and day-out landing procedures. To insure that it will be so related, it is required that the speed used for demonstrating the approach climb be established consistent with the landing procedures, but that it not exceed 1.5 V_s. In addition, the approach gradient of 2.8 percent prescribed for four-engine airplanes is being reduced to 2.7 percent to obtain consistency in the differences between gradients applicable to twins and fours.

A change is made to the "all-engines-operating landing climb" provisions which now require a 4.0 percent gradient of climb in the landing configuration. On the premise that requiring the landing configuration during the climb after a balk is unduly conservative, consideration was given to a proposal to permit showing of compliance with the 4.0 percent gradient of climb in the configuration which would exist 5 seconds after the initiation of the climb. Further study of this proposal indicated that such a rule would tend to introduce complications in design and lead to

less favorable operating procedures which ultimately would not contribute to safety. One of the most important factors in connection with this configuration is the response of the engines to throttle movement. Therefore, there is a provision which requires that the power used in showing compliance with the climb gradient be that power or thrust attained 8 seconds after initiation of movement of the power controls to the take-off position from the minimum flight idle position. In addition, for consistency with the procedures used for determining the landing distance, the speed limitation of 1.4 V_s is reduced to 1.3 V_s. Concern has been indicated to the effect that any reduction in the prescribed gradient of 4.0 percent might not insure in all cases the ability of the airplane to continue a safe climb after a balk. To provide a further safeguard, the take-off weight-altitude-temperature limitations (WAT limitations stemming from the application of the one-engine-inoperative take-off climb requirements) are being made applicable to the maximum landing weight at the airport of landing. In the past, the landing weight limitations were applicable to the airport of destination but not to the weather alternates. This regulation makes both the take-off weight and landing weight limitations equally applicable to the airport of destination and the weather alternates. In view of the aforementioned changes, a reduction of the required climb gradient from 4.0 to 3.2 percent is justified and included in this regulation.

In addition to the substantive changes which have been discussed, there are three significant changes of a clarifying nature. The first deals with the determination of the landing distance as affected by devices or means other than wheel brakes. There is included a provision similar to the one applicable to the accelerate-stop distance for application to the landing distance. This provision permits the use of means other than wheel brakes in the determination of the landing distance. Additionally, there is a change to the provision which requires in some cases the determination of the landing distance with one engine inoperative. It is believed that the new requirement expresses the intent more clearly. One of the more obvious applications of this provision is in respect of turbopropeller airplanes. Such airplanes usually are landed with the propellers in a relatively high drag position. If one of the engines becomes inoperative, its propeller would be expected to be in a relativly low drag position with the consequence of a longer landing distance than with all engines operating. In such a case it is required that the landing distance be determined with one engine inoperative unless use could be made by the crew of other means (e.g., reverse thrust not otherwise considered in determining the landing distance) which would reduce the landing distance at least to that determined for all-engine operation.

The second clarification being included deals with the provision setting forth the procedures which must be included in the Airplane Flight Manual. This provision in SR–422 does not make clear what procedures are involved and whether the procedures are considered to be limitations on the operation of the airplane. The clarification in language specifies that the procedures which are included with the performance limitations shall be considered only as guidance material.

The third clarification concerns the applicability of the performance limitations prescribed in SR–422. These consist of the "certificate limita-

tions" and the "operating limitations." The former relate to maximum take-off and landing weights, minimum take-off distances, accelerate-stop distances, and the operational limits imposed upon the airplane. These limitations, being part of the conditions of the type and airworthiness certificates, must be complied with at all times irrespective of the type of operation being conducted (e.g., air carrier, private, cargo). The "operating limitations," distinct from the "certificate limitations," are only applicable when required by the operating parts of the regulations (Parts 40, 41, and 42 require compliance for passenger operations). Although it appeared that previous Board pronouncements regarding this general principle as well as the explanation contained in the preamble to SR–422 would make the issue quite clear, it has come to the Board's attention that there is still some misunderstanding of this matter. Apparently this misunderstanding stems from the fact that SR–422 prescribes operating rules for air carrier operations which contain both the "certificate limitations" and the "operating limitations" while no prescription is given to non-air-carrier operations; thus giving an impression that not even the "certificate limitations" are applicable to non-air-carriers. The inclusion of "certificate limitations" for air carrier operations with the "operating limitations" was meant only to provide the operators with the convenience of having together the complete prescription of the applicable performance limitations, notwithstanding that such an inclusion, in fact, duplicates the general requirement of compliance with the "certificate limitations" contained in the Airplane Flight Manual. In view of the possible misunderstanding which might exist from the aforementioned inclusion, there are included in this regulation the same "certificate limitations" for application to all operations under the provisions of Part 43 of the Civil Air Regulations.

In addition, other changes of a minor nature are included herein, the most significant of which is the generalization of the stall speed V_s, eliminating reference to V_{s_0} and V_{s_1}.

Of the changes to SR–422 made in this regulation, there are a number which might require further consideration as studies continue and as additional experience is gained with the application of these new rules. Several of these involve new concepts with which U.S. operators have had little or no experience. These entail the requirements relative to unbalanced field lengths with respect to clearways, to the rotational speed, and to the all-engine take-off distance. Strong representation has been made to the Board to the effect that the numerical factors applicable to the aforementioned rules are too high and should be reduced pending further experience. The Board considers that it would not be in the public interest to reduce any of these factors until such time as further experience indicates that they are in fact overly conservative. Realizing, however, that these issues are of considerable importance in prescribing a practicable level of performance, the Board stands ready to reconsider the relevant provisions of this regulation at such time as substantiating information is received.

There are areas other than those previously mentioned where additional refinement of details may be advisable. This is so particularly in the case of the requirements pertaining to the landing stage of flight, to the take-off lateral clearances, and to the two-engine-inoperative en route

gradient margin. It is anticipated that, after further study of the regulation and especially after its application in the design, certification, and operation of forthcoming turbine-powered airplanes, the desirability of changes may become more apparent. It is the intent of the Board to consider without delay such changes as might be found necessary. Only after the provisions of this Special Civil Air Regulation are reasonably verified by practical application will the Board consider incorporating them on a more permanent basis into Parts 4b, 40, 41, 42, and 43 of the Civil Air Regulations.

This Special Civil Air Regulation is not intended to compromise the authority of the Administrator under section 4b.10 to impose such special conditions as he finds necessary in any particular case to avoid unsafe design features and otherwise to insure equivalent safety.

Interested persons have been afforded an opportunity to participate in the making of this regulation (23 F.R. 2139), and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, the Civil Aeronautics Board hereby makes and promulgates the following Special Civil Air Regulation, effective July 2, 1958:

Contrary provisions of the Civil Air Regulations notwithstanding, all turbine-powered transport category airplanes for which a type certificate is issued after August 27, 1957, shall comply with Special Civil Air Regulation No. SR–422 or, alternatively, with the following provisions, except that those airplanes for which a type certificate is issued after September 30, 1958, shall comply with the following provisions:

1. The provisions of Part 4b of the Civil Air Regulations, effective on the date of application for type certificate; and such of the provisions of all subsequent amendments to Part 4b, in effect prior to August 27, 1957, as the Administrator finds necessary to insure that the level of safety of turbine-powered airplanes is equivalent to that generally intended by Part 4b.

2. In lieu of sections 4b.110 through 4b.125, and 4b.743 of Part 4b of the Civil Air Regulations, the following shall be applicable:

PERFORMANCE

4T.110 *General.*

(a) The performance of the airplane shall be determined and scheduled in accordance with, and shall meet the minima prescribed by, the provisions of sections 4T.110 through 4T.123. The performance limitations, information, and other data shall be given in accordance with section 4T.743.

(b) Unless otherwise specifically prescribed, the performance shall correspond with ambient atmospheric conditions and still air. Humidity shall be accounted for as specified in paragraph (c) of this section.

(c) The performance as affected by engine power and/or thrust shall be based on a relative humidity of 80 percent at and below standard temperatures and on 34 percent at and above standard temperatures plus 50° F. Between these two temperatures the relative humidity shall vary linearly.

(d) The performance shall correspond with the propulsive thrust available under the particular ambient atmospheric conditions, the particular flight condition, and the relative humidity specified in paragraph (c) of this section. The available propulsive thrust shall correspond with engine power and/or thrust not exceeding the approved power and/or thrust less the installational losses and less the power and/or equivalent thrust absorbed by the accessories and services appropriate to the particular ambient atmospheric conditions and the particular flight condition.

4T.111 *Airplane configuration, speed, power, and/or thrust; general.*

(a) The airplane configuration (setting of wing and cowl flaps, air brakes, landing gear, propeller, etc.), denoted respectively as the take-off, en route, approach, and landing configurations, shall be selected by the applicant except as otherwise prescribed.

(b) It shall be acceptable to make the airplane configurations variable with weight, altitude, and temperature, to an extent found by the Administrator to be compatible with operating procedures required in accordance with paragraph (c) of this section.

(c) In determining the accelerate-stop distances, take-off flight paths, take-off distances, and landing distances, changes in the airplane's configuration and speed, and in the power and/or thrust shall be in accordance with procedures established by the applicant for the operation of the airplane in service, except as otherwise prescribed. In addition, procedures shall be established for the execution of balked landings and missed approaches associated with the conditions prescribed in sections 4T.119 and 4T.120(d), respectively. All procedures shall comply with the provisions of subparagraphs (1) through (3) of this paragraph.

(1) The Administrator shall find that the procedures can be consistently executed in service by crews of average skill.

(2) The procedures shall not involve methods or the use of devices which have not been proven to be safe and reliable.

(3) Allowance shall be made for such time delays in the execution of the procedures as may be reasonably expected to occur during service.

4T.112 *Stalling speeds.*

(a) The speed V_s shall denote the calibrated stalling speed, or the minimum steady flight speed at which the airplane is controllable, in knots, with:

(1) Zero thrust at the stalling speed, or engines idling and throttles closed if it is shown that the resultant thrust has no appreciable effect on the stalling speed;

(2) If applicable, propeller pitch controls in the position necessary for compliance with subparagraph (1) of this paragraph; the airplane in all other respects (flaps, landing gear, etc.) in the particular configuration corresponding with that in connection with which V_s is being used;

(3) The weight of the airplane equal to the weight in connection with which V_s is being used to determine compliance with a particular requirement;

(4) The center of gravity in the most unfavorable position within the allowable range.

(b) The stall speed defined in this section shall be the minimum speed obtained in flight tests conducted in accordance with the procedure of subparagraphs (1) and (2) of this paragraph.

(1) With the airplane trimmed for straight flight at a speed of 1.4 V_s and from a speed sufficiently above the stalling speed to insure steady conditions, the elevator control shall be applied at a rate such that the airplane speed reduction does not exceed one knot per second.

(2) During the test prescribed in subparagraph (1) of this paragraph, the flight characteristics provisions of section 4b.160 of Part 4b of the Civil Air Regulations shall be complied with.

4T.113 *Take-off; general.*

(a) The take-off data in sections 4T.114 through 4T.117 shall be determined under the conditions of subparagraphs (1) and (2) of this paragraph.

(1) At all weights, altitudes, and ambient temperatures within the operational limits established by the applicant for the airplane.

(2) In the configuration for take-off (see sec. 4T.111).

(b) Take-off data shall be based on a smooth, dry, hard-surfaced runway and shall be determined in such a manner that reproduction of the performance does not require exceptional skill or alertness on the part of the pilot. In the case of seaplanes or float planes, the take-off surface shall be smooth water, while for skiplane it shall be smooth dry snow. In addition, the take-off data shall be corrected in accordance with subparagraphs (1) and (2) of this paragraph for wind and for runway gradients within the operational limits established by the applicant for the airplane.

(1) Not more than 50 percent of nominal wind components along the take-off path opposite to the direction of take-off, and not less than 150 percent of nominal wind components along the take-off path in the direction of take-off.

(2) Effective runway gradients.

4T.114 *Take-off speeds.*

(a) The critical-engine-failure speed V_1, in terms of calibrated air speed, shall be selected by the applicant, but shall not be less than the minimum speed at which controllability by primary aerodynamic controls alone is demonstrated during the take-off run to be adequate to permit proceeding safely with the take-off using average piloting skill, when the critical engine is suddenly made inoperative.

(b) The take-off safety speed V_2, in terms of calibrated air speed, shall be selected by the applicant so as to permit the gradient of climb required in section 4T.120 (a) and (b), but it shall not be less than:

(1) 1.2 V_s for two-engine propeller-driven airplanes and for airplanes without propellers which have no provisions for obtaining a significant reduction in the one-engine-inoperative power-on stalling speed;

(2) 1.15 V_s for propeller-driven airplanes having more than two engines and for airplanes without propellers which have provisions for obtaining a significant reduction in the one-engine-inoperatve power-on stalling speed;

(3) 1.10 times the minimum control speed V_{MC}, established in accordance with section 4b.133 of Part 4b of the Civil Air Regulations;

(4) The rotation speed V_R plus the increment in speed attained in compliance with section 4T.116(e).

(c) The minimum rotation speed V_R, in terms of calibrated air speed, shall be selected by the applicant, except that it shall not be less than:

(1) The speed V_1;

(2) A speed equal to 95 percent of the highest speed obtained in compliance with subparagraph (1) or (2), whichever is applicable, and with subparagraph (3) of paragraph (b) of this section;

(3) A speed which permits the attainment of the Speed V_2 prior to reaching a height of 35 feet above the take-off surface as determined in accordance with section 4T.116(e);

(4) A speed equal to 110 percent of the minimum speed above which the airplane, with all engines operating, can be made to lift off the ground and to continue the take-off without displaying any hazardous characteristics.

4T.115 *Accelerate-stop distance.*

(a) The accelerate-stop distance shall be the sum of the following:

(1) The distance required to accelerate the airplane from a standing start to the speed V_1;

(2) Assuming the critical engine to fail at the speed V_1, the distance required to bring the airplane to a full stop from the point corresponding with the speed V_1.

(b) In addition to, or in lieu of, wheel brakes, the use of other braking means shall be acceptable in determining the accelerate-stop distance, provided that such braking means shall have been proven to be safe and reliable, that the manner of their employment is such that consistent results can be expected in service, and that exceptional skill is not required to control the airplane.

(c) The landing gear shall remain extended throughout the accelerate-stop distance.

4T.116 *Take-off path.* The take-off path shall be considered to extend from the standing start to a point in the take-off where a height of 1,500 feet above the take-off surface is reached or to a point in the take-off where the transition from the take-off to the en route configuration is completed and a speed is reached at which compliance with section 4T.120(c) is shown, whichever point is at a higher altitude. The conditions of paragraphs (a) through (i) of this section shall apply in determining the take-off path.

(a) The take-off path shall be based upon procedures prescribed in accordance with section 4T.111(c).

(b) The airplane shall be accelerated on the ground to the speed V_1 at which point the critical engine shall be made inoperative and shall remain inoperative during the remainder of the take-off. Subsequent to attaining speed V_1, the airplane shall be accelerated to speed V_2 during which time it shall be permissible to initiate raising the nose gear off the ground at a speed not less than the rotation speed V_R.

(c) Landing gear retraction shall not be initiated until the airplane becomes airborne.

(d) The slope of the airborne portion of the take-off path shall be positive at all points.

(e) The airplane shall attain the speed V_2 prior to reaching a height of 35 feet above the take-off surface and shall continue at a speed as close as practical to, but not less than, V_2 until a height of 400 feet above the take-off surface is reached.

(f) Except for gear retraction and propeller feathering, the airplane configuration shall not be changed before reaching a height of 400 feet above the take-off surface.

(g) At all points along the take-off path starting at the point where the airplane first reaches a height of 400 feet above the take-off surface, the available gradient of climb shall not be less than 1.2 percent for two-engine airplanes and 1.7 percent for four-engine airplanes.

(h) The take-off path shall be determined either by a continuous demonstrated take-off, or alternatively, by synthesizing from segments the complete take-off path.

(i) If the take-off path is determined by the segmental method, the provisions of subparagraphs (1) through (4) of this paragraph shall be specifically applicable.

(1) The segments of a segmental take-off path shall be clearly defined and shall be related to the distinct changes in the configuration of the airplane, in power and/or thrust, and in speed.

(2) The weight of the airplane, the configuration, and the power and/or thrust shall be constant throughout each segment and shall correspond with the most critical condition prevailing in the particular segment.

(3) The segmental flight path shall be based on the airplane's performance without ground effect.

(4) Segmental take-off path data shall be checked by continuous demonstrated take-offs to insure that the segmental path is conservative relative to the continuous path.

4T.117 *Take-off distance and take-off run.*

(a) *Take-off distance.* The take-off distance shall be the greater of the distances established in accordance with subparagraphs (1) and (2) of this paragraph.

(1) The horizontal distance along the take-off path from the start of the take-off to the point where the airplane attains a height of 35 feet above the take-off surface, as determined in accordance with section 4T.116.

(2) A distance equal to 115 percent of the horizontal distance along the take-off path, with all engines operating, from the start of the take-off to the point where the airplane attains a height of 35 feet above the take-off surface, as determined by a procedure consistent with that established in accordance with section 4T.116.

(b) *Take-off run.* If the take-off distance is intended to include a clearway (see item 5 of this regulation), the take-off run shall be determined and shall be the greater of the distances established in accordance with subparagraphs (1) and (2) of this paragraph.

(1) The horizontal distance along the take-off path from the start of the take-off to a point equidistant between the point where the airplane first becomes airborne and the point where it attains a height of 35 feet above the take-off surface, as determined in accordance with section 4T.116.

(2) A distance equal to 115 percent of the horizontal distance along the take-off path, with all engines operating, from the start of the take-off to a point equidistant between the point where the airplane first becomes airborne and the point where it attains a height of 35 feet above the take-off surface, as determined by a procedure consistent with that established in accordance with section 4T.116.

4T.117a *Take-off flight path.*

(a) The take-off flight path shall be considered to begin at a height of 35 feet above the take-off surface at the end of the take-off distance as determined in accordance with section 4T.117(a).

(b) The net take-off flight path data shall be determined in such a manner that they represent the airplane's actual take-off flight paths, determined in accordance with paragraph (a) of this section, diminished by a gradient of climb equal to 1.0 percent.

4T.118 *Climb; general.* Compliance shall be shown with the climb requirements of sections 4T.119 and 4T.120 at all weights, altitudes, and ambient temperatures, within the operational limits established by the applicant for the airplane. The airplane's center of gravity shall be in the most unfavorable position corresponding with the applicable configuration.

4T.119 *All-engine-operating landing climb.* In the landing configuration the steady gradient of climb shall not be less than 3.2 percent, with:

(a) All engines operating at the power and/or thrust which is available 8 seconds after initiation of movement of the power and/or thrust controls from the minimum flight idle to the take-off position;

(b) A climb speed not in excess of 1.3 V_s.

4T.120 *One-engine-inoperative climb.*

(a) ***Take-off; landing gear extended.*** In the take-off configuration existing at the point of the flight path where the airplane first becomes airborne, in accordance with section 4T.116 but without ground effect, the steady gradient of climb shall be positive for two-engine airplanes and shall not be less than 0.5 percent for four-engine airplanes, with:

(1) The critical engine inoperative, the remaining engine(s) operating at the available take-off power and/or thrust existing in accordance with section 4T.116 at the time retraction of the airplane's landing gear is initiated, unless subsequently a more critical power operating condition exists along the flight path prior to the point where the landing gear is fully retracted;

(2) The weight equal to the airplane's weight existing in accordance with section 4T.116 at the time retraction of the airplane's landing gear is initiated;

(3) The speed equal to the speed V_2.

(b) *Take-off; landing gear retracted.* In the take-off configuration existing at the point of the flight path where the airplane's landing gear is fully retracted, in accordance with section 4T.116 but without ground effect, the steady gradient of climb shall not be less than 2.5 percent for two-engine airplanes and not less than 3.0 percent for four-engine airplanes, with:

(1) The critical engine inoperative, the remaining engine(s) operating at the available take-off power and/or thrust existing in accordance with section 4T.116 at the time the landing gear is fully retracted, unless subsequently a more critical power operating condition exists along the flight path prior to the point where a height of 400 feet above the take-off surface is reached;

(2) The weight equal to the airplane's weight existing in accordance with section 4T.116 at the time the airplane's landing gear is fully retracted;

(3) The speed equal to the speed V_2.

(c) *Final take-off.* In the en route configuration, the steady gradient of climb shall not be less than 1.2 percent for two-engine airplanes and not less than 1.7 percent for four-engine airplanes, at the end of the take-off path as determined by section 4T.116, with:

(1) The critical engine inoperative, the remaining engine(s) operating at the available maximum continuous power and/or thrust;

(2) The weight equal to the airplane's weight existing in accordance with section 4T.116 at the end of the take-off path;

(3) The speed equal to not less than 1.25 V_s.

(d) *Approach.* In the approach configuration such that the corresponding V_s for this configuration does not exceed 110 percent of the V_s corresponding with the related landing configuration, the steady gradient of climb shall not be less than 2.2 percent for two-engine airplanes and not less than 2.7 percent for four-engine airplanes with:

(1) The critical engine inoperative, the remaining engine(s) operating at the available take-off power and/or thrust;

(2) The weight equal to the maximum landing weight;

(3) A climb speed established by the applicant in connection with normal landing procedures, except that it shall not exceed 1.5 V_s (see sec. 4T.111(c)).

4T.121 *En route flight paths.* With the airplane in the en route configuration, the flight paths prescribed in paragraphs (a) and (b) of this section shall be determined at all weights, altitudes, and ambient temperatures within the limits established by the applicant for the airplane.

(a) *One engine inoperative.* The one-engine-inoperative net flight path data shall be determined in such a manner that they represent the airplane's actual climb performance diminished by a gradient of climb equal to 1.1 percent for two-engine airplanes and 1.6 percent for four-engine airplanes. It shall be acceptable to include in these data the varia-

tion of the airplane's weight along the flight path to take into account the progressive consumption of fuel and oil by the operating engine(s).

