Civil Aeronautics Manual 20

# Pilot Certificates

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U. S. DEPARTMENT OF COMMERCE

Sinclair Weeks, Secretary

CIVIL AERONAUTICS ADMINISTRATION

F. B. Lee, Administrator

# Pilot Certificates

June 1954

Civil Aeronautics Manual 20

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# Introductory Note

Civil Aeronautics Manual 20 contains in a consolidated form (1) Part 20, Pilot Certificates adopted by the Civil Aeronautics Board and (2) the policies and interpretations issued by the Administrator of Civil Aeronautics in application to the various sections of the regulations.

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

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

The manual is arranged to show the number of each section of the regulations followed by the title of the particular section in italic leters. Any policies or interpretations follow the pertinent section of the regulations and are identified by consecutive dash numbers appended to the regulation section number with the title.

This manual supersedes Supplement No. 1 to Civil Aeronautics Manual 20 dated June 16, 1950. Moreover, the contents of this manual supersedes any contradictory material which may be found in any Aviation Safety Release or like publication outstanding on the issuance date of this manual.

# Table of Contents

## Student Pilot Certification


| | Paragraph | Page |
|---|---|---|
| **Issuance** | **20. 1** | 1 |
| Where to obtain student pilot certificates (*CAA policies which apply to 20.1*) | 20. 1–1 | 1 |
| **Age** | **20. 2** | 1 |
| Minors in the armed forces (*CAA policies which apply to 20.2*) | 20. 2–1 | 1 |
| Other minors (*CAA interpretations which apply to 20.2*) | 20. 2–2 | 1 |
| **Citizenship** | **20. 3** | 1 |
| **Education** | **20. 4** | 1 |
| Language limitation (*CAA policies which apply to 20.4*) | 20. 4–1 | 1 |
| Removal of limitation (*CAA policies which apply to 20.4*) | 20. 4–2 | 1 |
| **Physical standards** | **20. 5** | 1 |
| Evidence of meeting physical standards (*CAA policies which apply to 20.5 (a)*) | 20. 5–1 | 1 |
| Color deficiency limitation (*CAA interpretations which apply to 20.5 (a)*) | 20. 5–2 | 2 |
| Glider pilot certification of physical condition (*CAA policies which apply to 20.5 (b)*) | 20. 5–3 | 2 |
| **Aeronautical knowledge** | **20. 6** | 2 |


## Pilot Certificates and Ratings


| | | |
|---|---|---|
| **Issuance** | **20. 10** | 2 |
| Types of certificates and by whom issued (*CAA policies which apply to 20.10*) | 20. 10–1 | 2 |
| **Graduates of certificated flying schools** | **20. 11** | 2 |
| **Limited pilot certificate** | **20. 12** | 2 |
| Demonstration of aeronautical knowledge (*CAA policies which apply to 20.12*) | 20. 12–1 | 3 |
| Evidence of meeting physical standards (*CAA policies which apply to 20.12*) | 20. 12–2 | 3 |
| Eligibility for a limited private pilot certificate (*CAA policies which apply to 20.12*) | 20. 12–3 | 3 |
| Eligibility for a limited commercial pilot certificate (*CAA policies which apply to 20.12*) | 20. 12–4 | 3 |
| Aircraft and instrument ratings on limited pilot certificates (*CAA policies which apply to 20.12*) | 20. 12–5 | 3 |
| Language limitation (*CAA policies which apply to 20.12*) | 20. 12–6 | 3 |
| **Computation of flight time** | **20. 13** | 3 |