(b) *Two engines inoperative.* For airplanes with four engines, the two-engine-inoperative net flight path data shall be determined in such a manner that they represent the airplane's actual climb performance diminished by a gradient of climb equal to 0.5 percent. It shall be acceptable to include in these data the variation of the airplane's weight along the flight path to take into account the progressive consumption of fuel and oil by the operating engines.

(c) *Conditions.* In determining the flight paths prescribed in paragraphs (a) and (b) of this section, the conditions of subparagraphs (1) through (4) of this paragraph shall apply.

(1) The airplane's center of gravity shall be in the most unfavorable position.

(2) The critical engine(s) shall be inoperative, the remaining engine(s) operating at the available maximum continuous power and/or thrust.

(3) Means for controlling the engine cooling air supply shall be in the position which provides adequate cooling in the hot-day condition.

(4) The speed shall be selected by the applicant.

4T.122 *Landing distance.* The landing distance shall be the horizontal distance required to land and to come to a complete stop (to a speed of approximately 3 knots in the case of seaplanes or float planes) from a point at a height of 50 feet above the landing surface. Landing distances shall be determined for standard temperatures at all weights, altitudes, and winds within the operational limits established by the applicant for the airplane. The conditions of paragraphs (a) through (g) of this section shall apply.

(a) The airplane shall be in the landing configuration. During the landing, changes in the airplane's configuration, in power and/or thrust, and in speed shall be in accordance with procedures established by the applicant for the operation of the airplane in service. The procedures shall comply with the provisions of section 4T.111(c).

(b) The landing shall be preceded by a steady gliding approach down to the 50-foot height with a calibrated air speed of not less than 1.3 V_s.

(c) The landing distance shall be based on a smooth, dry, hard-surfaced runway, and shall be determined in such a manner that reproduction does not require exceptional skill or alertness on the part of the pilot. In the case of seaplanes or float planes, the landing surface shall be smooth water, while for skiplanes it shall be smooth dry snow. During landing, the airplane shall not exhibit excessive vertical acceleration, a tendency to bounce, nose over, ground loop, porpoise, or water loop.

(d) The landing distance shall be corrected for not more than 50 percent of nominal wind components along the landing path opposite to the direction of landing and not less than 150 percent of nominal wind components along the landing path in the direction of landing.

(e) During landing, the operating pressures on the wheel brak-

ing system shall not be in excess of those approved by the manufacturer of the brakes, and the wheel brakes shall not be used in such a manner as to produce excessive wear of brakes and tires.

(f) In addition to, or in lieu of, wheel brakes, the use of other braking means shall be acceptable in determining the landing distance, provided such braking means shall have been proven to be safe and reliable, that the manner of their employment is such that consistent results can be expected in service, and that exceptional skill is not required to control the airplane.

(g) If the characteristics of a device (e.g., the propellers) dependent upon the operation of any of the engines noticeably increase the landing distance when the landing is made with the engine inoperative, the landing distance shall be determined with the critical engine inoperative unless the Administrator finds that the use of compensating means will result in a landing distance not greater than that attained with all engines operating.

4T.123 *Limitations and information.*

(a) *Limitations.* The performance limitations on the operation of the airplane shall be established in accordance with subparagraphs (1) through (4) of this paragraph. **(See also sec. 4T.743.)**

(1) *Take-off weights.* The maximum take-off weights shall be established at which compliance is shown with the generally applicable provisions of this regulation and with the take-off climb provisions prescribed in section 4T.120 (a), (b), and (c) for altitudes and ambient temperatures within the operational limits of the airplane (see subparagraph (4) of this paragraph).

(2) *Landing weights.* The maximum landing weights shall be established at which compliance is shown with the generally applicable provisions of this regulation and with the landing and take-off climb provisions prescribed in sections 4T.119 and 4T.120 for altitudes and ambient temperatures within the operational limits of the airplane (see subparagraph (4) of this paragraph).

(3) *Accelerate-stop distance, take-off distance, and take-off run.* The minimum distances required for take-off shall be established at which compliance is shown with the generally applicable provisions of this regulation and with sections 4T.115 and 4T.117(a), and with 4T.117(b) if the take-off distance is intended to include a clearway, for weights, altitudes, temperatures, wind components, and runway gradients, within the operational limits of the airplane (see subparagraph (4) of this paragraph).

(4) *Operational limits.* The operational limits of the airplane shall be established by the applicant for all variable factors required in showing compliance with this regulation (weight, altitude, temperature, etc.). (See secs. 4T.113 (a)(1) and (b), 4T.118, 4T.121, and 4T.122.)

(b) *Information.* The performance information on the operation of the airplane shall be scheduled in compliance with the generally applicable provisions of this regulation and with sections 4T.117a(b), 4T.121, and 4T.122 for weights, altitudes, temperatures, wind components, and runway gradients, as these may be applicable, within the operational limits of the airplane (see subparagraph (a)(4) of this section). In addition, the

performance information specified in subparagraphs (1) through (3) of this paragraph shall be determined by extrapolation and scheduled for the ranges of weights between the maximum landing and maximum take-off weights established in accordance with subparagraphs (a)(1) and (a)(2) of this section. **(See also sec. 4T.743.)**

(1) Climb in the landing configuration (see sec. 4T.119);

(2) Climb in the approach configuration (see sec. 4T.120(d));

(3) Landing distance (see sec. 4T.122).

AIRPLANE FLIGHT MANUAL

4T.743 *Performance limitations, information, and other data.*

(a) *Limitations.* The airplane's performance limitations shall be given in accordance with section 4T.123(a).

(b) *Information.* The performance information prescribed in section 4T.123(b) for the application of the operating rules of this regulation shall be given together with descriptions of the conditions, air speeds, etc., under which the data were determined.

(c) *Procedures.* Procedures established in accordance with section 4T.111(c) shall be given to the extent such procedures are related to the limitations and information set forth in accordance with paragraphs (a) and (b) of this section. Such procedures, in the form of guidance material, shall be included with the relevant limitations or information, as applicable.

(d) *Miscellaneous.* An explanation shall be given of significant or unusual flight or ground handling characteristics of the airplane.

3. In lieu of sections 40.70 through 40.78, 41.27 through 41.36(d), and 42.70 through 42.83, of Parts 40, 41, and 42 of the Civil Air Regulations, respectively, the following shall be applicable:

OPERATING RULES

40T.80 *Transport category airplane operating limitations.*

(a) In operating any passenger-carrying transport category airplane certificated in accordance with the performance requirements of this regulation, the provisions of sections 40T.80 through 40T.84 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) The performance data in the Airplane Flight Manual shall be applied in determining compliance with the provisions of sections 40T.81 through 40T.84. Where conditions differ from those for which specific tests were made, compliance shall be determined by approved interpolation or computation of the effects of changes in the specific variables if such interpolations or computations give results substantially equalling in accuracy the results of a direct test.

40T.81 *Airplane's certificate limitations.*

(a) No airplane shall be taken off at a weight which exceeds the take-off weight specified in the Airplane Flight Manual for the elevation of the airport and for the ambient temperature existing at the time of the take-off. (See secs. 4T.123(a)(1) and 4T.743(a).)

(b) No airplane shall be taken off at a weight such that, allowing for normal consumption of fuel and oil in flight to the airport of destination and to the alternate airports, the weight on arrival will exceed the landing weight specified in the Airplane Flight Manual for the elevation of each of the airports involved and for the ambient temperatures anticipated at the time of landing. (See secs. 4T.123(a)(2) and 4T.743(a).

(c) No airplane shall be taken off at a weight which exceeds the weight shown in the Airplane Flight Manual to correspond with the minimum distances required for take-off. These distances shall correspond with the elevation of the airport, the runway to be used, the effective runway gradient, and the ambient temperature and wind component existing at the time of take-off. (See secs. 4T.123(a)(3) and 4T.743(a).) If the take-off distance includes a clearway as defined in Item 5 of this regulation, the take-off distance shall not include a clearway distance greater than one-half of the take-off run.

(d) No airplane shall be operated outside the operational limits specified in the Airplane Flight Manual. (See secs. 4T.123(a)(4) and 42.743(a).)

40T.82 *Take-off obstacle clearance limitations.* No airplane shall be taken off at a weight in excess of that shown in the Airplane Flight Manual to correspond with a net take-off flight path which clears all obstacles either by at least a height of 35 feet vertically or by at least 200 feet horizontally within the airport boundaries and by at least 300 feet horizontally after passing beyond the boundaries. In determining the allowable deviation of the flight path in order to avoid obstacles by at least the distances prescribed, it shall be assumed that the airplane is not banked before reaching a height of 50 feet as shown by the take-off path data in the Airplane Flight Manual, and that a maximum bank thereafter does not exceed 15 degrees. The take-off path considered shall be for the elevation of the airport, the effective runway gradient, and for the ambient temperature and wind component existing at the time of take-off. (See secs. 4T.123(b) and 4T.743(b).)

40T.83 *En route limitations.*

(a) *One engine inoperative.* No airplane shall be taken off at a weight in excess of that which, according to the one-engine-inoperative en route net flight path data shown in the Airplane Flight Manual, will permit compliance with either subparagraph (1) or subparagraph (2) of this paragraph at all points along the route. The net flight path used shall be for the ambient temperatures anticipated along the route. (See secs. 4T.123(b) and 4T.743(b).)

(1) The slope of the net flight path shall be positive at an altitude of at least 1,000 feet above all terrain and obstructions along the route within 5 miles on either side of the intended track.

(2) The net flight path shall be such as to permit the airplane to continue flight from the cruising altitude to an alternate airport where a landing can be made in accordance with the provisions of section 40T.84(b), the net flight path clearing vertically by at least 2,000 feet all terrain and obstructions along the route within 5 miles on either side of the intended track. The provisions of subdivisions (i) through (vii) of this subparagraph shall apply.

(i) The engine shall be assumed to fail at the most critical point along the route.

(ii) 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, except that the Administrator may authorize a procedure established on a different basis where adequate operational safeguards are found to exist.

(iii) The net flight path shall have a positive slope at 1,500 feet above the airport used as the alternate.

(iv) An approved method shall be used to account for winds which would otherwise adversely affect the flight path.

(v) Fuel jettisoning shall be permitted if the Administrator finds that the operator has an adequate training program, proper instructions are given to the flight crew, and all other precautions are taken to insure a safe procedure.

(vi) The alternate airport shall be specified in the dispatch release and shall meet the prescribed weather minima.

(vii) The consumption of fuel and oil after the engine becomes inoperative shall be that which is accounted for in the net flight path data shown in the Airplane Flight Manual.

(b) *Two engines inoperative.* No airplane shall be flown along an intended route except in compliance with either subparagraph (1) or subparagraph (2) of this paragraph.

(1) No place along the intended track shall be more than 90 minutes away from an airport at which a landing can be made in accordance with the provisions of section 40T.84(b), assuming all engines to be operating at cruising power.

(2) No airplane shall be taken off at a weight in excess of that which, according to the two-engine-inoperative en route net flight path data shown in the Airplane Flight Manual, will permit the airplane to continue flight from the point where two engines are assumed to fail simultaneously to an airport where a landing can be made in accordance with the provisions of section 40T.84(b), the net flight path having a positive slope at an altitude of at least 1,000 feet above all terrain and obstructions along the route within 5 miles on either side of the intended track or at an altitude of 2,000 feet, whichever is higher. The net flight path considered shall be for the ambient temperatures anticipated along the route. The provisions of subdivisions (i) through (iii) of this subparagraph shall apply. (See secs. 4T.123(b) and 4T.743(b).)

(i) The two engines shall be assumed to fail at the most critical point along the route.

(ii) 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 the airport and to arrive there at an altitude of at least 1,500 feet directly over the landing area and thereafter to fly for 15 minutes at cruise power and/or thrust.

(iii) The consumption of fuel and oil after the engines become inoperative shall be that which is accounted for in the net flight path data shown in the Airplane Flight Manual.

40T.84 *Landing limitations.*

(a) *Airport of destination.* No airplane shall be taken off at a weight in excess of that which, in accordance with the landing distances shown in the Airplane Flight Manual for the elevation of the airport of intended destination and for the wind conditions anticipated there at the time of landing, would permit the airplane to be brought to rest at the airport of intended destination within 60 percent of the effective length of the runway from a point 50 feet directly above the intersection of the obstruction clearance plane and the runway. The weight of the airplane shall be assumed to be reduced by the weight of the fuel and oil expected to be consumed in flight to the airport of intended destination. Compliance shall be shown with the conditions of subparagraphs (1) and (2) of this paragraph. (See secs. 4T.123(b) and 4T.743(b).)

(1) It shall be assumed that the airplane is landed on the most favorable runway and direction in still air.

(2) It shall be assumed that the airplane is landed on the most suitable runway considering the probable wind velocity and direction and taking due account of the ground handling characteristics of the airplane and of other conditions (i.e., landing aids, terrain, etc.). If full compliance with the provisions of this subparagraph is not shown, the airplane may be taken off if an alternate airport is designated which permits compliance with paragraph (b) of this section.

(b) *Alternate airport.* No airport shall be designated as an alternate airport in a dispatch release unless the airplane at the weight anticipated at the time of arrival at such airport can comply with the provisions of paragraph (a) of this section, provided that the airplane can be brought to rest within 70 percent of the effective length of the runway.

4. In lieu of section 43.11 of Part 43 of the Civil Air Regulations, the following shall be applicable:

43T.11 *Transport category airplane weight limitations.* The performance data in the Airplane Flight Manual shall be applied in determining compliance with the following provisions:

(a) No airplane shall be taken off at a weight which exceeds the take-off weight specified in the Airplane Flight Manual for the elevation of the airport and for the ambient temperature existing at the time of the take-off. (See secs. 4T.123(a)(1) and 4T.743(a).)

(b) No airplane shall be taken off at a weight such that, allowing for normal consumption of fuel and oil in flight to the airport of destination and to the alternate airports, the weight on arrival will exceed the landing weight specified in the Airplane Flight Manual for the elevation of each of the airports involved and for the ambient temperatures anticipated at the time of landing. (See secs. 4T.123(a)(2) and 4T.743(a).)

(c) No airplane shall be taken off at a weight which exceeds the weight shown in the Airplane Flight Manual to correspond with the minimum distances required for take-off. These distances shall correspond with the elevation of the airport, the runway to be used, the effective runway gradient, and the ambient temperature and wind component existing at the time of take-off. (See secs. 4T.123(a)(3) and 4T.743(a).) If the take-off distance includes a clearway as defined in Item 5 of this regulation, the take-off distance shall not include a clearway distance greater than one-half of the take-off run.

(d) No airplane shall be operated outside the operational limits specified in the Airplane Flight Manual. (See secs. 4T.123(a)(4) and 4T.743(a).)

5. The following definitions shall apply:

Clearway. A clearway is an area beyond the airport runway not less than 300 feet on either side of the extended center line of the runway, at an elevation no higher than the elevation at the end of the runway, clear of all fixed obstacles, and under the control of the airport authorities.

SPECIAL CIVIL AIR REGULATION NO. SR–422B

Effective: July 9, 1959
Issued: July 9, 1959

Turbine-Powered Transport Category Airplane of Current Design

Special Civil Air Regulation No. SR–422, effective August 27, 1957, prescribes requirements applicable to the type certification and operation of turbine-powered transport category airplanes for which a type certificate is issued after August 27, 1957. Special Civil Air Regulation No. SR–422A, effective July 2, 1958, included substantive changes to SR–422 and was made applicable to all turbine-powered transport category airplanes for which a type certificate is issued after September 30, 1958.

This Special Civil Air Regulation makes further changes to the airworthiness rules for turbine-powered transport category airplanes to be applicable to all such airplanes for which a type certificate is issued after August 29, 1959. These changes were proposed in Draft Release No. 58–1C (24 F.R. 128) by the Civil Aeronautics Board in connection with the 1958 Annual Airworthiness Review. The amendments herein have been adopted after careful consideration of all the discussion and comment received thereon.

Substantive and minor changes have been made to the provisions of SR–422A. For ease in identification they are listed as follows:

(a) Substantive changes: introductory paragraphs; 4T.114 (b), (c), (d), (e), and (f); 4T.115(d); 4T.117a(b); 4T.120 (a)(3), (b), and (d); 40T.81(c); 43T.11(c); and item 5 (a) and (b).

(b) Minor changes; item 2; 4T.112 (title), (b)(1), (c), (d), and (e); 4T.113(b); 4T.116(i)(4); 4T.117(b) (1) and (2); 4T.120(a); 4T.121; 4T.122(d); 4T.123(a); 40T.82; and 40T.83.

Pertinent background information to this regulation is contained in the preambles to SR–422 and SR–422A. Following is a discussion of important issues relevant to the changed provisions contained herein.

One of the most important changes being introduced concerns the rotation speed V_R of the airplane during takeoff (4T.114). Experience gained in the certification of airplanes under the provisions of SR–422 and SR–422A indicates that relating V_R to the stall speed is not essential and might unduly penalize airplanes with superior flying qualities. It has been found that the primary limitations on V_R should be in terms of a margin between the actual lift-off speeds V_{LOF} and the minimum unstick speed V_{MU} at which the airplane can proceed safely with the takeoff. The provisions contained herein require that V_R speeds be established to be applicable to takeoffs with one engine inoperative as well as with all engines operating. The V_{MU} speeds can be established from free air data provided that the data are verified by ground takeoff tests. Certain safeguards are included in conjunction with the establishment of V_R speeds to ensure that takeoffs in service can be made with consistent safety.

A change is being introduced to the provision in 4T.117a(b) concerning the manner in which the net takeoff flight path is obtained. In accordance with this provision as contained in SR–422A, the net takeoff flight path would have a negative slope throughout the acceleration segment. Since this segment usually represents level flight easily controlled by reference to the normal flight instruments, a significant reduction in the flight path's gradient would not be expected. For these reasons, the provision is being changed to permit an equivalent reduction in acceleration in lieu of a reduction in gradient.

Section 4T.117a(b) is being amended additionally by changing the value of gradient margin in the net flight path for two-engine airplanes from 1.0 percent to 0.8 percent. The value for four-engine airplanes remains 1.0 percent. Differentiation in gradient values in the net flight path between two and four-engine airplanes is consistent with the differentiation in the climb gradients for the takeoff, enroute, and approach stages of flight. Statistical analysis substantiates the specific reduction of the net flight path gradient to a value of 0.8 percent. Correlatively, a reevaluation of the climb gradients for twin-engine airplanes in the second segment takeoff and in the approach climb indicates that the respective values should be 2.4 percent and 2.1 percent and these changes are being made in 4T.120 (b) and (d).

A change is introduced in the conditions prescribed for meeting the climb gradient in the first segment takeoff climb (4T.120(a)), by changing the speed V_2 to the speed V_{LOF}. The intent of this requirement is to use the speed at which the airplane lifts off the ground. In SR–422 this speed was considered to be V_2; however, in SR–422A and in this regulation the speed V_2 is a higher speed which is reached at the end of the takeoff distance and no longer reflects the conditions pertinent to the first segment climb. In making this change consistent with relevant changes in SR–422A and in this regulation, no consideration has been given to the appropriateness of the minimum climb gradient values prescribed for the first segment climb. These are subject to alteration if results of further studies so indicate.

There is being introduced in this regulation the concept of "stopways," the definition of which is contained in item 5(b). Stopways have been used outside the United States in meeting the accelerate-stop distances in case of aborted takeoffs. They are considered to result in more practical operations. In order to ensure that they can be used without detrimental effects on safety, a provision is being included in 4T.115(d) requiring taking into account the surface characteristics of the stopways to be used in scheduling the accelerate-stop distances in the Airplane Flight Manual.

In conjunction with the introduction of stopways, there are changes being made in the definition of a "clearway" (item 5(a)). One of the changes is to specify that a clearway begins at the end of the runway whether or not a stopway is being used. Of the other changes, the most significant one expresses the clearway in terms of a clearway plane and permits this plane to have an upward slope of 1.25 percent. In effect, this change will allow, in some cases, use of clearways which would not be allowed under the definition in SR–422A because of relatively small obstacles or slightly sloping terrain. **(See also 40T.81(c) and 43T.11(c).)**

There are also included in this regulation a number of minor, editorial, or clarifying changes.

Draft Release No. 58–1C included a proposal for expanding lateral obstacle clearances in the takeoff flight path. Studies indicate that some expanding lateral clearances are necessary for safety in operations with all turbine-powered airplanes. It appears, therefore, that an appropriate rule should be made applicable not only to airplanes certificated in accordance with this regulation, but also to those certificated in accordance with SR–422 and SR–422A. Accordingly, no change is being made in this regulation to the lateral obstacle clearance provisions, instead, a Notice of Proposed Rule Making is now being prepared to amend SR–422, SR–422A, and this regulation, to require expanding lateral obstacle clearances for all airplanes certificated thereunder.

This Special Civil Air Regulation is not intended to compromise the authority of the Administrator under section 4b.10 to impose such special conditions as are found necessary in any particular case to avoid unsafe design features and otherwise to ensure equivalent safety.

Interested persons have been afforded an opportunity to participate in the making of this regulation (24 F.R. 128), and due consideration has been given to all relevant matter presented.

This regulation does not require compliance until after August 29, 1959; however, since applicants for a type certificate for turbine-powered transport category airplanes may elect to show compliance with this regulation before that date, it is being made effective immediately.

In consideration of the foregoing, the following Special Civil Air Regulation is hereby promulgated to become effective immediately:

Contrary provisions of the Civil Air Regulations notwithstanding, all turbine-powered transport category airplanes for which a type certificate is issued after August 29, 1959, shall comply with the following requirements. Applicants for a type certificate for a turbine-powered transport category airplane may elect and are authorized to meet the requirements of this Special Civil Air Regulation prior to August 29, 1959, in which case however, all of the following provisions must be complied with.

1. The provisions of Part 4b of the Civil Air Regulations, effective on the date of application for type certificate; and such of the provisions of all subsequent amendments to Part 4b, in effect prior to August 27, 1957, as the Administator finds necessary to ensure that the level of safety of turbine-powered airplanes is equivalent to that generally intended by Part 4b.

2. In lieu of sections 4b. 110 through 4b.125, 4b.183, and 4b.743 of Part 4b of the Civil Air Regulations, the following shall be applicable:

PERFORMANCE

4T.110 *General.*

(a) The performance of the airplane shall be determined and scheduled in accordance with, and shall meet the minima prescribed by, the provision of sections 4T.110 through 4T.123. The performance limitations, information, and other data shall be given in accordance with section 4T.743.

(b) Unless otherwise specifically prescribed, the performance shall correspond with ambient atmospheric conditions and still air.

Humidity shall be accounted for as specified in paragraph (c) of this section.

(c) The performance as affected by engine power and/or thrust shall be based on a relative humidity of 80 percent at and below standard temperatures and on 34 percent at and above standard temperatures plus 50° F. Between these two temperatures the relative humidity shall vary linearly.

(d) The performance shall correspond with the propulsive thrust available under the particular ambient atmospheric conditions, the particular flight condition, and the relative humidity specified in paragraph (c) of this section. The available propulsive thrust shall correspond with engine power and/or thrust not exceeding the approved power and/or thrust less the installational losses and less the power and/or equivalent thrust absorbed by the accessories and services appropriate to the particular ambient atmospheric conditions and the particular flight condition.

4T.111 *Airplane configuration, speed, power, and/or thrust; general.*

(a) The airplane configuration (setting of wing and cowl flaps, air brakes, landing gear, propeller, etc.), denoted respectively as the takeoff, en route, approach, and landing configurations, shall be selected by the applicant except as otherwise prescribed.

(b) It shall be acceptable to make the airplane configurations variable with weight, altitude, and temperature, to an extent found by the Administrator to be compatible with operating procedures required in accordance with paragraph (c) of this section.

(c) In determining the accelerate-stop distances, takeoff flight paths, takeoff distances, and landing distances, changes in the airplane's configuration and speed, and in the power and thrust shall be in accordance with procedures established by the applicant for the operation of the airplane in service, except as otherwise prescribed. In addition, procedures shall be established for the execution of balked landings and missed approaches associated with the conditions prescribed in sections 4T.119 and 4T.120(d), respectively. All procedures shall comply with the provisions of subparagraphs (1) through (3) of this paragraph.

(1) The Administrator shall find that the procedures can be consistently executed in service by crews of average skill.

(2) The procedures shall not involve methods or the use of devices which have not been proven to be safe and reliable.

(3) Allowance shall be made for such time delays in the execution of the procedures as may be reasonably expected to occur during service.

4T.112 *Stalling and minimum control speeds.*

(a) The speed V_s shall denote the calibrated stilling speed, or the minimum steady flight speed at which the airplane is controllable, in knots, with:

(1) Zero thrust at the stalling speed, or engines idling and throttles closed if it is shown that the resultant thrust has no appreciable effect on the stalling speed;

(2) If applicable, propeller pitch controls in the position

necessary for compliance with subparagraph (1) of this paragraph; the airplane in all other respects (flaps, landing gear, etc.) in the particular configuration corresponding with that in connection with which V_s is being used;

(3) The weight of the airplane equal to the weight in connection with which V_s is being used to determine compliance with a particular requirement;

(4) The center of gravity in the most unfavorable position within the the allowable range.

(b) The stall speed defined in this section shall be the minimum speed obtained in flight tests conducted in accordance with the procedure of subparagraphs (1) and (2) of this paragraph.

(1) With the airplane trimmed for straight flight at a speed chosen by the applicant, but not less than 1.2 V_s nor greater than 1.4 V_s, and from a speed sufficiently above the stalling speed to ensure steady conditions, the elevator control shall be applied at a rate such that the airplane speed reduction does not exceed 1 knot per second.

(2) During the test prescribed in subparagraph (1) of this paragraph, the flight characteristics provisions of section 4b.160 of Part 4b of the Civil Air Regulations shall be complied with.

(c) The minimum control speed V_{MC}, in terms of calibrated air speeed, shall be determined under the conditions specified in this paragraph so that, when the critical engine is suddenly made inoperative at that speed, it is possible to recover control of the airplane with the engine still inoperative and to maintain it in straight flight at that speed, either with zero yaw or, at the option of the applicant, with an angle of bank not in excess of 5 degrees. V_{MC} shall not exceed 1.2 V_s with:

(1) Engines operating at the maximum available takeoff thrust and/or power;

(2) Maximum sea level takeoff weight or such lesser weight as might be necessary to demonstrate V_{MC}.

(3) The airplane in the most critical takeoff configuration existing along the flight path after the airplane becomes airborne, except that the landing gear is retracted;

(4) The airplane trimmed for takeoff;

(5) The airplane airborne and the ground effect negligible;

(6) The center of gravity in the most unfavorable position;

(d) In demonstrating the minimum speed specified in paragraph (c) of this section, the rudder force required to maintain control shall not exceed 180 pounds and it shall not be necessary to reduce the power and/or thrust of the operative engine(s).

(e) During recovery from the maneuver specified in paragraph (c) of this section, the airplane shall not assume any dangerous attitude, nor shall it require exceptional skill, strength, or alertness on the part of the pilot to prevent a change of heading in excess of 20 degrees before recovery is complete.

4T.113 *Takeoff; general.*

(a) The takeoff data in sections 4T.114 through 4T.117 shall be determined under the conditions of subparagraphs (1) and (2) of this paragraph.

(1) At all weights, altitudes, and ambient temperatures, within the operational limits established by the applicant for the airplane.

(2) In the configuration for takeoff (see sec. 4T.111).

(b) Takeoff data shall be based on a smooth, dry, hard-surfaced runway and shall be determined in such a manner that reproduction of the performance does not require exceptional skill or alertness on the part of the pilot. In the case of seaplanes or float planes, the takeoff surface shall be smooth water, while for skiplane it shall be smooth, dry snow. In addition, the takeoff data shall include operational correction factors in accordance with subparagraphs (1) and (2) of this paragraph for wind and for runway gradients, within the operational limits established by the applicant for the airplane.

(1) Not more than 50 percent of nominal wind components along the takeoff path opposite to the direction of takeoff, and not less than 150 percent of nominal wind components along the takeoff path in the direction of takeoff.

(2) Effective runway gradients.

4T.114 *Takeoff speeds.*

(a) The critical-engine-failure speed V_1 in terms of calibrated air speed, shall be selected by the applicant, but shall not be less than the minimum speed at which controllability by primary aerodynamic controls alone is demonstrated during the takeoff run to be adequate to permit proceeding safely with the takeoff using average piloting skill, when the critical engine is suddenly made inoperative.

(b) The minimum takeoff safety speed $V_{2\,min}$, in terms of calibrated air speed, shall not be less than:

(1) 1.2 V_s for two-engine propeller-driven airplanes and for airplanes without propellers which have no provisions for obtaining a significant reduction in the one-engine-inoperative power-on stalling speed;

(2) 1.15 V_s for propeller-driven airplanes having more than two engines and for airplanes without propellers which have provisions for obtaining a significant reduction in the one-engine-inoperative power-on stalling speed;

(3) 1.10 times the minimum control speed V_{MC}.

(c) The takeoff safety speed V_2, in terms of calibrated air speed, shall be selected by the applicant so as to permit the gradient of climb required in section 4T.120(b), but it shall not be less than:

(1) The speed $V_{2\,min}$,

(2) The rotation speed V_R (see paragraph (e) of this section) plus the increment in speed attained prior to reaching a height of 35 feet above the takeoff surface in compliance with section 4T.116(e).

(d) The minimum unstick speed V_{MU}, in terms of calibrated air speed, shall be the speed at and above which the airplane can be made to lift off the ground and to continue the takeoff without displaying any hazardous characteristics. V_{MU} speeds shall be selected by the applicant for the all-engines-operating and the one-engine-inoperative conditions. It shall be acceptable to establish the V_{MU} speeds from free air data: *Provided,* That these data are verified by ground takeoff tests.

NOTE: In certain cases, ground takeoff tests might involve some takeoffs at the V_{MU} speeds.

(e) The rotation speed V_R, in terms of calibrated air speed, shall be selected by the applicant in compliance with the conditions of subparagraphs (1) through (4) of this paragraph.

(1) The V_R speed shall not be less than:

(i) The speed V_1;

(ii) A speed equal to 105 percent of V_{MC};

(iii) A speed which permits the attainment of the speed V_2 prior to reaching a height of 35 feet above the takeoff surface as determined in accordance with section 4T.116(e);

(iv) A speed which, if the airplane is rotated at its maximum practicable rate, will result in a lift-off speed V_{LOF} (see paragraph (f) of this section) not less than 110 percent of V_{MU} in the all-engines-operating condition nor less than 105 percent of V_{MU} in the one-engine-inoperative condition.

(2) For any given set of conditions (weight, configuration, temperature, etc.), a single value of V_R speed obtained in accordance with this paragraph shall be used in showing compliance with both the one-engine-inoperative and the all-engines-operating takeoff provisions.

(3) It shall be shown that the one-engine-inoperative takeoff distance determined with a rotation speed 5 knots less than the V_R speed established in accordance with subparagraphs (1) and (2) of this paragraph does not exceed the corresponding one-engine-inoperative takeoff distance determined with the established V_R speed. The determination of the takeoff distances shall be in accordance with section 4T.117(a)(1).

(4) It shall be demonstrated that reasonably expected variations in service from the takeoff procedures established by the applicant for the operation of the airplane (see sec. 4T.111(c)) (e.g., over-rotation of the airplane, out of trim conditions) will not result in unsafe flight characteristics nor in marked increases in the scheduled takeoff distances established in accordance with section 4T.117(a).

(f) The lift-off speed V_{LOF}, in terms of calibrated air speed, shall be the speed at which the airplane first becomes airborne.

4T.115 *Accelerate-stop distance.*

(a) The accelerate-stop distance shall be the sum of the following:

(1) The distance required to accelerate the airplane from a standing start to the speed V_1;

(2) Assuming the critical engine to fail at the speed V_1, the distance required to bring the airplane to a full stop from the point corresponding with the speed V_1.

(b) In addition to, or in lieu of, wheel brakes, the use of other braking means shall be acceptable in determining the accelerate-stop distance, provided that such braking means shall have been proven to be safe and reliable, that the manner of their employment is such that consistent results can be expected in service and that exceptional skill is not required to control the airplane.

(c) The landing gear shall remain extended throughout the accelerate-stop distance.

(d) If the accelerate-stop distance is intended to include a stopway with surface characteristics substantially different from those of a

smooth hard-surfaced runway, the takeoff data shall include operational correction factors for the accelerate-stop distance to account for the particular surface characteristics of the stopway and the variations in such characteristics with seasonal weather conditions (i.e., temperature, rain, snow, ice, etc.), within the operational limits established by the applicant.

4T.116 *Takeoff path.* The takeoff path shall be considered to extend from the standing start to a point in the takeoff where a height of 1,500 feet above the takeoff surface is reached or to a point in the takeoff where the transition from the takeoff to the en route configuration is completed and a speed is reached at which compliance with section 4T.120(c) is shown, whichever point is at a higher altitude. The conditions of paragraphs (a) through (i) of this section shall apply in determining the takeoff path.

(a) The takeoff path shall be based upon procedures prescribed in accordance with section 4T.111(c).

(b) The airplane shall be accelerated on the ground to the speed V_1 at which point the critical engine shall be made inoperative and shall remain inoperative during the remainder of the takeoff. Subsequent to attaining speed V_1, the airplane shall be accelerated to speed V_2 during which time it shall be permissible to initiate raising the nose gear off the

(c) Landing gear retraction shall not be initiated until the ground at a speed not less than the rotating speed V_R.
airplane becomes airborne.

(d) The slope of the airborne portion of the takeoff path shall be positive at all points.

(e) The airplane shall attain the speed V_2 prior to reaching a height of 35 feet above the takeoff surface and shall continue at a speed as close as practical to, but not less than, V_2 until a height of 400 feet above the takeoff surface is reached.

(f) Except for gear retraction and propeller feathering, the airplane configuration shall not be changed before reaching a height of 400 feet above the takeoff surface.

(g) At all points along the takeoff path starting at the point where the airplane first reaches a height of 400 feet above the takeoff surface, the available gradient of climb shall not be less than 1.2 percent for two-engine airplanes, and 1.7 percent for four-engine airplanes.

(h) The takeoff path shall be determined either by a continuous demonstrated takeoff, or alternatively, by synthesizing from segments the complete takeoff path.

(i) If the takeoff path is determined by the segmental method, the provisions of subparagraphs (1) through (4) of this paragraph shall be specifically applicable.

(1) The segments of a segmental takeoff path shall be clearly defined and shall be related to the distinct changes in the configuration of the airplane, in power and/or thrust, and in speed.

(2) The weight of the airplane, the configuration, and the power and/or thrust shall be constant throughout each segment and shall correspond with the most critical condition prevailing in the particular segment.

(3) The segmental flight path shall be based on the airplane's performance without ground effect.

(4) Segmental takeoff path data shall be checked by continuous demonstrated takeoffs up to the point where the airplane's performance is out of ground effect and the airplane's speed is stabilized, to ensure that the segmental path is conservative relative to the continuous path.

NOTE: The airplane usually is considered out of ground effect when it reaches a height above the ground equal to the airplane's wing span.

4T.117 *Takeoff distance and takeoff run.*

(a) *Takeoff distance.* The takeoff distance shall be the greater of the distances established in accordance with subparagraphs (1) and (2) of this paragraph.

(1) The horizontal distance along the takeoff path from the start of the takeoff to the point where the airplane attains a height of 35 feet above the takeoff surface, as determined in accordance with section 4T.116.

(2) A distance equal to 115 percent of the horizontal distance along the takeoff path, with all engines operating, from the start of the takeoff to the point where the airplane attains a height of 35 feet above the takeoff surface, as determined by a procedure consistent with that established in accordance with section 4T.116.

(b) *Takeoff run.* If the takeoff distance is intended to include a clearway (see item 5 of this regulation), the takeoff run shall be determined and shall be the greater of the distances established in accordance with subparagraphs (1) and (2) of this paragraph.

(1) The horizontal distance along the takeoff path from the start of the takeoff to a point equidistant between the point where the speed V_{LOF} is reached and the point where the airplane attains a height of 35 feet above the takeoff surface, as determined in accordance with section 4T.116.

(2) A distance equal to 115 percent of the horizontal distance along the takeoff path, with all engines operating, from the start of the takeoff to a point equidistant between the point where the speed V_{LOF} is reached and the point where the airplane attains a height of 35 feet above the takeoff surface, as determined by a procedure consistent with that established in accordance with section 4T.116.

4T.117a *Takeoff flight path.*

(a) The takeoff flight path shall be considered to begin at a height of 35 feet above the takeoff surface at the end of the takeoff distance as determined in accordance with section 4T.117(a).

(b) The net takeoff flight path data shall be determined in such a manner that they represent the airplane's actual takeoff flight paths, determined in accordance with section 4T.116 and with paragraph (a) of this section, reduced at each point by a gradient of climb equal to 0.8 percent for two-engine airplanes and equal to 1.0 percent for four-engine airplanes. It shall be acceptable to apply the prescribed reduction in climb gradient as an equivalent reduction in the airplane's acceleration along that portion of the actual takeoff flight path where the airplane is accelerated in level flight.

4T.118 *Climb; general.* Compliance shall be shown with the climb requirements of sections 4T.119 and 4T.120 at all weights, altitudes, and ambient temperatures, within the operational limits established by the applicant for the airplane. The airplane's center of gravity shall be in the most unfavorable position corresponding with the applicable configuration.

4T.119 *All-engine-operating landing climb.* In the landing configuration the steady gradient of climb shall not be less than 3.2 percent, with:

(a) All engines operating at the power and/or thrust which are available 8 seconds after initiation of movement of the power and/or thrust controls fromthe minimum flight idle to the takeoff position;

(b) A climb speed not in excess of 1.3 V_s.

4T.120 *One-engine-inoperative climb.*

(a) *Takeoff; landing gear extended.* In the critical takeoff configuration existing along the flight path between the points where the airplane reaches the speed V_{LOF} and where the landing gear is fully retracted, in accordance with section 4T.116 but without ground effect, the steady gradient of climb shall be positive for two-engine airplanes and shall not be less than 0.5 percent for four-engine airplanes, with:

(1) The critical engine inoperative, the remaining engine(s) operating at the available takeoff power and/or thrust existing in accordance with section 4T.116 at the time retraction of the airplane's landing gear is initiated, unless subsequently a more critical power operating condition exists along the flight path prior to the point where the landing gear is fully retracted;

(2) The weight equal to the airplane's weight existing in accordance with section 4T.116 at the time retraction of the airplane's landing gear is initiated;

(3) The speed equal to the speed V_{LOF}.

(b) *Takeoff; landing gear retracted.* In the takeoff configuration existing at the point of the flight path where the airplane's landing gear is fully retracted, in accordance with section 4T.116 but without ground effect, the steady gradient of climb shall not be less than 2.4 percent for two-engine airplanes and not less than 3.0 percent for four-engine airplanes, with:

(1) The critical engine inoperative, the remaining engine(s) operating at the available takeoff power and/or thrust existing in accordance with section 4T.116 at the time the landing gear is fully retracted, unless subsequently a more critical power operating condition exists along the flight path prior to the point where a height of 400 feet above the takeoff surface is reached;

(2) The weight equal to the airplane's weight existing in accordance with section 4T.116 at the time the airplane's landing gear is fully retracted;

(3) The speed equal to the speed V_2.

(c) *Final takeoff.* In the en route configuration, the steady gradient of climb shall not be less than 1.2 percent for two-engine airplanes and not less than 1.7 percent for four-engine airplanes, at the end of the takeoff path as determined by section 4T.116, with:

(1) The critical engine inoperative, the remaining engine(s) operating at the available maximum continuous power and/or thrust;

(2) The weight equal to the airplane's weight existing in accordance with section 4T.116 at the end of the takeoff path.

(3) The speed equal to not less than 1.25 V_s.

(d) *Approach.* In the approach configuration corresponding with the normal all-engines-operating procedure such that V_s related to this configuration does not exceed 110 percent of the V_s corresponding with the related landing configuration, the steady gradient of climb shall not be less than 2.1 percent for two-engine airplanes and not less than 2.7 percent for four-engine airplanes with:

(1) The critical engine inoperative, the remaining engine(s) operating at the available takeoff power and/or thrust;

(2) The weight equal to the maximum landing weight;

(3) A climb speed established by the applicant in connection with normal landing procedures, except that it shall not exceed 1.5 V_s (see sec. 4T.111(c)).

4T.121 *En route flight paths.* With the airplane in the en route configuration, the flight paths prescribed in paragraphs (a) and (b) of this section shall be determined at all weights, altitudes, and ambient temperatures, within the operational limits established by the applicant for the airplane.

(a) *One engine inoperative.* The one-engine-inoperative net flight path data shall be determined in such a manner that they represent the airplane's actual climb performance diminished by a gradient of climb equal to 1.1 percent for two-engine airplanes and 1.6 percent for four-engine airplanes. It shall be acceptable to include in these data the variation of the airplane's weight along the flight path to take into account the progressive consumption of fuel and oil by the operating engine(s).

(b) *Two engines inoperative.* For airplanes with four engines, the two-engine-inoperative net flight path data shall be determined in such a manner that they represent the airplane's actual climb performance diminished by a gradient of climb equal to 0.5 percent. It shall be acceptable to include in these data the variation of the airplane's weight along the flight path to take into account the progressive consumption of fuel and oil by the operating engines.

(c) *Conditions.* In determining the flight paths prescribed in paragraphs (a) and (b) of this section, the conditions of subparagraphs (1) through (4) of this paragraph shall apply.

(1) The airplane's center of gravity shall be in the most unfavorable position.

(2) The critical engine(s) shall be inoperative, the remaining engine(s) operating at the available maximum continuous power and/or thrust.

(3) Means for controlling the engine cooling air supply shall be in the position which provides adequate cooling in the hot-day condition.

(4) The speed shall be selected by the applicant.

4T.122 *Landing distance.* The landing distance shall be the horizontal distance required to land and to come to a complete stop (to a speed

of approximately 3 knots in the case of seaplanes or float planes) from a point at a height of 50 feet above the landing surface. Landing distances shall be determined for standard temperatures at all weights, altitudes, and winds, within the operational limits established by the applicant for the airplane. The conditions of paragraphs (a) through (g) of this section shall apply.

(a) The airplane shall be in the landing configuration. During the landing, changes in the airplane's configuration, in power and/or thrust, and in speed shall be in accordance with procedures established by the applicant for the operation of the airplane in service. The procedures shall comply with the provisions of section 4T.111(c).

(b) The landing shall be preceded by a steady gliding approach down to the 50-foot height with a calibrated air speed of not less than 1.3 V_s.

(c) The landing distance shall be based on a smooth, dry, hard-surfaced runway, and shall be determined in such a manner that reproduction does not require exceptional skill or alertness on the part of the pilot. In the case of seaplanes or float planes, the landing surface shall be smooth water, while for skiplanes it shall be smooth, dry snow. During landing, the airplane shall not exhibit excessive vertical acceleration, a tendency to bounce, nose over, ground loop, porpoise, or water loop.

(d) The landing distance data shall include operational correction factors for not more than 50 percent of nominal wind components along the landing path opposite to the direction of landing and not less than 150 percent of nominal wind components along the landing path in the direction of landing.

(e) During landing, the operating pressures on the wheel braking system shall not be in excess of those approved by the manufacturer of the brakes, and the wheel brakes shall not be used in such a manner as to produce excessive wear of brakes and tires.

(f) In addition to, or in lieu, of, wheel brakes, the use of other braking means shall be acceptable in determining the landing distance, provided such braking means shall have been proven to be safe and reliable, that the manner of their employment is such that consistent results can be expected in service, and that exceptional skill is not required to control the airplane.

(g) If the characteristics of a device (e.g., the propellers) dependent upon the operation of any of the engines noticeably increase the landing distance when the landing is made with the engine inoperative, the landing distance shall be determined with the critical engine inoperative unless the Administrator finds that the use of compensating means will result in a landing distance not greater than that attained with all engines operating.

4T.123 *Limitations and information.*

(a) *Limitations.* The performance limitations on the operation of the airplane shall be established in accordance with subparagraph (1) through (4) of this paragraph. (See also sec. 4T.743.)

(1) *Takeoff weights.* The maximum takeoff weights shall be established at which compliance is shown with the generally applicable provisions of this regulation and with the takeoff climb provisions pre-

scribed in section 4T.120 (a), (b), and (c) for altitudes and ambient temperatures, within the operational limits of the airplane (see subparagraph (4) of this paragraph).

(2) *Landing weights.* The maximum landing weights shall be established at which compliance is shown with the generally applicable provisions of this regulation and with the landing and takeoff climb provisions prescribed in sections 4T.119 and 4T.120 for altitudes and ambient temperatures, within the operational limits of the airplane (see subparagraph (4) of this paragraph).

(3) *Accelerate-stop distance, takeoff distance, and takeoff run.* The minimum distances required for takeoff shall be established at which compliance is shown with the generally applicable provisions of this regulation and with sections 4T.115 and 4T.117(a) and with 4T.117(b) if the takeoff distance is intended to include a clearway, for weights, altitudes, temperatures, wind components, and runway gradients, within the operational limits of the airplane (see subparagraph (4) of this paragraph).

(4) *Operational limits.* The operational limits of the airplane shall be established by the applicant for all variable factors required in showing compliance with this regulation (weight, altitude, temperature, etc.). (See secs. 4T.113 (a)(1) and (b), 4T.115(d), 4T.118, 4T.121, and 4T.122.)

(b) *Information.* The performance information on the operation of the airplane shall be scheduled in compliance with the generally applicable provisions of this regulation and with sections 4T.117a(b), 4T.121, and 4T.122 for weights, altitudes, temperatures, wind components, and runway gradients, as these may be applicable, within the operational limits of the airplane (see subparagraph (a)(4) of this section). In addition, the performance information specified in subparagraphs (1) through (3) of this paragraph shall be determined by extrapolation and scheduled for the ranges of weights between the maximum landing and maximum takeoff weights established in accordance with subparagraphs (a)(1) and (a)(2) of this section. (See also sec. 4T.743.)

(1) Climb in the landing configuration (see sec. 4T.119);

(2) Climb in the approach configuration (see sec. 4T.120(d));

(3) Landing distance (see sec. 4T.122).

AIRPLANE FLIGHT MANUAL

4T.743 *Performance limitations, information, and other data.*

(a) *Limitations.* The airplane's performance limitations shall be given in accordance with section 4T.123(a).

(b) *Information.* The performance information prescribed in section 4T.123(b) for the application of the operating rules of this regulation shall be given together with descriptions of the conditions, air speeds, etc., under which the data were determined.

(c) *Procedures.* Procedures established in accordance with section 4T.111(c) shall be given to the extent such procedures are related to the limitations and information set forth in accordance with paragraphs (a) and (b) of this section. Such procedures, in the form of

guidance material, shall be included with the relevant limitations or information, as applicable.

(d) ***Miscellaneous.*** An explanation shall be given of significant or unusual flight or ground handling characteristics of the airplane.

3. In lieu of sections 40.70 through 40.78, 41.27 through 41.36(d), and 42.70 through 42.83, of Parts 40, 41, and 42, respectively, of the Civil Air Regulations, the following shall be applicable:

OPERATING RULES

40T.80 *Transport category airplane operating limitations.*

(a) In operating any passenger-carrying transport category airplane certificated in accordance with the performance requirements of this regulation, the provisions of sections 40T.80 through 40T.84 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) The performance data in the Airplane Flight Manual shall be applied in determining compliance with the provisions of sections 40T.81 through 40T.84. Where conditions differ from those for which specific tests were made, compliance shall be determined by approved interpolation or computation of the effects of changes in the specific variables if such interpolations or computations give results substantially equalling in accuracy the results of a direct test.

40T.81 *Airplane's certificate limitations.*

(a) No airplane shall be taken off at a weight which exceeds the takeoff weight specified in the Airplane Flight Manual for the elevation of the airport and for the ambient temperature existing at the time of the takeoff. (See secs. 4T.123(a)(1) and 4T.743(a).)

(b) No airplane shall be taken off at a weight such that, allowing for normal consumption of fuel and oil in flight to the airport of destination and to the alternate airports, the weight on arrival will exceed the landing weight specified in the Airplane Flight Manual for the elevation of each of the airports involved and for the ambient temperatures anticipated at the time of landing. (See secs. 4T.123(a)(2) and 4T.743(a).)

(c) No airplane shall be taken off at a weight which exceeds the weight at which, in accordance with the minimum distances for takeoff scheduled in the Airplane Flight Manual, compliance with subparagraphs (1) through (3) of this paragraph is shown. These distances shall correspond with the elevation of the airport, the runway to be used, the effective runway gradient, and the ambient temperature and wind component existing at the time of takeoff. (See secs. 4T.123(a)(3) and 4T.743(a).)

(1) The accelerate-stop distance shall not be greater than the length of the runway plus the length of the stopway if present.

(2) The takeoff distance shall not be greater than the length of the runway plus the length of the clearway if present, except that the length of the clearway shall not be greater than one-half of the length of the runway.

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

(d) No airplane shall be operated outside the operational limits specified in the Airplane Flight Manual. (See secs. 4T.123(a)(4) and 4T.743(a).)

40T.82 *Takeoff obstacle clearance limitations.* No airplane shall be taken off at a weight in excess of that shown in the Airplane Flight Manual to correspond with a net takeoff flight path which clears all obstacles either by at least a height of 35 feet vertically or by at least 200 feet horizontally within the airport boundaries and by at least 300 feet horizontally after passing beyond the boundaries. In determining the allowable deviation of the net takeoff flight path in order to avoid obstacles by at least the distances prescribed, it shall be assumed that the airplane is not banked before reaching a height of 50 feet as shown by the net takeoff flight path data in the Airplane Flight Manual, and that a maximum bank thereafter does not exceed 15 degrees. The net takeoff flight path considered shall be for the elevation of the airport, the effective runway gradient, and for the ambient temperature and wind component existing at the time of takeoff. (See secs. 4T.123(b) and 4T.743(b).)

40T.83 *En route limitations.* All airplanes shall be operated in compliance with paragraph (a) of this section. In addition, no airplane shall be flown along an intended route if any place along the route is more than 90 minutes away from an airport at which a landing can be made in accordance with section 40T.84(b), assuming all engines to be operating at cruising power, unless compliance is shown with paragraph (b) of this section.

(a) *One engine inoperative.* No airplane shall be taken off at a weight in excess of that which, according to the one-engine-inoperative en route net flight path data shown in the Airplane Flight Manual, will permit compliance with either subparagraphs (1) or (2) of this paragraph at all points along the route. The net flight path shall have a positive slope at 1,500 feet above the airport where the landing is assumed to be made after the engine fails. The net flight path used shall be for the ambient temperatures anticipated along the route. (See secs. 4T.123(b) and 4T.743(b).)

(1) The slope of the net flight path shall be positive at an altitude of at least 1,000 feet above all terrain and obstructions along the route within 5 statute miles (4.34 nautical miles) on either side of the intended track.

(2) The net flight path shall be such as to permit the airplane to continue flight from the cruising altitude to an airport where a landing can be made in accordance with the provisions of section 40T.84(b), the net flight path clearing vertically by at least 2,000 feet all terrain and obstructions along the route within 5 statute miles (4.34 nautical miles) on either side of the intended track. The provisions of subdivisions (i) through (vi) of this subparagraph shall apply.

(i) The engine shall be assumed to fail at the most critical point along the route.

(ii) 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, except that the Administrator may authorize a procedure established on a different basis where adequate operational safeguards are found to exist.

(iii) An approved method shall be used to account for winds which would otherwise adversely affect the flight path.

(iv) Fuel jettisoning shall be permitted if the Administrator finds that the operator has an adequate training program, proper instructions are given to the flight crew, and all other precautions are taken to ensure a safe procedure.

(v) The alternate airport shall be specified in the dispatch release and shall meet the prescribed weather minima.

(vi) The consumption of fuel and oil after the engine is assumed to fail shall be that which is accounted for in the net flight path data shown in the Airplane Flight Manual.

(b) *Two engines inoperative.* No airplane shall be taken off at a weight in excess of that which, according to the two-engine-inoperative en route net flight path data shown in the Airplane Flight Manual, will permit the airplane to continue flight from the point where two engines are assumed to fail simultaneously to an airport where a landing can be made in accordance with the provisions of section 40T.84(b), the net flight path clearing vertically by at least 2,000 feet all terrain and obstructions along the route within 5 statute miles (4.34 nautical miles) on either side of the intended track. The net flight path considered shall be for the ambient temperatures anticipated along the route. The provisions of subparagraphs (1) through (5) of this paragraph shall apply. (See secs. 4T.123(b) and 4T.734(b).)

(1) The two engines shall be assumed to fail at the most critical point along the route.

(2) The net flight path shall have a positive slope at 1,500 feet above the airport where the landing is assumed to be made after failure of two engines.

(3) Fuel jettisoning shall be permitted if the Administrator finds that the operator has an adequate training program, proper instructions are given to the flight crew, and all other precautions are taken to ensure a safe procedure.

(4) 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 the airport and to arrive there at an altitude of at least 1,500 feet directly over the landing area and thereafter to fly for 15 minutes at cruise power and/or thrust.

(5) The consumption of fuel and oil after the engines are assumed to fail shall be that which is accounted for in the net flight path data shown in the Airplane Flight Manual.

40T.84 *Landing limitations.*

(a) *Airport of destination.* No airplane shall be taken off at a weight in excess of that which, in accordance with the landing distances shown in the Airplane Flight Manual for the elevation of the airport of intended destination and for the wind conditions anticipated there at the time of landing, would permit the airplane to be brought to rest at the airport of intended destination within 60 percent of the effective length of the runway from a point 50 feet directly above the intersection of the

obstruction clearance plane and the runway. The weight of the airplane shall be assumed to be reduced by the weight of the fuel and oil expected to be consumed in flight to the airport of intended destination. Compliance shall be shown with the conditions of subparagraphs (1) and (2) of this paragraph. (See secs. 4T.123(b) and 4T.743(b).)

(1) It shall be assumed that the airplane is landed on the most favorable runway and direction in still air.

(2) It shall be assumed that the airplane is landed on the most suitable runway considering the probable wind velocity and direction and taking due account of the ground handling characteristics of the airplane and of other conditions (i.e., landing aids, terrain, etc.). If full compliance with the provisions of this subparagraph is not shown, the airplane may be taken off if an alternate airport is designated which permits compliance with paragraph (b) of this section.

(b) *Alternate airport.* No airport shall be designated as an alternate airport in a dispatch release unless the airplane at the weight anticipated at the time of arrival at such airport can comply with the provisions of paragraph (a) of this section, provided that the airplane can be brought to rest within 70 percent of the effective length of the runway.

4. In lieu of section 43.11 of Part 43 of the Civil Air Regulations the following shall be applicable.

43T.11 *Transport category airplane weight limitations.* The performance data in the Airplane Flight Manual shall be applied in determining compliance with the following provisions:

(a) No airplane shall be taken off at a weight which exceeds the takeoff weight specified in the Airplane Flight Manual for the elevation of the airport and for the ambient temperature existing at the time of the takeoff. (See secs. 4T.123(a)(1) and 4T.743(a).)

(b) No airplane shall be taken off at a weight such that, allowing for normal consumption of fuel and oil in flight to the airport of destination and to the alternate airports, the weight on arrival will exceed the landing weight specified in the Airplane Flight Manual for the elevation of each of the airports involved and for the ambient temperatures anticipated at the time of landing. (See secs. 4T.123(a)(2) and 4T.743(a).)

(c) No airplane shall be taken off at a weight which exceeds the weight at which, in accordance with the minimum distances for takeoff scheduled in the Airplane Flight Manual, compliance with subparagraphs (1) through (3) of this paragraph is shown. These distances shall correspond with the elevation of the airport, the runway to be used, the effective runway gradient, and the ambient temperature and wind component existing at the time of takeoff. (See secs. 4T.123(a)(3) and 4T.734(a).)

(1) The accelerate-stop distance shall not be greater than the length of the runway plus the length of the stopway if present.

(2) The takeoff distance shall not be greater than the length of the runway plus the length of the clearway if present, except that the length of the clearway shall not be greater than one-half of the length of the runway.

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

(d) No airplane shall be operated outside the operational limits specified in the Airplane Flight Manual. (See secs. 4T.123(a)(4) and 4T.743(a).)

5. The following definitions shall apply:

(a) *Clearway.* A clearway is an area beyond the runway, not less than 500 feet wide, centrally located about the extended center line of the runway, and under the control of the airport authorities. The clearway is expressed in terms of a clearway plane, extending from the end of the runway with an upward slope not exceeding 1.25 percent, above which no object nor any portion of the terrain protrudes, except that threshold lights may protrude above the plane if their height above the end of the runway is not greater than 26 inches and if they are located to each side of the runway.

NOTE: For the purpose of establishing takeoff distances and takeoff runs, in accordance with section 4T.117 of this regulation, the clearway plane is considered to be the takeoff surface.

(b) *Stopway.* A stopway is an area beyond the runway, not less in width than the width of the runway, centrally located about the extended center line of the runway, and designated by the airport authorities for use in decelerating the airplane during an aborted takeoff: To be considered as such, a stopway must be capable of supporting the airplane during an aborted takeoff without inducing structural damage to the airplane. (See also sec. 4T.115(d) of this regulation.)

SPECIAL CIVIL AIR REGULATIONS NO. SR–423

Effective: December 20, 1957
Adopted: November 15, 1957

Type Certification of Transport Category Airplanes With Turbo-Prop Replacements

The airworthiness requirements with which a particular airplane is required to comply are established by the date of application for the type certificate. After the type certificate is issued, the holder of the type certificate or an applicant for a supplemental type certificate, at his option, can obtain approval of changes in the design in accordance with requirements in effect at the time of the original application for type certificate or in accordance with later requirements in effect at the time of the change.

Prior to May 18, 1954, the regulations placed no specific limit on the extent of changes to the airplane which could be approved in this manner nor did they define a new type design for which a new application for type certification would be required. Amendment 4b–1 effective on that date, among other changes in Part 4b, lists certain changes in design which if made to an airplane would require it to be considered as a new type. In such a case, a new application for type certification would be required and the regulations, together with all amendments thereto effective on the date of the new application, would have to be complied with (sec. 4b.11(a)). One such change which would require a new type certificate is a change to engines employing different priciples of operation or propulsion (sec 4b.11(e)(2)).

Interest has been shown recently within the aviation industry in the installation of turbo-propeller engines on airplanes presently equipped with reciprocating engines. In accordance with sec. 4b.11(e)(2) such a change would require a showing of compliance with the latest airworthiness requirements of Part 4b. The Board is of the opinion that showing of compliance with all of the latest requirements might be burdensome, impractical, and not essential to safety.

This Special Civil Air Regulation will permit the certification of a turbo-propeller-powered airplane, which previously was type certificated with the same number of reciprocating engines, if compliance is shown with the airworthiness provisions applicable to the airplane as type certificated with reciprocating engines, together with certain later provisions of the Civil Air Regulations in effect on the date of application for a supplemental or new type certificate which are applicable or related to the powerplant of the turbo-propeller-powered version.

In order to insure that the level of safety of the turbine-powered airplane is equivalent to that intended by Part 4b, the Board considers that compliance must be shown with the later provisions of Part 4b which apply to the powerplant installation, airplane performance, and cockpit standardization, such other requirements as the Administrator finds are otherwise related to the changes made in the engines.

Special Civil Air Regulation No. SR–422 establishes certain certification and operational requirements for all turbine-powered airplanes for which a type certificate is issued after the effective date of that regulation. Except as otherwise provided, all of the provisions of SR–422 remain applicable to airplanes certificated in accordance with the regulation prescribed herein. Therefore, to be certificated in accordance with the regulation prescribed herein compliance must be shown with the certification performance requirements prescribed in paragraph 2 of SR–422.

It must be emphasized that the certification performance limitations established by the performance requirements; i.e., the take-off weights, landing weights, take-off and accelerate-stop distances, and the operational limits, become part of the airworthiness certificate and must be complied with at all times, regardless of the type of operations conducted with the airplane. (See sec. 43.10, as amended, of Part 43 of the Civil Air Regulations.)

In addition to certification performance limitations, SR–422 prescribes performance operating limitations which are applicable to turbine-powered transport category airplanes when used in air carrier passenger operations. Since turbo-propeller-powered airplanes certificated in accordance with the regulation prescribed herein are required to comply with the certification performance requirements of SR–422, they are also subject to the performance operating limitations prescribed in paragraph 3 of SR–422 when used in air carrier passenger operations.

Since a change in engines will require a rather extensive change in the cockpit to accommodate the new instruments and controls for turbine engines, the Board considers that compliance with the latest cockpit standardization requirements can be accomplished without any undue burden and such compliance would speed up the cockpit standardization of other airplanes in an airline's fleet in accordance with the Board's objectives. Therefore, this regulation makes the latest cockpit standardization requirements applicable, with the exception of such detailed requirements as the Administrator finds are impracticable, and do not contribute materially to standardization. It should be noted that in referring to this exception in the preamble to Draft Release No. 56–29, the use of the conjunction "or" after the word "impracticable" was inadvertent. As the language of the proposed regulation clearly indicated, "and" was the proper conjunction following the word "impracticable."

The Board also considers it appropriate to call attention to the fact that if other changes to the airplane are made simultaneously with, or subsequent to, such an engine change, then compliance will also have to be shown with all requirements related to the additional changes in effect on the date of the new application for a supplemental or new type certificate. In this regard, if an airplane converted to turbo-propeller power is to be certificated for operation at altitudes, speeds, or weights higher than those which are applicable to the reciprocating-engine-powered airplane, compliance will be required with all the latest provisions of the regulations which are related to such changes.

In order to assure that all airplanes converted to turbo-propeller power meet the minimum requirements considered essential to safety, this regulation is made retroactive and requires compliance with the provisions of the Civil Air Regulations as set forth herein for all of such

airplanes for which application for a supplemental or new type certificate was made prior to the effective date of this regulation.

This Special Civil Air Regulation shall continue in effect for 5 years, at the end of which time the effectiveness of the regulation will be evaluated for the purpose of considering the incorporation of the substance of these rules in the permanent body of the Civil Air Regulations.

Interested persons have been afforded an opportunity to participate in the making of this Special Civil Air Regulation (21 F.R. 9436), and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, the Civil Aeronautics Board hereby makes and promulgates the following Special Civil Air Regulation effective December 20, 1957.

Contrary provisions of section 4b.11(a) as it applies to section 4b.11 (e)(2) of Part 4b of the Civil Air Regulations and paragraph (1) of Special Civil Air Regulation No. SR–422 notwithstanding, the following provisions shall be applicable to the certification of a turbo-propeller-powered airplane which was previously type certificated with the same number of reciprocating engines:

(1) The airworthiness regulations applicable to the airplane as type certificated with reciprocating engines and, in addition thereto or in lieu thereof as appropriate, the following provisions of the Civil Air Regulations effective on the date of application for a supplemental or new type certificate (see paragraph (3)):

(a) The certification performance requirements prescribed in Special Civil Air Regulation No. SR–422;

(b) The powerplant installation requirements of Part 4b applicable to the turbo-propeller-powered airplane;

(c) The requirements of Part 4b for the standardization of cockpit controls and instruments, except where the Administrator finds that showing of compliance with a particular detailed requirement would be impractical and would not contribute materially to standardization; and

(d) Such other requirements of Part 4b applicable to the turbo-propeller-powered airplane as the Administrator finds are related to the changes in engines and are necessary to insure a level of safety of the turbo-propeller-powered airplane equivalent to that generally intended by Part 4b.

(2) If new limitations are established with respect to weight, speed, or altitude of operation and the Administrator finds that such limitations are significantly altered from those approved for the airplane with reciprocating engines, compliance shall be shown with all of the requirements, applicable to the specific limitations being changed, which are in effect on the date of application for the new or supplemental type certificate.

(3) Airplanes converted to turbo-propeller power, for which application for a supplemental or a new type certificate was made prior to the effective date of this Special Civil Air Regulation, shall comply with all of the provisions of the Civil Air Regulations specified in paragraphs (1) and (2) effective on the date of this special regulation, rather than those provisions effective on the date application was made for the supplemental or the new type certificate.

This Special Civil Air Regulation shall terminate December 20, 1962 unless sooner superseded or rescinded by the Board.

SPECIAL CIVIL AIR REGULATION NO. 425C

Effective: June 6, 1961
Adopted: May 31, 1961
Published: June 6, 1961
(26 F.R. 4990)

Provisional Certification and Operation of Aircraft

Special Civil Air Regulation No. SR–425A was adopted on July 22, 1958, to provide for provisional certification of turbine-powered transport category airplanes in order to permit certain air carriers and manufacturers to conduct crew training, service testing, and simulated air carrier operations prior to introduction of the airplanes into commercial service. The objective of this regulation was to provide a means whereby the air carriers and manufacturers could obtain as much experience as possible with turbine-powered airplanes which, although safe for flight, had not been approved for the issuance of a type certificate.

Special Civil Air Regulation No. SR–425B, which superseded SR–425A, was adopted on April 7, 1960, to extend the application of the regulation to: (1) piston-engine transport category aircraft, including rotorcraft; and (2) personal and executive type aircraft, including rotorcraft, irrespective of powerplant type. In addition, this regulation permitted operations such as sales demonstrations and market surveys with aircraft having a provisional type and airworthiness certificate.

To accomplish this, SR–425B provided for, among other things, the issuance of two classes of provisional type and airworthiness certificates. Class I provisional and airworthiness certificates could be issued for all types of aircraft for operation by the aircraft manufacturer. Class II provisional type and airworthiness certificates could be issued only for transport category aircraft, but these aircraft could be operated by either the aircraft manufacturer or a certificated air carrier. In general, the requirements for the issuance of Class I provisional certificates were less stringent, and the operating limitations less confining, than those for the issuance of Class II provisional certificates.

Under the provisions of SR–425B, however, eligibility to apply for Class I provisional certificates was limited to aircraft manufacturers. A recommendation that this eligibility be extended to include engine manufacturers had been evaluated by the Agency prior to the adoption of SR–425B, but rule making action on such extension was deferred until additional experience with provisional certification could be acquired.

Experience accumulated since the adoption of SR–425B has indicated that it would be practicable for engine manufacturers, who have altered a type certificated aircraft by installing type certificated engines of their own manufacture in place of the original engines, to show compliance with the currently effective requirements for issuance of Class I provisional type and provisional airworthiness certificates; and that compliance with these requirements will insure safe operation of provisionally certificated aircraft by such engine manufacturers. Further, the Agency

believes that operations conducted by engine manufacturers under the terms of Class I provisional certificates, for the purpose of sales demonstrations, market surveys, and other similar activities related to the sale of their engines, would contribute to the promotion and development of civil aeronautics in the United States.

SR–425B is therefore being superseded by SR–425C to permit certain engine manufacturers to apply for Class I provisional type and provisional airworthiness certificates if they have applied for the issuance of a supplemental type certificate.

Since this is a superseding regulation which relieves restrictions and imposes no additional burden on any person, notice and public procedures hereon are unnecessary, and this regulation may be made effective on less than 30 days' notice.

In consideration of the foregoing, the following Special Civil Air Regulation is adopted to become effective June 6, 1961:

GENERAL

1. *Applicability.* Contrary provisions of the Civil Air Regulations notwithstanding, provisional type and airworthiness certificates, amendments to provisional type certificates, and provisional amendments to type certificates, will be issued as prescribed in this regulation to a manufacturer or an air carrier. As used in this regulation, a manufacturer shall mean only a manufacturer who is a citizen of the United States; and the term air carrier shall not include an air taxi operator.

2. *Eligibility.*

(a) A manufacturer of aircraft manufactured by him within the United States may apply for Class I or Class II provisional type and provisional airworthiness certificates, for amendments to provisional type certificates held by him, and for provisional amendments to type certificates held by him.

(b) An air carrier holding an air carrier operating certificate authorizing him to conduct operations under Parts 40, 41, 42, or 46 of the Civil Air Regulations may apply for Class II provisional airworthiness certificates for transport category aircraft which meet the conditions of either subparagraphs (1) or (2) of this paragraph.

(1) The aircraft has a currently valid Class II provisional type certificate or an amendment thereto;

(2) The aircraft has a currently valid provisional amendment to a type certificate which was preceded by a corresponding Class II provisional type certificate.

(c) An engine manufacturer who has altered a type certificated aircraft by installing different type certificated engines, manufactured by him within the United States, in place of the original engines, may apply for Class I provisional type and provisional airworthiness certificates for such aircraft, and for amendments to Class I provisional type certificates held by him, if the basic aircraft, before alteration was type certificated in the normal, utility, acrobatic, or transport category.

3. *Application.*

(a) *General.* Applications for provisional type and airworthiness certificates, for amendments to provisional type certificates, and for

provisional amendments to type certificates, shall be submitted to the Chief, Flight Standards Division, FAA, of the Regional Office in which the manufacturer or air carrier is located and shall be accompanied by the pertinent information specified in this regulation.

4. *Duration.* Unless sooner surrendered, superseded, revoked, or otherwise terminated, certificates and amendments thereto, shall have periods of duration in accordance with paragraphs (a) through (f) of this section.

(a) A Class I provisional type certificate shall remain in effect for 24 months after the date of its issuance or until the date of issuance of the corresponding type or supplemental type certificate, whichever occurs first.

(b) A Class I provisional type certificate shall expire immediately upon issuance of a Class II provisional type certificate for aircraft of the same type design.

(c) A Class II provisional type certificate shall remain in effect for 6 months after the date of its issuance or 60 days after the date of issuance of the corresponding type certificate, whichever occurs first.

(d) An amendment to a Class I or a Class II provisional type certificate shall remain in effect for the duration of the corresponding provisional type certificate.

(e) A provisional amendment to a type certificate shall remain in effect for 6 months after its approval or until the amendment to the type certificate is approved, whichever occurs first.

(f) Provisional airworthiness certificates shall remain in effect for the duration of the corresponding provisional type certificate, amendment to a provisional type certificate, or a provisional amendment to the type certificate.

5. ***Transferability of certificates.*** Certificates issued pursuant to this regulation are not transferable except that a Class II provisional airworthiness certificate may be transferred to an air carrier eligible to apply for such certificate under section 2 of this regulation.

6. *Display of certificates and markings.* A provisional airworthiness certificate shall be prominently displayed in the aircraft for which it is issued. The words "Provisional Airworthiness" shall be painted in letters not less than 2 inches high on the exterior of such aircraft adjacent to each entrance to the cabin and cockpit of the aircraft.

REQUIREMENTS FOR ISSUANCE

7. *Class I provisional type certificates.* A Class I provisional type certificate and amendments thereto will be issued for a particular type design when the eligible aircraft or engine manufacturer shows compliance with the provisions of paragraphs (a) through (f) of this section, and an authorized representative of the Administrator finds, on the basis of information submitted to him by the manufacturer in compliance with the provisions of this section and of other relevant information, that there is no feature, characteristic, or condition which would render the aircraft unsafe when operated in accordance with the limitations established in paragraph (d) of this section and in section 13 of this regulation.

(a) The manufacturer has applied for the issuance of a type or supplemental type certificate for the aircraft.

(b) The manufacturer certifies that the aircraft has met the provisions of subparagraphs (1) through (3) of this paragraph.

(1) The aircraft has been designed and constructed in accordance with the airworthiness requirements applicable to the issuance of the type or supplemental type certificate for the aircraft;

(2) The aircraft substantially complies with the applicable flight characteristics requirements for the type or supplemental type certificate;

(3) The aircraft can be operated safely under the appropriate operating limitations specified in this regulation.

(c) The manufacturer has submitted a report showing that the aircraft had been flown in all maneuvers necessary to show compliance with the flight requirements for the issuance of the type or supplemental type certificate and to establish that the aircraft can be operated safely in accordance with the limitations specified in this regulation.

(d) The manufacturer has established limitations with respect to weights, speeds, flight maneuvers, loading, operation of controls and equipment, and all other relevant factors. The limitations shall include all the limitations required for the issuance of a type or supplemental type certificate for the aircraft: *Provided,* That, where such limitations have not been established, appropriate restrictions on the operation of the aircraft shall be established.

(e) The manufacturer has established an inspection and maintenance program for the continued airworthiness of the aircraft.

(f) A prototype aircraft has been flown by the manufacturer for at least 50 hours pursuant to the authority of an experimental certificate issued under Part 1 of the Civil Air Regulations or under the auspices of a United States military service: *Provided,* That the number of flight hours may be reduced by the authorized representative of the Administrator in the case of an amendment to a provisional type certificate.

8. *Class I provisional airworthiness certificates.* Except as provided in section 12 of this regulation, a Class I provisional airworthiness certificate will be issued for an aircraft, for which a Class I provisional type certificate is in effect, when the eligible aircraft or engine manufacturer shows compliance with the provisions of paragraphs (a) through (d) of this section, and an authorized representative of the Administrator finds that there is no feature, characteristic, or condition of the aircraft which would render the aircraft unsafe when operated in accordance with the limitations established in sections 7(d) and 13 of this regulation.

(a) The manufacturer is the holder of the provisional type certificate for the aircraft.

(b) The manufacturer submits a statement that the aircraft conforms to the type design corresponding with the provisional type certificate and has been found by him to be in safe operating condition under the applicable limitations.

(c) The aircraft has been flown at least 5 hours by the manufacturer.

(d) The aircraft has been supplied with a provisional aircraft flight manual or other document and appropriate placards containing the limitations required by sections 7(d) and 13 of this regulation.

9. *Class II provisional type certificates.* A Class II provisional type certificate and amendments thereto will be issued for a particular transport category type design when the manufacturer of the aircraft shows compliance with the provisions of paragraphs (a) through (h) of this section, and an authorized representative of the Administrator finds, on the basis of information submitted to him by the manufacturer in compliance with the provisions of this section and of other relevant information, that there is no feature, characteristic, or condition which would render the aircraft unsafe when operated in accordance with the limitations established in paragraph (f) of this section and in sections 13 and 14 of this regulation.

(a) The manufacturer has applied for the issuance of a transport category type certificate for the aircraft.

(b) The manufacturer holds a type certificate and a currently effective production certificate for at least one other aircraft in the same transport category as the subject aircraft.

(c) The Agency's official flight test program with respect to the issuance of a type certificate for the aircraft is in progress.

(d) The manufacturer certifies that the aircraft has met the provisions of subparagraphs (1) through (3) of this paragraph.

(1) The aircraft has been designed and constructed in accordance with the airworthiness requirements applicable to the issuance of the type certificate for the aircraft;

(2) The aircraft substantially complies with the applicable flight characteristics requirements for the type certificate;

(3) The aircraft can be operated safely under the appropriate operating limitations specified in this regulation.

(e) The manufacturer has submitted a report showing that the aircraft had been flown in all maneuvers necessary to show compliance with the flight requirements for the issuance of the type certificate and to establish that the aircraft can be operated safely in accordance with the limitations specified in this regulation.

(f) The manufacturer has prepared a provisional aircraft flight manual which includes limitations with respect to weights, speeds, flight maneuvers, loading, operation of controls and equipment, and all other relevant factors. The limitations shall include all the limitations required for the issuance of a type certificate for the aircraft: *Provided,* That, where such limitations have not been established, the provisional flight manual shall contain appropriate restrictions on the operation of the aircraft.

(g) The manufacturer has established an inspection and maintenance program for the continued airworthiness of the aircraft.

(h) A prototype aircraft has been flown by the manufacturer for at least 100 hours pursuant to the authority of either an experimental certificate issued under Part 1 of the Civil Air Regulations or a Class I provisional airworthiness certificate: *Provided,* That the number of flight hours may be reduced by the authorized representative of the Administrator in the case of an amendment to a provisional type certificate.

10. *Class II provisional airworthiness certificates.* Except as provided in section 12 of this regulation, a Class II provisional airworthiness certificate will be issued for an aircraft, for which a Class II provisional type certificate is in effect, when the applicant shows compliance with the provisions of paragraphs (a) through (e) of this section, and an authorized representative of the Administrator finds that there is no feature, characteristic, or condition of the aircraft which would render the aircraft unsafe when operated in accordance with the limitations established in sections 9(f), 13, and 14 of this regulation.

(a) The applicant submits evidence that a Class II provisional type certificate for the aircraft has been issued to the manufacturer.

(b) The applicant submits a statement by the manufacturer that the aircraft has been manufactured under a quality control system adequate to insure that the aircraft conforms to the type design corresponding with the provisional type certificate.

(c) The applicant submits a statement that the aircraft has been found by him to be in a safe operating condition under the applicable limitations.

(d) The applicant submits a statement that the aircraft has been flown at least 5 hours by the manufacturer.

(e) The aircraft has been supplied with a provisional aircraft flight manual containing the limitations required by sections 9(f), 13, and 14 of this regulation.

11. *Provisional amendments to type certificate.* A provisional amendment to a type certificate will be approved when the manufacturer of the type certificated aircraft shows compliance with the provisions of paragraphs (a) through (g) of this section, and an authorized representative of the Administrator finds, on the basis of information submitted to him by the manufacturer in compliance with the provisions of this section and of other relevant information, that there is no feature, characteristic, or condition which would render the aircraft unsafe when operated in accordance with the limitations established in paragraph (e) of this section, and section 13 and, if applicable, section 14 of this regulation.

(a) The manufacturer has applied for an amendment to the type certificate.

(b) The Agency's official flight test program with respect to the amendment of the type certificate is in progress.

(c) The manufacturer certifies that the aircraft has met the provisions of subparagraphs (1) through (3) of this paragraph.

(1) The modification involved in the amendment to the type certificate has been designed and constructed in accordance with the airworthiness requirements applicable to the issuance of the type certificate for the aircraft;

(2) The aircraft substantially complies with the applicable flight characteristics requirements for the type certificate;

(3) The aircraft can be operated safely under the appropriate operating limitations specified in this regulation.

(d) The manufacturer has submitted a report showing that the aircraft incorporating the modifications involved had been flown in all maneuvers necessary to show compliance with the flight require-

ments applicable to these modifications and to establish that the aircraft can be operated safely in accordance with the limitations specified in this regulation.

(e) The manufacturer has established, in a provisional aircraft flight manual or other document and appropriate placards, limitations with respect to weights, speeds, flight maneuvers, loading, operation of controls and equipment, and all other relevant factors. The limitations shall include all the limitations required for the issuance of a type certificate for the aircraft: *Provided,* That, where such limitations have not been established, appropriate restrictions on the operation of the aircraft shall be established.

(f) The manufacturer has established an inspection and maintenance program for the continued airworthiness of the aircraft.

(g) An aircraft modified in accordance with the corresponding amendment to the type certificate has been flown by the manufacturer for the number of hours found necessary by the authorized representative of the Administrator, such flights having been conducted pursuant to the authority of an experimental certificate issued under Part 1 of the Civil Air Regulations.

12. *Provisional airworthiness certificates corresponding with provisional amendment to type certificate.* A Class I or a Class II provisional airworthiness certificate, as specified in section 2 of this regulation, will be issued for an aircraft, for which a provisional amendment to the type certificate has been issued, when the applicant shows compliance with the provisions of paragraphs (a) through (e) of this section, and an authorized representative of the Administrator finds that there is no feature, characteristic, or condition of the aircraft, as modified in accordance with the provisionally amended type certificate, which would render the aircraft unsafe when operated in accordance with the limitations established in sections 11(e) and 13 and, if applicable, section 14 of this regulation.

(a) The applicant submits evidence that approval has been obtained for the relevant provisional amendment to the type certificate for the aircraft.

(b) The applicant submits evidence that the modification to the aircraft was accomplished under a quality control system adequate to insure that the modification conforms to the provisionally amended type certificate.

(c) The applicant submits a statement that the aircraft has been found by him to be in a safe operating condition under the applicable limitations.

(d) The applicant submits a statement that the aircraft has been flown at least 5 hours by the manufacturer.

(e) The aircraft has been supplied with a provisional aircraft flight manual or other document and appropriate placards containing the limitations required by sections 11(e) and 13 and, if applicable, section 14 of this regulation.

OPERATING LIMITATIONS

13. *Operation of provisionally certificated aircraft.* An aircraft for which a provisional airworthiness certificate has been issued shall

be operated only by a person eligible to apply for a provisional airworthiness certificate in accordance with section 2 of this regulation. Operations shall be in compliance with paragraphs (a) through (j) of this section.

(a) The aircraft shall not be operated in air transportation unless so authorized in a particular case by the Director, Bureau of Flight Standards.

(b) Operations shall be restricted to the United States, its Territories and possessions.

(c) The aircraft shall be limited to the types of operations listed in subparagraphs (1) through (7) of this paragraph.

(1) Flights conducted by the aircraft or engine manufacturer in direct conjunction with the type or supplemental type certification of the aircraft;

(2) Training of flight crews, including simulated air carrier operations;

(3) Demonstration flights conducted by the manufacturer for prospective purchasers;

(4) Market surveys by the manufacturer;

(5) Flight checking of instruments, accessories, and equipment, the functioning of which does not adversely affect the basic airworthiness of the aircraft;

(6) Service testing of the aircraft;

(7) Such additional operations as may be specifically authorized by the authorized representative of the Administrator.

(d) All operations shall be conducted within the prescribed limitations displayed in the aircraft or set forth in the provisional aircraft flight manual or other document containing the limitations for the safe operation of the aircraft: *Provided,* That operations conducted in direct conjunction with the type or supplemental type certification of the aircraft shall be subject to the experimental aircraft limitations of section 1.74 of Part 1 of the Civil Air Regulations, and all "flight tests" as defined in section 60.60 of the Civil Air Regulations shall be conducted in accordance with the requirements of section 60.24 of that part.

(e) The operator shall establish procedures for the use and guidance of flight and ground personnel in the conduct of operations under this section. Specific procedures shall be established for operations from and into airports where the runways require takeoffs or approaches over populated areas. All procedures shall be approved by an authorized representative of the Administrator. All operations shall be conducted in accordance with such approved procedures.

(f) The operator shall insure that each flight crewmember is properly certificated and possesses adequate knowledge of, and familiarity with, the aircraft and the procedures to be used by him.

(g) The aircraft shall be maintained in accordance with applicable Civil Air Regulations, with the inspection and maintenance program established in accordance with this regulation, and with any special inspections and maintenance conditions prescribed by an authorized representative of the Administrator.

(h) No aircraft shall be operated under authority of a provisional airworthiness certificate if the manufacturer or the authorized

representative of the Administrator determines that a change in design, construction, or operation is necessary to insure safe operation, until such change is made and approved by the authorized representative of the Administrator. Section 1.24 of Part 1 of the Civil Air Regulations shall be applicable to operations under this section.

(i) Only those persons who have a bona fide interest in the operations permitted under this section or who are specifically authorized by both the manufacturer and the authorized representative of the Administrator may be carried in provisionally certificated aircraft: *Provided,* That they have been advised by the operator of the provisional certification status of the aircraft.

(j) The authorized representative of the Administrator may prescribe such additional limitations or procedures as he finds necessary. This shall include limitations on the number of persons who may be carried aboard the aircraft.

14. *Additional limitations to operations by air carriers.* In addition to the limitations in section 13 of this regulation, operations by air carriers shall be subject to the provisions of paragraphs (a) through (d) of this section.

(a) In addition to crewmembers, the aircraft may carry only those persons who are listed in section 40.356(c) of Part 40 of the Civil Air Regulations or who are specifically authorized by both the air carrier and the authorized representative of the Administrator.

(b) The air carrier shall maintain current records for each flight crewmember. These records shall include such information as is necessary to show that each flight crewmember is properly trained and qualified to perform his assigned duties.

(c) The appropriate instructor, supervisor, or check airman shall certify to the proficiency of each flight crewmember and such certification shall become a part of the flight crewmember's record.

(d) A log of all flights conducted under this regulation, and accurate and complete records of inspections made and maintenance accomplished, shall be kept by the air carrier and made available to the manufacturer and to an authorized representative of the Administrator.

15. ***Other operations.*** The Director, Bureau of Flight Standards, may credit toward the aircraft proving test requirements of the applicable air carrier regulations such operations conducted pursuant to this special regulation as he finds have met the applicable aircraft proving test requirements: *Provided,* That he also finds that there is no significant difference between the provisionally certificated aircraft and the aircraft for which application is made for operation pursuant to an air carrier operating certificate.

CERTIFICATES ISSUED UNDER SR–425A AND SR–425B

16. *Duration.* Currently valid provisional type and airworthiness certificates issued in accordance with Special Civil Air Regulations Nos. SR–425A and SR–425B shall remain in effect for the durations and under the conditions prescribed in those regulations.

This special regulation supersedes Special Civil Air Regulation No. SR–425B and shall terminate on June 30, 1963, unless sooner superseded, rescinded, or otherwise terminated.

SPECIAL CIVIL AIR REGULATION NO. SR–428

[Deleted]

The requirements of Special Civil Air Regulation No. SR–428 have been transferred to Part 61—Certification: Pilots and Flight Instructors [New] effective November 1, 1962.

U.S. GOVERNMENT PRINTING OFFICE: 1962 O - 656320

SPECIAL CIVIL AIR REGULATION NO. SR-446A

Effective: May 25, 1962
Adopted: May 22, 1962
Published: May 25, 1962
(27 F.R. 4906)

Use of Portable Frequency Modulation (FM) Type Radio Receivers on Aircraft During Flight

In 1961, during tests conducted by the Federal Aviation Agency's Aviation Research and Development Service, it was found that radio receivers having local oscillators operating within or near the VHF omnirange (VOR) frequency band (108 to 118 Mcs.) cause interference which adversely affects the operation of an aircraft's VOR navigational system. Various types of portable radio receivers (i.e., radio receivers capable of being carried aboard an aircraft by a passenger) were used in these tests to determine which would produce interference to the VOR equipment. It was determined that the portable frequency modulation (FM) radio receiver is the only type radio receiver, which is commonly used by the general public, that would create this unwanted interference. Therefore, it was found that immediate regulatory action was necessary in order to provide adequately for safety in air commerce.

Accordingly, on May 4, 1961, the Federal Aviation Agency issued Special Civil Air Regulation No. SR-446 (26 F.R. 4011) to become effective May 25, 1961. This regulation, which will expire May 24, 1962, prohibits the operation of portable FM radio receivers during flight on all civil aircraft of the United States operated by an air carrier or a commercial operator. It also prohibits the operation of portable FM radio receivers on all other VOR-equipped civil aircraft of the United States while such VOR equipment is being used for navigational purposes. The added restriction in the case of aircraft operated by an air carrier or a commercial operator was necessary since most of these aircraft are equipped with VOR navigational equipment and it would be difficult, if not impossible, for a passenger to know when the pilot in command was depending upon this equipment for navigational purposes. In addition, although not all portable FM radio receivers utilize local oscillators which will create interference, it was necessary to make the rule applicable to all portable FM radio receivers since it would not be feasible to expect the general public, airline personnel, or air crewmembers to distinguish which will cause this interference.

The tests which disclosed the interference problems caused by FM radio receivers were not completed at the time SR-446 was issued in 1961. Therefore, to simplify revision of the rule if additional interference problems were found by the tests, SR-446 was issued as a temporary rule, effective for a 1-year period. When SR-446 was issued, the Agency had intended, prior to its expiration, to incorporate the provisions of the rule into the applicable operating parts, i.e., Parts 40, 41, 42, 43, 45, and 46.

However, since the final evaluation of these tests by all interested industry parties has not been completed, this action has not been taken. Accordingly, since the conditions under which SR–446 was issued still exist, it is necessary, in order to provide adequately for safety in air commerce, to extend the provisions of that rule for a period of one year.

Since this regulation extends the provisions of a currently effective regulation which expires on May 24, 1962, and a lapse in the effectiveness of the regulation would endanger safety in air commerce, I find that notice and public procedure hereon would be contrary to the public interest, and that good cause exists for making it effective on less than 30 days' notice.

In consideration of the foregoing, Special Civil Air Regulation No. SR–446 is superseded by the following Special Civil Air Regulation which is hereby adopted to become effective on May 25, 1962:

No person shall operate, nor shall any operator or pilot in command of an aircraft permit the operation of, a portable frequency modulation (FM) radio receiver on the following civil aircraft of the United States while such aircraft are engaged in flight in air commerce: (a) Aircraft operated by an air carrier or commercial operator; and (b) any other aircraft equipped with VHF omnirange (VOR) navigational equipment while such VOR equipment is being used for navigational purposes.

This special regulation supersedes Special Civil Air Regulation No. SR–446 and shall remain in effect for one year unless sooner superseded or rescinded by the Federal Aviation Agency.

SPECIAL CIVIL AIR REGULATION NO. SR-448A

Adopted: Oct. 9, 1961
Effective: Oct. 13, 1961
Published: Oct. 13, 1961
(26 F.R. 9669)

Precautions to Prevent Hijacking of Aircraft and Interference With Crewmembers in the Performance of Their Duties

Special Civil Air Regulation No. SR-448 was adopted and effective July 28, 1961 (26 F. R. 7009). The preamble thereto stated that:

The recent hijackings of air carrier aircraft have highlighted a necessity to provide additional controls over the conduct of passengers in order to avoid a serious threat to the safety of flights and persons aboard them. The Federal Aviation Agency has the responsibility to see that air carriers take such steps as are possible to prevent such occurrences. We have requested the air carriers to take every practicable precaution to prevent passengers from having access to the pilot compartment. In addition, we are adopting a regulation which will prohibit any person, except one who is specifically authorized to carry arms, from carrying on or about his person while aboard an air carrier aircraft a concealed deadly or dangerous weapon. The regulation being adopted will also make it a violation of the CARs for any person to assault, threaten, intimidate, or interfere with a crewmember in the performance of his or her duties aboard an air carrier aircraft or to attempt to or cause a flight crewmember to divert the flight from its intended course or destination.

Special regulation SR-448, however, does not prohibit a person from carrying an unconcealed deadly or dangerous weapon on or about his person while aboard an aircraft. The present emergency situation requires stringent measures to preclude the carriage of any weapon which may be used to intimidate or interfere with crewmembers performing their duties on an aircraft engaged in air transportation. Therefore, paragraph 2 of SR-448 is amended by this regulation to prohibit any person, except those specified, from carrying a deadly or dangerous weapon on or about his person, either concealed or openly, while on board an air carrier aircraft engaged in air transportation.

Since the promulgation of Special Civil Air Regulation No. SR-448, Public Law 87-197 has been enacted which, among other things, makes it a criminal offense to carry a concealed deadly or dangerous weapon on or about one's person while aboard an air carrier aircraft being operated in air transportation. Excepted from this provision are certain law enforcement officers, and "other persons as may be so authorized under regulations issued by the Administrator." To implement this statutory provision, this regulation excepts from the prohibition against carrying a concealed weapon while aboard an aircraft being operated by an air carrier in air transportation (1) employees or officials of municipal, State, or Federal Governments who are authorized or required to carry arms; (2) crewmembers authorized by the air carrier; and (3) such other persons as may be authorized by the air carrier pursuant to such precautions as may be established by the carrier.

In view of the foregoing exceptions, the prohibition of paragraph 2 of SR-448 is changed to apply to any person, rather than only to those persons who are passengers. This regulation does not in any way affect the shipment

of unloaded firearms in baggage not accessible to the passenger while aboard the aircraft if these firearms are otherwise acceptable for shipment under the provisions of Part 49. In such case, the firearms will be located so as not to be accessible to the passenger during flight, and therefore, not deemed to be on or about his person within the meaning of this regulation.

The present provisions of paragraph 1 of SR–448 apply to aircraft being operated in air transportation. This paragraph is changed to apply to aircraft being operated in air commerce to broaden the scope of the provision to provide similar protection to those general aviation operations and operations conducted for compensation or hire which are not considered as air transportation under the Federal Aviation Act of 1958.

Because of the emergency nature of the situation and the present threat to safety of persons being carried in air commerce, I find that notice and public procedure hereon would be impracticable and good cause exists for making this regulation effective in less than 30 days.

In consideration of the foregoing changes, Special Civil Air Regulation SR–448 is superseded by the following Special Civil Air Regulation to become effective October 13, 1961:

1. No person shall assault, threaten, intimidate, or interfere with a crewmember in the performance of his duties aboard an aircraft being operated in air commerce; nor shall any person attempt to or cause the flight crew of such aircraft to divert its flight from its intended course or destination.

2. Except for employees or officials of municipal, State, or Federal Governments who are authorized or required to carry arms, and except for those crewmembers and such other persons as may be authorized by an air carrier, no person, while aboard an aircraft being operated by an air carrier in air transportation, shall carry on or about his person a deadly or dangerous weapon, either concealed or unconcealed.

This special regulation supersedes Special Civil Air Regulation No. SR–448.

U.S. GOVERNMENT PRINTING OFFICE: 1961 O—624082

SPECIAL CIVIL AIR REGULATION NO. SR–450A

Effective: Aug. 31, 1962
Adopted: Aug. 29, 1962
Published: Sept. 1, 1962
(27 F.R. 8760)

Airspeed Operation Limitation for Transport Category Airplanes

Special Civil Air Regulation No. SR–450, effective May 3, 1962 (27 F.R. 2995), contained a number of requirements dealing with airspeed operating limitations to airplanes certificated under the provisions of Part 4b in effect prior to May 3, 1962. A revision of the Airplane Flight Manual statement concerning airspeed operating limitations was prescribed for all such airplanes. Consistent revision of airspeed placards and instrument markings, and the installation of a speed warning device, were additionally prescribed for turbine-powered airplanes. The special regulation required compliance with the speed warning device provision on or before February 1, 1963; with all other provisions, on or before September 1, 1962.

Several operators of airplanes affected by SR–450 have requested extensions of the compliance dates specified therein, contending that compliance before these dates would be unnecessarily and excessively burdensome in relation to the attained increment of safety. With respect to the September 1, 1962, compliance date specified in section 1(a)(2), they point out that remarking airspeed instruments generally involves removal of the instrument seal. When this is done, the instrument is processed through a time-consuming overhaul schedule to make certain that its calibration has not been changed. They state, in addition, that the airplane manufacturer delayed delivery of the detailed service information required for the modification until necessary technical consultations with the instrument manufacturer, and with representatives of this Agency, could be completed. With respect to the February 1, 1963, date established for compliance with section 1(b), operators of turbine-powered airplanes not already equipped with a speed warning device report that they cannot obtain delivery of the device in less than 5 months; that installation of the device involves extensive electrical modifications, rework of the pitot-static pressure system, and other installation changes; that ground and flight tests are necessary to insure proper functioning of the modified systems; and that such modifications and tests, to be conducted in a safe manner, should be scheduled during a major airplane overhaul.

The Agency has determined that, for the reasons stated above and despite diligent efforts on their part, many persons affected by SR–450 will not be able to comply with its provisions before the specified dates and that a period of relief may be granted without adversely affecting safety. Accordingly, SR–450 has been amended by extending the Sep-

tember 1, 1962, compliance dates to March 1, 1963, and by extending the February 1, 1963, compliance date to February 1, 1964.

Since this regulation provides relief from the provisions of the previous regulation, and imposes no additional burden upon any persons, compliance with the notice and public procedure provisions of the Administrative Procedure Act is unnecessary, and good cause exists for making this regulation effective on less than 30 days' notice.

In consideration of the foregoing, the following Special Civil Air Regulation is hereby adopted to become effective August 31, 1962:

Contrary provisions of the Civil Air Regulations notwithstanding, the following requirements shall be applicable to transport category airplanes certificated under the provisions of Part 4b in effect prior to May 3, 1962:

1. *Turbine-powered airplanes.*

(a) On or before March 1, 1963:

(1) The airspeed operating limitations in the Airplane Flight Manual shall be revised by deleting the term "normal operating limit speed" and the corresponding symbols "V_{NO}/M_{NO}", together with statements explaining the significance of this term, and inserting in lieu thereof the term "maximum operating limit speed", the corresponding symbols "V_{MO}/M_{MO}", and the following statement explaining the significance of the new term:

"The maximum operating limit speed shall not be deliberately exceeded in any regime of flight (climb, cruise, or descent), except where a higher speed is specifically authorized for flight test or pilot training operations, or in approved emergency procedures."

(2) Airspeed placards and instrument markings shall be consistent with subparagraph (1) of this paragraph. Where color markings are used on airspeed or Mach indicators, the red radial line shall be at V_{MO}/M_{MO}. Where a maximum allowable airspeed indicator is used, the limit hand shall indicate V_{MO}/M_{MO}.

(b) On or before February 1, 1964, each airplane shall be equipped with a speed warning device which shall provide aural warning to the pilots, which is distinctly different from aural warnings used for other purposes, whenever the speed exceeds V_{MO} plus 6 knots or $M_{MO}+0.01$. The upper limit of the production tolerances permitted for the warning device shall be at a speed not greater than the prescribed warning speed.

2. *Reciprocation engine-powered airplanes.* On or before March 1, 1963, the airspeed operating limitations in the Airplane Flight Manual shall be revised as necessary to state that the normal operating limit speed, or the maximum structural cruising speed (whichever term is used in the particular manual), shall not be deliberately exceeded in any regime of flight (climb, cruise, or descent), except where a higher speed is specifically authorized for flight test or pilot training operations, or in approved emergency procedures.

This regulation supersedes Special Civil Air Regulation No. SR–450.

different from aural warnings used for other purposes, whenever the speed exceeds V_{MO} plus 6 knots or $M_{MO}+0.01$. The upper limit of the production tolerances permitted for the warning device shall be at a speed not greater than the prescribed warning speed.

2. *Reciprocating engine-powered airplanes.* On or before September 1, 1962, the airspeed operating limitations in the Airplane Flight Manual shall be revised as necessary to state that the normal operating limit speed, or the maximum structural cruising speed (whichever term is used in the particular manual), shall not be deliberately exceeded in any regime of flight (climb, cruise, or descent), except where a higher speed is specifically authorized for flight test or pilot training operations, or in approved emergency procedures.

SPECIAL CIVIL AIR REGULATION NO. SR-451

Adopted: May 7, 1962
Effective: June 12, 1962
Published: May 11, 1962
(27 F.R. 4507)

Requirements for Solo Flight in Single-Place Rotorcraft of the Gyroplane Class by Holders of Student Pilot Certificates

The Federal Aviation Agency has received requests for relief from the presolo requirements for rotorcraft by individuals who (1) hold a student pilot certificate; (2) have made many flights in gyrogliders while being towed by a surface vehicle or boat; (3) wish to obtain authority to solo gyroplanes during powered flight; (4) are unable to obtain instruction in gyroplanes capable of carrying at least two persons because at the present time there are but 12 such certificated gyroplanes in the country (manufactured and certificated as autogiros); and (5) find that dual flight instruction in a helicopter (which is a class of rotorcraft and consequently would count toward dual flight instruction requirements), is not significant with respect to gyroplane techniques, and is consequently an economic burden not related to safety.

When Part 20 was revised on August 23, 1956, it provided for a single rotorcraft category instead of previous category ratings designated as helicopter and autogiro. This was done because no autogiros had been built for many years. Since then, amateur-built gyrogliders have come into common use. They are single-place and flown by towline attached to a surface vehicle or boat. Some of these have been modified to incorporate a powerplant, and thus the amateur-built, single-place gyroplane has come into use.

The policy of the Agency until recently was to classify gyrogliders as kites when confined to flights at the end of a towline from the surface. On April 5, Part 48 was amended, effective June 4, 1962, by revising the definition of "kite" to include a gyroglider attached by towline to a vehicle on the surface. Therefore, under this policy and under Part 48 as amended (1) a pilot certificate is not required, and (2) the towed flights are subject to the requirements of Part 48.

Under the present regulations, a person who wishes to solo a gyroplane under the terms of a student pilot certificate has no means for qualifying, practically speaking, since there are so few gyroplanes available that are capable of carrying two persons. It is possible to meet the regulatory requirements by receiving dual instruction in a helicopter following which a certificated flight instructor with a rotorcraft rating could endorse the student pilot certificate for the particular make and model of gyroplane to be soloed, provided he has determined that the student is competent to exercise such privileges with safety as required by section 43.64(c).

Since the flight characteristics of helicopters and gyroplanes are different in fundamental respects, the flight instructor would still be

obliged to use some means other than the dual instruction given in a helicopter to make this determination. It is thus apparent that the present requirements are impractical, and burdensome upon a person who holds a student pilot certificate.

Following the type certification of gyroplanes capable of carrying at least two persons, and because of the present interest in them, it is expected that their use may become sufficiently common so that it will be practical in the future for gyroplane student pilots to obtain dual flight instruction in gyroplanes. In the meantime, this special regulation will permit a certificated flight instructor holding a pilot certificate with an airplane or rotorcraft category rating to endorse a student pilot certificate for solo flight in a single-place gyroplane during powered flight if he has witnessed a certain number of towed flights and determined that the student pilot is familiar with the general and visual flight rules of Part 60. He would also be required to determine that the student pilot has been instructed in preparatory and flight procedures such as preflight inspection; starting, warming up, operating, and stopping the engine; and taxiing and parking.

In view of these standards for determining student pilot competence in single-place gyroplanes, it is believed that a flight instructor with either an airplane or rotorcraft rating would be equally competent to judge the proficiency of the student pilot.

Since this special regulation grants relief and imposes no additional burden on any person, notice and public procedure hereon are unnecessary.

In consideration of the foregoing, the following Special Civil Air Regulation is hereby adopted to become effective June 12, 1962:

1. Contrary provisions of section 20.53 of Part 20 of the Civil Air Regulations notwithstanding, a student pilot may solo a particular make and model of the single-place gyroplane if his pilot certificate has been endorsed by a certificated flight instructor, holding a pilot certificate with either an airplane or rotorcraft rating, who has examined him and found that he has met the following requirements, and is otherwise competent to make a solo flight in such gyroplane:

(a) He is familiar with the general and visual flight rules of Part 60 of the Civil Air Regulations;

(b) He has received instruction from such flight instructor in preparatory and flight procedures such as preflight inspection; starting, warming up, operating, and stopping the engine; taxiing and parking; and emergency procedures, including engine failure;

(c) He has competently performed at least three takeoffs and landings to a full stop in a gyroglider or gyroplane attached by a towline to a vehicle on the surface, that have been observed by a certificated flight instructor holding an airplane or rotorcraft category rating, and the flights have been logged in the student pilot's logbook and certified by the flight instructor.

2. A gyroglider or a gyroplane not using its powerplant, attached by a towline to a vehicle on the surface, is a kite within the meaning of Part 48 of the Civil Air Regulations, and is subject only to the provisions of that part.

3. *Definitions.*

As used in this regulation—

"Glider (or Gyroglider)" means a heavier-than-air aircraft the free flight of which does not depend principally upon a power-generating unit.

"Gyroplane" means a rotorcraft which depends principally for its support upon the lift generated by one or more rotors which are not power driven, except for initial starting, and which are caused to rotate by the action of the air when the rotorcraft is in motion. The propulsion is independent of the rotor system and usually consists of conventional propellers.

"Rotorcraft" means any aircraft deriving its principal lift from one or more rotors.

4. This special regulation shall terminate June 12, 1964, unless sooner superseded or rescinded.

SPECIAL CIVIL AIR REGULATION NO. SR-454A

Effective: November 23, 1962
Adopted: November 23, 1962
Published: November 28, 1962
(27 F.R. 11692)

Amendment of Special Operating Rule Within Certain Areas of the State of Florida and Over Waters Adjacent Thereto

On October 23, 1962, this Agency adopted Special Civil Air Regulation No. SR–454 (27 F.R. 10444) in the interests of National defense and for the safety of air commerce. SR–454 prohibited the operation of civil aircraft, in specified areas of the State of Florida and over the waters adjacent thereto, unless certain aircraft equipment and operational limitations were satisfied.

After consultation with the Department of Defense, I have determined that the circumstances which generated the need for this regulation now permit its relaxation for the area over the land mass of the Florida peninsula north of latitude 25°10′ North subject to the inclusion, however, of a provision for reinstatement of its effect for that area, if required by changes in the situation. Accordingly, I find that Special Civil Air Regulation No. SR–454 should be rescinded and Special Civil Air Regulation No. SR–454A adopted.

Since this action relaxes an existing restriction, compliance with the notice, public procedure and effective date requirements of the Administrative Procedure Act is unnecessary.

In consideration of the foregoing, SR–454 is hereby rescinded and the following Special Civil Air Regulation is adopted:

Section 1. **No person may operate any civil aircraft within the area described in Section 2 of this Regulation:**

(1) Over water and outside the land mass of the State of Florida or over land South of 25°10′ North latitude, unless:

(a) It is operated under a flight plan that has been approved by appropriate military authority acting through an FAA air traffic control facility; and

(b) The aircraft possesses functioning navigation equipment and functioning communications equipment necessary to maintain two-way radio contact with air traffic control facilities at all times during the operation, and the pilot in command monitors the radio frequencies specified by air traffic control.

(2) Over the land mass of the State of Florida North of 25°10′ North latitude whenever a NOTAM has been issued by the Administrator which specifies this Regulation applies thereto, unless:

(a) It is operated under a flight plan that has been approved by appropriate military authority acting through an FAA air traffic control facility; and

(b) The aircraft possesses functioning navigation equipment, and functioning communications equipment necessary to maintain two-

way radio contact with air traffic control facilities at all times during the operation, and the pilot in command monitors the radio frequencies specified by air traffic control.

Section 2. This Regulation applies within the following area within the State of Florida and over waters adjacent thereto, from the surface upward:

> Beginning at 29 degrees North latitude, 85 degrees West longitude; thence clockwise to 29 degrees North latitude, 79 degrees 30 minutes West longitude, to 24 degrees North latitude, 79 degrees 30 minutes West longitude, to 24 degrees North latitude, 85 degrees West longitude, to the point of beginning.

This regulation becomes effective immediately.

Addendum

Preambles to Amendments to Civil Air Regulations Part 43

NOTE

Part 43 of the Civil Air Regulations was last revised by the Civil Aeronautics Board with an effective date of October 1, 1954. This was not a general revision of the part, but only a reprint to incorporate outstanding amendments and to make minor editorial changes. This revision was published in the Federal Register on October 2, 1954 (19 F.R. 6370).

Amendment 43–1

Additional Instruments for IFR Operations	Adopted:	July 20, 1955.
	Effective:	Aug. 1, 1956.
	Published:	July 26, 1955. (20 F.R. 5312)

This amendment includes a substantive change which requires an artificial-horizon and a directional gyro as additional instruments for IFR flight operations. This additional equipment is made mandatory because flight tests on small aircraft have shown that safe instrument flight without such equipment is extremely difficult under rough air conditions.

Interested persons have been afforded an opportunity to participate in the making of this amendment (20 F.R. 369), and due consideration has been given to all relevant matter presented.

Amendment revised section 43.40 by adding a note after the introductory paragraph and by adding new subparagraphs (8) and (9) to paragraph (c).

Amendment 43–2

Elimination of the Annual Inspection of General Aircraft	Adopted:	Apr. 13, 1956.
	Effective:	July 17, 1956.
	Published:	Apr. 20, 1956. (21 F.R. 2587)

Currently effective maintenance provisions of Part 43 of the Civil Air Regulations require owners and operators of general aircraft to maintain their aircraft in accordance with Part 18 and to have the aircraft inspected once a year by a representative of the Administrator or an appropriately certificated repair station. In addition, prior to the annual inspection, such aircraft must receive a periodic inspection conducted by an appropriately certificated mechanic or repair station. If the aircraft is used for hire, it must also receive an inspection each 100 hours of operation. The owner or operator is presently required to retain various CAA forms in addition to his aircraft and engine records.

Amendments to other parts of the Civil Air Regulations are being made concurrently with these amendments to Part 43 in order to simplify the procedures for inspection, retention of records, and return to service, of general aircraft and to assign to the industry the final responsibility for making inspections and for maintaining documentary evidence of continued airworthiness subject to such surveillance activities as the Administrator determines necessary.

Part 43 is being amended to provide the owner or operator of an aircraft with two methods of inspection. The first requires a periodic inspection once each year; and, in addition, requires a 100-hour inspection on those aircraft used for carrying passengers for hire or used for flight instruction for hire. The second, or alternate method, requires the use of a system whereby the inspection may be conducted on a progressive or continuous basis which permits a balanced or equalized workload, thus allowing increased utilization of the aircraft. An authorized representative of the Administrator is not required to return the aircraft to service after any of these inspections.

A record of the time in service of the aircraft and each engine, inspections, maintenance, compliance with mandatory notes, weight and balance record, equipment list, and a reference to major repairs and major alterations are now required to be kept in the aircraft log.

Interested persons have been afforded an opportunity to participate in the making of these amendments (20 F.R. 7380), and due consideration has been given to all relevant matter presented.

Amendment revised sections 43.20, 43.22, and 43.23 and added definitions of "Aircraft," "Maintenance," "Operate," "One-hundred-hour inspection," "Periodic inspection," "Progressive inspection," and "Time in service" to section 43.70.

Amendment 43–3

Airworthiness Certification of Foreign Aircraft Operated in the United States	Adopted: Jan. 3, 1957. Effective: Feb. 7, 1957. Published: Jan. 9, 1957. (22 F.R. 181)

Section 43.10 of Part 43 of the Civil Air Regulations permits the Administrator to exempt foreign aircraft, authorized by him to be flown in the United States, from compliance with certain requirements applicable to domestic civil aircraft. The language of this section of Part 43 was originally predicated on the provisions of Section 6(c) of the Air Commerce Act of 1926 (as amended prior to August 8, 1953) which authorized the Administrator to issue special permits for foreign aircraft to be navigated in the United States. Since the amendment of August 8, 1953, divested the Administrator of such authority and vested it in the Board under Section 6(b) of the Air Commerce Act, it is considered advisable to revise section 43.10 and delete the obsolete provisions.

Interested persons have been afforded an opportunity to participate in the making of this amendment (21 F.R. 2952), and due consideration has been given to all relevant matter presented.

Amendment revised section 43.10.

Amendment 43–4

General Operation Rules VFR Minimums Within a Control Zone for Flights Issued a Traffic Clearance	Adopted: Feb. 6, 1957. Effective: Mar. 25, 1957. Published: Feb. 9, 1957. (22 F.R. 813)

Part 60 of the Civil Air Regulations contains the air traffic rules governing the operation of aircraft. Section 60.31 currently authorizes air traffic control to permit flight within a control zone when the flight and ground visibility are below the specified three-mile minimum. This provision was intended to permit a pilot to fly from a control zone to an area outside of controlled airspace in which the visibility minimum for VFR flight is one mile. Part 43 prohibits a pilot from flying an aircraft under instrument flight rules unless he holds a valid instrument rating issued by the Administrator and unless he satisfies certain recent flight experience requirements.

It has come to the Board's attention that some pilots who are not rated to fly their aircraft solely by reference to instruments were obtaining a traffic clearance and flying through solid overcast or in conditions of restricted visibility and, consequently, were a hazard to themselves and others. In order to clarify the Board's intention that such flights not be conducted, certain amendments to the Civil Air Regulations were proposed in Draft Release 56–7 (21 F.R. 1748), "VFR Minimums Within a Control Zone for Flights Issued a Traffic Clearance." The foregoing draft release proposed to establish in Part 60 specific weather minimums below which VFR flight could not be conducted. In addition, amendments to sections 43.65 and 43.68(d) of Part 43 were proposed to make it clear that these sections are intended to prohibit a non-instrument-rated pilot, as well as an instrument-rated pilot who has not met the recent experience requirements for instrument

flight, from operating aircraft in weather conditions below the minimums prescribed in Part 60 for VFR flight.

Interested persons have been afforded an opportunity to participate in the making of these amendments (21 F.R. 1748), and due consideration has been given to all relevant matters.

Amendment revised section 43.65 and the first sentence of section 43.68(d).

Amendment 43–5

Position and Anticollision Light Requirements

Adopted: Feb. 25, 1957.
Effective: Apr. 1, 1957.
Published Mar. 1, 1957.
(22 F.R. 1276)

The continuing increase in air traffic density and the advent of aircraft capable of appreciably higher speeds than heretofore attained demand further improvement in the exterior lighting of aircraft. Experience with the use of anticollision lights on large airplanes has shown that a significant increase in the conspicuity of aircraft can be attained with such lights during night operations. The currently effective provisions of Part 43 of the Civil Air Regulations require the installation of an approved anticollision light only on large aircraft operated at night.

When the Board promulgated regulations requiring anticollision lights on large aircraft, it indicated that additional study was being given to the possibility of requiring generally similar types of lights for small aircraft. This amendment, which requires anticollision lights for the night operation of newly certificated small aircraft, reflects the initial results of such additional study by the Board. Experience gained under this amendment along with results of continued studies should provide a basis for possible regulatory action in the future with respect to requiring anticollision lights on all small aircraft.

In view of the foregoing, and since there are no requirements in the operating parts of the regulations to require small aircraft to install anticollision lights, the Board is amending section 43.30(b)(3) to require their use on all small aircraft for which such lights are required in conjunction with their certification, i.e., all small aircraft for which application for type certification is made after the effective date of this amendment.

Since there are no specifications for anticollision lights in Parts 3 and 6 of the Civil Air Regulations, amendments to these parts are being promulgated concurrently to provide a basis of approval for such lights as are required by this amendment. Aircraft not affected by this amendment may continue to use or install existing approved anticollision lights or, optionally, may install anticollision lights conforming with the new specifications in Parts 3 and 6.

Interested persons have been afforded an opportunity to participate in the making of this amendment (21 F.R. 3388), and due consideration has been given to all relevant matter presented.

Amendment revised section 43.30(b)(3).

Amendment 43–6

Miscellaneous Amendments

Adopted: Apr. 11, 1957.
Effective: Apr.11, 1957.
Published: Apr. 17, 1957.
(22 F.R. 2658)

Several sections in the recently revised Part 20 of the Civil Air Regulations duplicate certain provisions in the currently effective Part 43. The purpose of this amendment is to eliminate duplication and conflict between the two parts.

The subject matter of section 43.43, "Pilot logbooks," is now contained in Part 20; and, concurrently with this amendment, the related subject matter contained in section 43.44, "Logging of flight time," is being added to Part 20. Accordingly, in order to eliminate duplication, both of these sections are being deleted from Part 43.

The provisions in sections 43.53 and 43.54, "Requirements for first solo" and "Flight area limitations," are now contained in the revised Part 20. As these requirements are more appropriately contained in Part 20, they are being deleted from Part 43.

Section 43.66, "Instrument flight instruction," is in conflict with the provision in section 20.127 which requires an applicant for an instrument rating to have received 10 hours of instrument flight instruction given by a rated instrument flight instructor. This conflict is being remedied by deleting section 43.66.

Since the changes effected by this amendment are minor in nature and impose no additional burden on any person, notice and public procedure hereon are unnecessary, and they may be made effective on less than 30 days' notice.

Amendment deleted sections 43.43, 43.44, 43.53, 43.54, and 43.66.

Amendment 43–7

Variation of Aircraft Maximum Weights With Altitude

Adopted: July 19, 1957.
Effective: Aug. 23, 1957.
Published: July 24, 1957. (22 F.R. 5863)

It has been brought to the attention of the Civil Aeronautics Board that difficulty has been encountered in the interpretation of the Civil Air Regulations with respect to the provisions concerning variation of aircraft maximum weights with altitude for transport category airplanes. In order to clarify the Board's intention in this matter, this amendment to Part 43 of the Civil Air Regulations is being promulgated.

The presently effective certification regulations applicable to transport category airplanes, contained in Part 4b of the Civil Air Regulations, require the determination of the maximum certificated weights. The provisions of this part permit, at the option of the applicant for type certification, the establishment of different maximum weights for the airplane at each altitude and for each practicably separable operating condition; e.g., takeoff, en route, and landing. In addition, the applicant is permitted to elect the altitudes at which maximum weights are to be established. In other words, the applicant may request certification of an airplane at sea level only or up to any altitude he may choose. If the applicant chooses a high airport elevation for certification, he may vary the maximum weights of the airplane for the various airport elevations between sea level and the highest airport elevation or he may establish the maximum weights for one airport elevation and use those weights for all airport elevations below the one selected. For example, if the airplane will be operated out of airports at elevations of 5,000 feet or less, the airplane's maximum takeoff and landing weights will be determined for an altitude of 5,000 feet and those weights will be used for all operations; or, on the other hand, the weight can be varied for intermediary airport elevations since this usually results in higher maximum weights for lower airport elevations.

In addition to the aforementioned certification requirements, Part 4b requires that an Airplane Flight Manual be prepared by the applicant. The regulations applicable to this Airplane Flight Manual require that the weight limitations determined in accordance with that part be listed as operating limitations of the airplane. Therefore, if the applicant chooses to vary the weight of the airplane with altitude, this variation becomes an operating limitation on the airplane. Accordingly, if he chooses to certificate the airplane at sea level only, the airplane would be limited to operations out of and into sea level airports. Similarly, if the applicant certificates the airplane for an airport elevation of 5,000 feet, the airplane would be limited to operations out of and into airports at elevations of 5,000 feet or less and if, in addition, he does not choose to vary the airplane's weight

with altitude, the weights established for 5,000 feet would be applicable for all airports up to the 5,000-foot elevation. If, however, the applicant chooses to vary the weight with altitude, the airplane weight limitation at a particular airport would depend on the airport elevation.

Presently effective provisions of Parts 40, 41, and 42 of the Civil Air Regulations prohibit takeoffs and landing of large transport category airplanes in passenger service at airports with elevations outside the altitude range for which maximum takeoff and landing weights have been determined, and, further, provide that the weight of the airplane at takeoff and landing shall not exceed the authorized maximum takeoff and landing weights for the elevation of the airport at which the takeoff or landing is made. This provision in Parts 40, 41, and 42 was specifically included in the text for passenger-carrying airplanes for the convenience of the operator since these airplanes are subject to performance operating limitations which are applicable over and above the certification limitations required by Part 4b. It became evident that singling out air carrier passenger service gave the erroneous impression to some operators that non-air-carrier and cargo service were not subject even to the certification limitations.

The intent of Draft Release No. 55–29 was to correct this impression by indicating directly that the certification limitations of Part 4b are applicable to all airplanes certificated in accordance with the transport category performance requirements, irrespective of the type of operation involved.

With respect to cargo operations under Parts 40 and 41, it should be noted that they may be conducted in accordance with provisions established by the Administrator under Part 42. Under Part 42, the Administrator has developed Civil Aeronautics Manual material applicable to transport category airplanes in cargo operations which prohibits the weight of the airplane at takeoff from exceeding the authorized maximum takeoff weight for the elevation of the airport from which the takeoff is made. Therefore, when cargo operations are conducted under Part 42 the same takeoff limitations apply as apply to passenger-carrying airplanes.

The Board has adopted Special Civil Air Regulations applicable to C–46, DC–3, and L–18 airplanes. Special Civil Air Regulation No. SR–406C requires that the C–46 airplane in passenger service be recertificated under the provisions of Part 4b of the Civil Air Regulations by a date certain. Special Civil Air Regulation No. SR–407, applicable to the DC–3 and L–18, permits the maximum certificated weights for these airplanes to be increased if the performance requirements of either Part 4a or Part 4b are complied with. The provisions of Part 4a permit certification with sea level data only. This limitation of Part 4a with respect to sea level data has led to additional confusion when an airplane so certificated is operated in accordance with Part 43. It was the Board's intention that, if operators of DC–3 or L–18 airplanes recertificate their airplanes in accordance with the provisions of Special Civil Air Regulation No. SR–407, the operating limitations contained in the Airplane Flight Manual would establish the weights for the airplane after the recertification since under the provisions of Part 43 it is required that all airplanes be operated in accordance with the limitations contained in the Airplane Flight Manual.

It was proposed in a notice of proposed rule making published in the Federal Register (20 F.R. 9312) and circulated to the industry as Civil Air Regulations Draft Release No. 55–29 to amend the present operating regulations to prohibit all transport category airplanes certificated under the provisions of Part 4a or Part 4b, or recertificated in accordance with SR–406C or SR–407, from operating at altitudes exceeding the altitude for which maximum certificated weights have been established.

It was apparent from the comments received on Draft Release No. 55–29 that misinterpretation of the regulations was even more widespread than previously believed. Accordingly, supplemental notice was given in the Federal Register (21 F.R. 1867) and circulated to the industry as Civil Air Regulations Draft Release No. 56–8 that a public discussion would be of constructive assistance to a more general understanding of the problems involved.

Pursuant to the supplemental notice, a meeting was held to discuss this subject on April 12, 1956, in Washington, D.C. Since most of the confusion with respect to this subject stems from operations involving DC–3 and L–18 type airplanes, participants in this meeting were predominantly operators of such airplanes. In explanation of the

Board's proposal, it was pointed out that Special Civil Air Regulation No. SR–407 contains a provision which permits an increase in the maximum certificated weight in accordance with the transport category provisions contained in Part 4a or Part 4b; and that SR–407 includes a note indicating that the application of transport category performance requirements usually results in establishment of maximum certificated weights which vary with altitude. Therefore, if an operator requested and received approval under SR–407 for an increase in takeoff weight, such weight would decrease as the elevation of the airport increases from which the operation is conducted. To clarify the situation as it pertains to the variation-of-weights-with-altitude requirements for all transport category airplanes, Part 43 is being amended by limiting operations to airport elevations where the weight has been determined and requiring that the airplane at takeoff and landing shall not exceed the authorized maximum takeoff and landing weights established for the altitude.

Interested persons have been afforded an opportunity to participate in the making of this amendment and due consideration has been given to all relevant matter presented.

Amendment added a new section 43.11.

Amendment 43–8

Deletion of Landing Flare Requirements

Adopted: Jan. 9, 1958.
Effective: Feb. 13, 1958.
Published: Jan. 16, 1958. (23 F.R. 294)

Part 43 of the Civil Air Regulations currently requires that civil aircraft carrying passengers for hire at night shall be equipped with specified types and numbers of landing flares.

The value of landing flares as required equipment was discussed at the Board's **1955 Annual Airworthiness Review.** Recommendations were made at that time to amend the regulations to require the carriage of flares only in large aircraft in extended overwater operations. As a result of this review and further study by the Board, Civil Air Regulations Draft Release No. 56–31, "Landing Flare Requirements of Parts 40, 41, 42, and 43 of the Civil Air Regulations," was circulated to the public (21 F.R. 10255). This notice, which proposed the deletion of the flare requirement, was issued for the purpose of obtaining the views of all interested persons to assist the Board in making a complete reevaluation of existing flare requirements.

The consensus in the comment received from interested persons on the proposals contained in Draft Release 56–31 was that the landing flare requirements should be deleted for all Part 43 operations. In this connection, it should be noted that Civil Air Regulations Draft Release No. 55–24, "Air Taxi Certification and Operation Rules" (small aircraft of 12,500 pounds or less maximum certificated takeoff weight), did not propose flares as required equipment and no adverse comment was received on this proposal. Attention is also called to the fact that the carriage of passengers for hire is governed by other parts of the Civil Air Regulations, namely, Parts 40, 41, and 42, and that concurrently with this amendment the Board is amending these parts by deleting the requirement for the carriage of flares in operations conducted over land.

The Board has carefully considered all of the comment received and other relevant information and has concluded that flares for passenger-carrying aircraft should not be required as essential or mandatory safety equipment for operations conducted within the United States. The elimination of the requirement for the carriage of flares as contained herein, however, will not prevent operators from carrying flares if they choose.

Interested persons have been afforded an opportunity to participate in the making of this amendment (21 F.R. 10255), and due consideration has been given to all relevant matter presented.

Amendment deleted section 43.30(b)(5).

Amendment 43–9

Pilot Certificate Requirements for the Operation of United States and Foreign Registered Aircraft	Adopted:	Sept. 19, 1958.
	Effective:	Oct. 24, 1958.
	Published:	Sept. 24, 1958. (23 F.R. 7423)

Section 43.40 of Part 43 of the Civil Air Regulations requires in effect that no person shall pilot a civil aircraft within the United States unless he has in his personal possession a valid U.S. airman certificate or valid foreign pilot certificate. The language of this section, however, does not clearly distinguish between the pilot certificate required for the operation of U.S. registered aircraft as against that required for the operation of foreign registered aircraft. As a result, numerous requests have been made for individual interpretations of this section.

Section 602(a) of the Civil Aeronautics Act of 1938, as amended, empowers the Authority (Administrator) "to issue airman certificates specifying the capacity in which the holders thereof are authorized to serve as airmen in connection with aircraft."

Section 610(b) authorizes the Civil Aeronautics Board to exempt foreign aircraft and airmen serving in connection therewith from the certificate requirements of Section 610(a) provided the exemption is considered to be in the public interest.

Section 1102 provides "In exercising and performing its powers and duties under this Act, the Authority shall do so consistently with any obligation assumed by the United States in any treaty, convention, or agreement that may be in force between the United States and any foreign country or foreign countries. . . ."

Article 32 of the Chicago Convention provides "(a) The pilot of every aircraft and other members of the operating crew of every aircraft engaged in international navigation shall be provided with certificates of competency and licenses issued or rendered valid by the State in which the aircraft is registered."

Consistent with these provisions, section 43.40 of Part 43 of the Civil Air Regulations has always been interpreted as prohibiting a person from operating a United States registered aircraft unless he has a valid United States pilot certificate; and as prohibiting a person holding only a foreign pilot certificate from operating aircraft in the United States unless the pilot certificate was issued or rendered valid by the country in which the foreign aircraft is registered. While the application of section 43.40 to holders of United States pilot certificates apparently is understood, the provisions of this section have been susceptible to the erroneous interpretation that a holder of only a foreign pilot certificate may operate, within the United States, an aircraft of United States registry or of a registry other than of the country which issued the pilot certificate. In view of this difficulty with the present language in section 43.40, and in order to eliminate the need for individual interpretations, the Board considers it advisable to revise this section to clearly define the pilot certificate requirements for operation of both United States and foreign registered aircraft in the United States.

Since the changes effected by this amendment are clarifying in nature and impose no additional burden on any person, notice and public procedure hereon are unnecessary.

Amendment revised section 43.40.

Amendment 43–10

Medical Certificate and Renewal	Adopted:	Dec. 30, 1958.
	Effective:	Feb. 3, 1959.
	Published:	Jan. 3, 1959. (24 F.R. 52)

Section 43.41 of Part 43 of the Civil Air Regulations provides that no person shall pilot an aircraft under the authority of a pilot certificate issued by the Administrator, unless he has in his personal possession at all times while piloting an aircraft a medical certificate or other evidence satisfactory to the Administrator showing that he has met the physical requirements appropriate to his rating within the following time limits:

(a) Student or private pilot—24 calendar months.

(b) Commercial pilot—12 calendar months, or 24 calendar months for operations requiring only a private pilot certificate.

(c) Airline transport pilot—6 calendar months, or 12 calendar months for operations requiring only a commercial pilot certificate, or 24 calendar months for operations requiring only a private pilot certificate.

In commenting on Civil Air Regulations Draft Release No. 58–17 which proposed an amendment to Part 29 of the Civil Air Regulations to provide for the inclusion of an electrocardiogram in the physical examination for first class medical certificates, several persons who hold airline transport ratings called attention to the fact that they are not engaged in airline flight activities, but are engaged in operations requiring only a commercial pilot certificate. They are, nevertheless, required to pass a first class medical examination on each subsequent physical examination or, conversely, voluntarily surrender their pilot certificate for one of a lesser grade if they wish to secure a valid medical certificate of a lesser class. Such persons contend that it is unrealistic and unreasonable to require a class of medical certificate of a higher grade than necessary for the flight privilege in which they are engaged, and an undue burden is thus imposed upon them. They also contend that it is equally unreasonable to expect them to voluntarily surrender ratings which have cost them a considerable amount of effort, time, and money to secure, and for which they may have need at some time in the future. The Board considers that there is merit in these contentions.

Recognition has been given to the fact that a pilot may engage in lesser flight activities than those authorized in his pilot certificate in that the duration of the validity of any class medical certificate is directly related to the flight privilege in which a pilot may subsequently engage. It is the Board's view that section 43.41 should be modified to more clearly relate the class of medical certificate required, except when originally qualifying for a particular class of pilot certificate, to the flight privilege in which the pilot is engaged rather than solely to the pilot certificate held.

Since the changes effected by this amendment are less restrictive in nature than the present requirements, and impose no additional burden on any person, notice and public procedure thereon are unnecessary.

Amendment revised section 43.41.

Amendment 43–11

Clarification of Periodic and 100-Hour Inspection Requirements	Adopted:	Sept. 17, 1959.
	Effective:	Sept. 17, 1959.
	Published:	Sept. 23, 1959. (24 F.R. 7637)

Currently effective maintenance provisions of Part 43 of the Civil Air Regulations require owners and operators of general aircraft to maintain their aircraft in accordance with Part 18 and to have the aircraft inspected at certain intervals depending upon the type of operation conducted. The requirements for such inspection including the

reference to persons authorized to perform them are contained in the applicable paragraphs of section 43.22 of Part 43. In addition, this section also provides for the acceptability of a required periodic inspection for a required 100-hour inspection. Although it is intended that the accomplishment of a periodic shall be accepted as satisfying the requirements of a 100-hour inspection, the reverse is not intended, as believed by some. The reason for this is that the performance of a periodic inspection requires a certificated mechanic to hold an inspection authorization issued in accordance with the provisions of section 24.43 of Part 24, whereas such inspection authorization is not required of mechanics performing a 100-hour inspection. A certificated mechanic holding an inspection authorization may perform 100-hour inspections in addition to performing periodic inspections. However, even though a 100-hour inspection is performed by a mechanic holding an inspection authorization, it may not be substituted for a periodic inspection since the periodic inspection has a different purpose than the 100-hour inspection.

Part 18 contains the provisions for persons authorized to perform and appprove 100-hour and periodic inspections. In order to preclude further misinterpretations, Part 43 is hereby amended to include specific reference to the pertinent sections of Part 18 which prescribe the authority of persons engaged in the maintenance of aircraft. Additionally, the "Note" at the end of section 43.22 of current Part 43 contains reference to the 100-hour and periodic inspections when related to the expiration or exchange of the old airworthiness certificate for the new type of indefinite duration. This "Note" has served its purpose and is no longer necessary. It is being deleted concurrently with the amendment to section 43.22.

Since this amendment is clarifying in nature and imposes no additional burden on any person, notice and public procedure hereon are unnecessary, and it may be made effective on less than 30 days' notice.

Amendment revised section 43.22(a) and deleted the Note following section 43.22(c)(2).

Amendment 43–12

Clarification of Aircraft Limitations for Student Pilots

Adopted: Nov. 18, 1959.
Effective: Dec. 29, 1959.
Published: Nov. 24, 1959. (24 F.R. 9418)

Section 43.55 of Part 43 of the Civil Air Regulations provides that a student shall not pilot an aircraft other than that of the category, class, and type which has been endorsed on his student pilot certificate by a flight instructor. As used in this regulation, the word "type" was intended to mean the make and model of the aircraft which a flight instructor had found the student competent to operate in solo flight. It was not intended that such an endorsement would authorize the student pilot to operate any other make and model of aircraft in solo flight, regardless of its similarity to the aircraft covered by the endorsement.

It is also true that similarity in design of some aircraft, especially those of the same manufacturer, could present substantial difficulty in determining whether two particular aircraft are, or are not, of the same type. The lack of clarification of this point has resulted in some student pilots operating, or attempting to operate, aircraft which they were not competent to fly.

Civil Air Regulations Draft Release No. 59–8 proposed substitution of the words "make and model" in lieu of the word "type". The words "category" and "class" have also been deleted as they are superfluous when the words "make and model" are used.

This amendment should increase safety by eliminating the possibility of misinterpretation of the intent of the regulation.

Interested persons have been afforded an opportunity to participate in the making of this amendment (24 F.R. 5613), and due consideration has been given to all relevant matter presented.

Amendment revised section 43.55.

Amendment 43–13

Installation and Use of Flight Recorders in Certain Airplanes Used by Air Carriers and Commercial Operators	Adopted: May 1, 1961 Effective: June 6, 1961 Published: May 9, 1961 (26 F.R. 3985)

The currently effective provisions of Parts 40, 41, and 42 of the Civil Air Regulations require the installation and use of an approved flight recorder on all large airplanes (more than 12,500 pounds maximum certificated takeoff weight) certificated for operations above 25,000 feet, and on all large turbine-powered airplanes, when such airplanes are being operated under the terms of an air carrier or commercial operator certificate. These rules are not applicable while the airplanes are being used by an air carrier or a commercial operator for flight checks, training flights, ferry flights, airworthiness test flights, or other operations conducted in accordance with the general operation rules of Part 43.

Civil Air Regulations Draft Release No. 60–18, dated November 23, 1960 (25 F.R. 12299, 12524), proposed to amend Part 43 to require the holder of an air carrier or commercial operating certificate to have installed and in operation an approved flight recorder on all large turbine-powered airplanes, and on all other large airplanes certificated for operation above 25,000 feet, when such airplanes are being used for flights conducted in accordance with the general operation rules. For purposes of clarity, the usual types of operation to which the rule would be applicable were listed in the proposal as flight checks, training flights, ferry flights, or airworthiness test flights. Provisionally certificated airplanes falling within the scope of this proposed rule were to be allowed until May 1, 1961, to comply.

As stated in Draft Release 60–18, the safety considerations which formed the basis of the flight recorder provisions of Parts 40, 41, and 42 are equally applicable to other operations, such as flight checks, training flights, airworthiness test flights, and ferry flights, when such flights are conducted by air carriers and commercial operators with large airplanes certificated for operation above 25,000 feet and with large turbine-powered airplanes. It is essential, therefore, that information be obtained for accident investigation and other safety purposes when these airplanes are being used to conduct any flight, regardless of the regulations under which such flights are conducted.

All comments received in response to Draft Release 60–18 indicated general concurrence with the rule as proposed. However, several persons pointed out the need for greater flexibility in the conduct of ferry flights with an inoperative flight recorder, and of airworthiness test flights with the recorder turned off. In light of these comments, the rule as adopted herein will permit the ferry flight of a newly acquired airplane not equipped with a flight recorder from the place of delivery to a base where a recorder is to be installed. Also, the rule will permit an airplane with an inoperative flight recorder, when located at a place where repair or replacement facilities are not available, to be ferried to a place where the recorder can be repaired or replaced. In addition, in the event of failure of the flight recorder after the airplane becomes airborne on a ferry flight, the flight will be permitted to continue as planned, rather than required to terminate at the next stop where repairs or replacements can be made. Provisions have also been included to allow the flight recorder to be turned off during airworthiness test flights conducted to test the operations of the recorder, or communication or electrical systems, when the successful conduct of such tests so requires.

Since the effective date of this amendment is later than the May 1, 1961, compliance date proposed for provisionally certificated airplanes, the requirement for flight recorders on such airplanes is not stated as a separate provision in the rule. However, the requirement for flight recorders, as set forth herein, is applicable to provisionally certificated airplanes.

Interested persons have been afforded an opportunity to participate in the making of this amendment, and due consideration has been given to all relevant matter presented.

Amendment added new section 43–32.

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ADDENDUM

Amendment 43-14

Use of Private Pilots in Charity Airlifts

Adopted: Aug. 1, 1961
Effective: Aug. 9, 1961
Published: Aug. 9, 1961
(26 F.R. 7122)

Section 43.60 of the Civil Air Regulations provides that a private pilot shall not pilot aircraft for compensation or hire. However, this regulation also provides that a private pilot may pilot aircraft in connection with a business if the flight is merely incidental thereto; and that an aircraft salesman holding a private pilot certificate may demonstrate aircraft in flight to a prospective purchaser if he has logged 200 hours of pilot flight time.

For many years charitable organizations used the "Charity Airlift" as a means of raising funds. In such an airlift, the charitable organization offered an airplane ride in exchange for a personal donation. Many of the rides were given in aircraft furnished and operated by private pilots who provided their services without compensation. The money donated by the passengers was retained by the charitable organization, and no payment for the service rendered was made to the pilot or aircraft owner; however, in some cases the organization paid for or supplied the fuel and oil consumed during the flights.

Shortly before the Federal Aviation Agency was established, Civil Aeronautics Board Examiners rendered several opinions on violation cases involving private pilots who had donated their services for fund-raising flights. The Examiners concluded that section 43.60 required pilots engaging in such flights to hold commercial pilot certificates. For some time thereafter, the Federal Aviation Agency permitted the operation of charity airlifts using private pilots, by issuing an individual exemption to the sponsor of each airlift. These exemptions specified safety requirements believed necessary for the particular airlift being conducted. This procedure was discontinued in June 1960 on the premise that passengefs who receive rides because of charitable donations are entitled to fly with pilots who meet commercial pilot standards.

In May of 1961, the National Foundation (March of Dimes) petitioned the Federal Aviation Agency to reconsider the matter of charity airlifts involving private pilot participation. The Foundation pointed out that the prohibition against the use of private pilots for such airlifts had adversely affected fund-raising efforts and that the practical effect had been to reduce pilot participation in the 1961 March of Dimes airlifts by nearly 75 percent. They suggested an amendment to the regulations, with the incorporation of special provisions as necessary, which would permit private pilots to participate in charity airlifts.

Consideration has been given to their petition. We have determined that (1) the use of private pilots operating under reasonable restrictions and with adequate supervision should provide a level of safety comparable to that expected of a commercial operation; (2) the heavy administrative burden formerly associated with the issuance of specific exemptions would be eliminated by an appropriate amendment to Part 43 of the Civil Air Regulations; and (3) private pilot participation in charity airlifts, with suitable safety provisions, is in the public interest.

Since this amendment relieves a restriction and delay in extending such relief would impose an unnecessary burden on certain persons, the Administrator for good cause finds that notice and public procedure hereon would be contrary to the public interest and may be omitted, and that this amendment may be made effective on less than 30 days' notice.

Amendment revised section 43.60.

Amendment 43–15

Miscellaneous Amendments Resulting From the First Federal Aviation Agency Airworthiness Review

Adopted: Mar. 27, 1962
Effective: May 3, 1962
Published: Mar. 30, 1962
(27 F.R. 3004)

As a result of the First Federal Aviation Agency Airworthiness Review, the Agency published a notice of proposed rule making affecting several parts of the Civil Air Regulations. This notice was published in the Federal Register (26 F.R. 5130) and circulated as Civil Air Regulations Draft Release No. 61–12 dated June 8, 1961. There are contained herein amendments to Part 43 of the Civil Air Regulations which stem from this First FAA Airworthiness Review.

Section 43.10 presently requires that no aircraft, except foreign aircraft, shall be operated in the United States unless there is available in the aircraft appropriate operating limitations set forth in a form and manner approved by the Administrator or an approved Aircraft Flight Manual. **Section 43.10–1 requires that the operating limitations consist** of either a current approved Airplane or Rotorcraft Flight Manual, Forms ACA 309 or 309A, or placards or listings or combinations of both. As proposed, section 43.10 has been amended to incorporate the substance of present section 43.10–1, and section 43.10–1 has been deleted. In this connection, the reference to Forms ACA 309 and 309A, previously contained in section 43.10–1, has been deleted since such forms are no longer issued. In those cases where they are still being used they constitute listings within the meaning of this regulation.

Section 43.10 has also been amended, as proposed, to expand the provision concerning the operating limitations to be included in the Flight Manual, or on placards, listings or markings. As amended, section 43.10 specifies additional items for which operating limitations must be included when prescribed for a particular aircraft. These items are consistent with the requirements concerning operating limitations contained in the airworthiness parts of the Civil Air Regulations. In this connection, section 43.10 now requires an operating limitation when prescribed for a particular aircraft concerning the weight distribution including the composition of the useful load in those combinations and ranges intended to insure that the weight and center of gravity position will remain within approved limits. This will insure that when a change in the operating limitations concerning the weight and center of gravity of an aircraft is required following a modification or alteration to such aircraft, the pilot or operator will have the necessary information available to avoid an inadvertent overloading of the aircraft.

Interested persons have been afforded an opportunity to participate in the making of this amendment, and due consideration has been given to all relevant matter presented.

Amendment revised section 43.10(d) and deleted section 43.10–1.

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Federal Aviation Agency
Washington, D.C.

Civil Aeronautics Manual 43

General Operation Rules

Supplement No. 1, CAM 43 dated September 1959 — Sept. 1, 1960

SUBJECT: Revisions to CAM 43.

This supplement is issued to incorporate into CAM 43 Civil Air Regulations Amendment 43–12, Special Civil Air Regulation SR–425B, and Amendment No. 1 to Special Civil Air Regulation SR–389B which was omitted inadvertently when the manual was last printed.

With the discontinuance of the distribution of individual amendments to the Civil Air Regulations, it is believed that the preamble material contained in the amendments should be reproduced in the manuals. Therefore, this supplement incorporates into CAM 43 the *preambles* of all amendments to Part 43 of the Civil Air Regulations issued since the part was last revised effective October 1, 1954, and published in the Federal Register as a complete document on October 2, 1954. In addition to the preamble, the date of adoption, the effective date, Federal Register citation, and the sections affected are given for each amendment.

These preambles are set up as an addendum to CAM 43 and the page numbers are prefixed with the letter "P." It is recommended that these pages be retained in the back of the current CAM 43. Additional pages will be added as amendments to Part 43 are issued.

New or revised material is enclosed in black brackets on the pages submitted with this supplement. However, because Special Civil Air Regulation SR–425B, Amendment 1 to Special Civil Air Regulation SR–389B, and the addendum containing the preambles to amendments to Part 43 are new in their entirety they are not so marked.

Remove the following pages:	*Insert the following new pages:*
III and IV	III and IV
9 and 10	9 and 10
	24–1
73	73 through 83
	Addendum, pages P–1 through P–11

Oscar Bakke

OSCAR BAKKE, *Director*
Bureau of Flight Standards.

ATTACHMENTS.

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Federal Aviation Agency
Washington, D.C.

Civil Aeronautics Manual 43

General Operation Rules

Supplement No. 2, CAM 43 dated Sept. 1959 — November 15, 1960

SUBJECT: Provisional Maximum Certificated Weights for Certain Airplanes Operated by Alaskan Air Carriers, Alaskan Air Taxi Operators, and the Department of the Interior.

This supplement is issued to incorporate into CAM 43 new Special Civil Air Regulation No. SR-399C, Provisional Maximum Certificated Weights for Certain Airplanes Operated by Alaskan Air Carriers, Alaskan Air Taxi Operators, and the Department of the Interior. This regulation was issued on October 25, 1960, to become effective on October 26, 1960, and supersedes Special Civil Air Regulation No. SR-399B.

Since this regulation is new in its entirety, it is not enclosed in black brackets.

Remove the following pages:	*Insert the following new pages:*
III and IV	III and IV
29 and 30	29 and 30

Oscar Bakke

OSCAR BAKKE, *Director*
Bureau of Flight Standards.

Attachments.

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Federal Aviation Agency
Washington, D.C.

Civil Aeronautics Manual 43

General Operation Rules

Supplement No. 3, CAM 43 dated Sept. 1959 **May 15, 1961**

SUBJECT: Revisions to CAM 43.

This supplement is issued to incorporate in CAM 43 Civil Air Regulations Amendment 43-13 and Special Civil Air Regulation No. SR-446.

Amendment 43-13 concerns installation and use of flight recorders in certain airplanes used by air carriers and commercial operators. It was issued on May 1, 1961, to become effective June 6, 1961.

Special Regulation SR-446 concerns the use of portable frequency modulation (FM) type radio receivers on aircraft during flight. It was issued on May 4, 1961, to become effective on May 25, 1961.

New or revised material is enclosed in black brackets on the pages submitted with this supplement. However, because Special Civil Air Regulation No. SR-446 is new in its entirety, it is not so marked.

Remove the following pages:	*Insert the following new pages:*
III and IV	III and IV
7 and 8	7 through 8-1
—	85 and 86
P-11	P-11 and P-12

Oscar Bakke

OSCAR BAKKE, *Director,*
Bureau of Flight Standards.

ATTACHMENTS.

9/11/61
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Federal Aviation Agency
Washington, D.C.

Civil Aeronautics Manual 43

General Operation Rules

Supplement No 4, CAM 43 dated Sept. 1959 **Aug. 15, 1961**

SUBJECT: Revisions to CAM 43.

This supplement is issued to incorporate in CAM 43 Civil Air Regulations Amendment 43-14 and Special Civil Air Regulations Nos. SR-399D and SR-425C.

Amendment 43-14 concerns the use of private pilots in charity airlifts.

Special regulation SR-399D concerns provisional maximum certificated weights for certain airplanes operated by Alaskan air carriers, air taxi operators in Alaska, and the Department of the Interior. It was issued June 20, 1961, to become effective June 24, 1961, and supersedes Special Civil Air Regulation No. SR-399C.

Special regulation SR-425C concerns provisional certification and operation of aircraft. It was issued May 31, 1961, to become effective June 6, 1961, and supersedes Special Civil Air Regulation No. SR-425B.

New or revised material is enclosed in black brackets on the pages submitted with this supplement, except Special Civil Air Regulations Nos. SR-399D and SR-425C, and the pages in the addendum containing the preambles to amendments.

Remove the following pages:	*Insert the following new pages:*
III and IV	III and IV
9 and 10	9 through 10-1
29 and 30	29 and 30
73 through 82	73 through 81
—	P-13

George C. Prill

GEORGE C. PRILL, *Director,*
Flight Standards Service.

Attachments.

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Federal Aviation Agency
Washington, D.C.

Civil Aeronautics Manual 43

General Operation Rules

Supplement No. 5, CAM 43 dated Sept. 1959 **January 1, 1962**

SUBJECT: Precautions to Prevent Hijacking of Aircraft and Interference With Crewmembers in the Performance of Their Duties.

This supplement is issued to incorporate into CAM 43 new Special Civil Air Regulation No. SR-448A, precautions to prevent hijacking of aircraft and interference with crewmembers in the performance of their duties. This regulation was issued October 9, 1961, to become effective October 13, 1961, and since it is new in its entirety, it is not enclosed in black brackets.

Remove the following pages:	*Insert the following new pages:*
III and IV	III and IV
	87 and 88

George C. Prill

GEORGE C. PRILL, *Director,*
Flight Standards Service.

Attachments.

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Federal Aviation Agency
Washington, D.C.

Civil Aeronautics Manual 43

General Operations Rules

Supplement No. 6, CAM 43 dated Sept. 1959 **June 1, 1962**

SUBJECT: Revisions to CAM 43.

This supplement is issued to incorporate into CAM 43 Civil Air Regulations Amendment 43–15 and Special Civil Air Regulations Nos. SR–392C, SR–446A, SR–450, and SR–451.

Amendment 43–15 concerns aircraft requirements. This amendment stemmed from the First Federal Aviation Agency Airworthiness Review. It was issued March 27, 1962, to become effective May 3, 1962.

Special regulation SR–392C concerns the facilitation of experiments with exterior lighting systems. This regulation was issued January 30, 1962, to become effective February 3, 1962, and supersedes Special Civil Air Regulation No. SR–392B.

Special regulation SR–446A concerns the use of portable frequency modulation (FM) type radio receivers on aircraft during flight. This regulation was issued May 22, 1962, to become effective May 25, 1962, and supersedes Special Civil Air Regulation SR–446.

Special regulation SR–450 concerns airspeed operating limitations for transport category airplanes. This regulation was issued March 27, 1962, to become effective May 3, 1962.

Special regulation SR–451 concerns the requirements for solo flight in single-place rotorcraft of the gyroplane class by holders of student pilot certificates. This regulation was issued May 7, 1962, to become effective June 12, 1962.

New or revised material is enclosed in black brackets on the pages submitted with this supplement, except Special Civil Air Regulations Nos. SR–392C, SR–446A, SR–450, and SR–451, and the pages in the addendum containing the preambles of amendments.

Remove the following pages:	*Insert the following new pages:*
III and IV	III and IV
1 and 2	1 and 2
25 and 26	25 and 26
85 and 86	85 and 86
	89 through 95
P–13	P–13 and P–14

George C. Prill

GEORGE C. PRILL, *Director,*
Flight Standards Service.

Attachments.

9/20/62
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Federal Aviation Agency
Washington, D.C.

Civil Aeronautics Manual 43

General Operations Rules

Supplement No. 7, CAM 43 dated Sept. 1959 — September 1, 1962

SUBJECT: Revisions to CAM 43.

In accordance with FAA's announced program to recodify its regulations, certain sections of Civil Aeronautics Manual 43 have been transferred to Part 61—Certification: Pilots and Flight Instructors [New], published in the Federal Register on August 10, 1962 (27 F.R. 7955), to become effective November 1, 1962.

CAM 43 will not be completely superseded by the new Parts until August 1963. As each new Part is published affecting CAM 43, corrected pages will be issued to this manual with the appropriate cross-reference to the new Part. In this way, CAM 43 will be kept current until it is completely superseded. (Page III of Part 1 sent you in June outlines the target dates for the issuance of the new Parts and page V carries a Distribution Table showing the old section numbers with the section numbers in the new Part to which the material has been transferred.)

This supplement also includes Special Civil Air Regulation No. SR-392D, which concerns the display of experimental exterior lighting systems approved for use on aircraft. This regulation was issued June 22, 1962, and became effective June 25, 1962.

Remove the following pages:	*Insert the following new pages:*
III and IV	III and IV
7 through 13	7 through 12
	26-1 through 26-3
83	83

George C. Prill

GEORGE C. PRILL, *Director,*
Flight Standards Service.

ATTACHMENTS.

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Federal Aviation Agency
Washington, D.C.

Civil Aeronautics Manual 43

General Operations Rules

Supplement No. 8, CAM 43 dated Sept. 1959 **Dec. 15, 1962**

SUBJECT: Revisions to CAM 43.

This supplement is issued to add to CAM 43 an amendment to section 43.47(b), and Special Civil Air Regulations Nos. SR–450A and SR–454A.

Section 43.47(b) is amended to restrict jumps made from aircraft, except in an emergency, to the provisions of Part 105 [New]. This amendment appeared in the preamble to Part 105 [New] and was published in 27 F.R. 11635, on November 27, 1962, to become effective on February 26, 1963.

Special regulation SR–450A concerns airspeed operation limitation for transport category airplanes. This regulation was issued August 29, 1962, and supersedes Special Civil Air Regulation No. SR–450.

Special regulation SR–454A concerns a special operating rule within certain areas of the State of Florida and over its adjacent waters. This regulation was issued and became effective on November 23, 1962, and rescinds SR–454. Because of its emergency nature, SR–454 was distributed to holders of CAM 43 without the usual supplement transmittal sheet and may now be destroyed.

New or revised material is enclosed in brackets with the exception of the Special Civil Air Regulations which are new in their entirety.

Remove the following pages:	*Insert the following new pages:*
III and IV	III and IV
9 and 10	9 and 10
89 through 91	89 and 90
SR–454	97 and 98

ATTACHMENTS.

GEORGE C. PRILL, *Director,*
Flight Standards Service.

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