## Private Pilot Rating


| | | |
|---|---|---|
| **Age** | **20. 20** | 3 |
| **Citizenship** | **20. 21** | 3 |
| **Education** | **20. 22** | 3 |
| Language limitation (*CAA policies which apply to 20.22*) | 20. 22–1 | 3 |
| Removal of limitation (*CAA policies which apply to 20.22*) | 20. 22–2 | 3 |
| **Physical standards** | **20. 23** | 4 |
| Evidence of meeting physical standards (*CAA policies which apply to 20.23 (a)*) | 20. 23–1 | 4 |
| Color deficiency limitation (*CAA policies which apply to 20.23 (a)*) | 20. 23–2 | 4 |
| Glider pilot certification of physical condition (*CAA policies which apply to 20.23 (b)*) | 20. 23–3 | 4 |
| **Aeronautical knowledge** | **20. 24** | 4 |
| Demonstration of aeronautical knowledge (*CAA policies which apply to 20.24*) | 20. 24–1 | 4 |
| **Aeronautical experience** | **20. 25** | 4 |
| Evidence of flight experience (*CAA policies which apply to 20.25*) | 20. 25–1 | 5 |
| Qualifying dual instruction (*CAA interpretations which apply to 20.25 (a)*) | 20. 25–2 | 5 |
| **Aeronautical skill** | **20. 26** | 5 |
| Demonstration of skill—general (*CAA interpretations which apply to 20.26*) | 20. 26–1 | 6 |
| Flight test—airplanes (*CAA policies which apply to 20.26 (a)*) | 20. 26–2 | 6 |
| Flight test—gliders (*CAA policies which apply to 20.26 (b)*) | 20. 26–3 | 6 |
| Flight test—rotorcraft (*CAA policies which apply to 20.26 (c)*) | 20. 26–4 | 7 |

## COMMERCIAL PILOT RATING


| | Paragraph | Page |
|---|---|---|
| **Age** | 20. 30 | 7 |
| **Citizenship** | 20. 31 | 7 |
| **Education** | 20. 32 | 7 |
| **Physical standards** | 20. 33 | 7 |
| Evidence of meeting physical standards (*CAA policies which apply to 20.33 (a)*) | 20. 33–1 | 7 |
| Color deficiency limitation (*CAA policies which apply to 20.33 (a)*) | 20. 33–2 | 7 |
| Glider pilot certification of physical condition (*CAA policies which apply to 20.33 (b)*) | 20. 33–3 | 7 |
| **Aeronautical knowledge** | 20. 34 | 7 |
| Demonstration of aeronautical knowledge—powered aircraft (*CAA policies which apply to 20.34 (a)*) | 20. 34–1 | 8 |
| Demonstration of aeronautical knowledge—gliders (*CAA interpretations which apply to 20.34 (b)*) | 20. 34–2 | 8 |
| **Aeronautical experience** | 20. 35 | 8 |
| Evidence of flight experience (*CAA policies which apply to 20.35*) | 20. 35–1 | 9 |
| International operating limitations (*CAA policies which apply to 20.35 (a) (6)*) | 20. 35–2 | 9 |
| **Aeronautical skill** | 20. 36 | 9 |
| Demonstration of skill—general (*CAA policies which apply to 20.36*) | 20. 36–1 | 10 |
| Flight test—airplanes (*CAA policies which apply to 20.36 (a)*) | 20. 36–2 | 10 |
| Flight test—helicopters (*CAA policies which apply to 20.36 (a)*) | 20. 36–3 | 10 |
| Flight test—gliders (*CAA policies which apply to 20.36 (b)*) | 20. 36–4 | 10 |


## AIRCRAFT, FLIGHT INSTRUCTOR, AND INSTRUMENT RATING


| | | |
|---|---|---|
| **Aircraft rating competence** | 20. 40 | 11 |
| Demonstration of competency for additional aircraft ratings (*CAA interpretations which apply to 20.40 (a)*) | 20. 40–1 | 11 |
| **Aircraft category rating** | 20. 40a | 11 |
| **Airplane class ratings** | 20. 40b | 11 |
| **Aircraft type ratings** | 20. 40c | 11 |
| Aircraft types (*CAA policies which apply to 20.40c*) | 20. 40c–1 | 11 |
| **Flight instructor rating** | 20. 41 | 11 |
| Demonstration of knowledge (*CAA policies which apply to 20.41 (b)*) | 20. 41–1 | 11 |
| Prerequisites for taking the written examination (*CAA policies which apply to 20.41 (b)*) | 20. 41–2 | 12 |
| Demonstration of skill—aircraft categories (*CAA policies which apply to 20.41 (d)*) | 20. 41–3 | 12 |
| Demonstration of skill—general (*CAA policies which apply to 20.41 (d)*) | 20. 41–4 | 12 |
| Practical examination—airplanes (*CAA policies which apply to 20.41 (d)*) | 20. 41–5 | 12 |
| Practical examination—gliders (*CAA policies which apply to 20.41 (d)*) | 20. 41–6 | 13 |
| Practical examination—helicopters (*CAA policies which apply to 20.41 (d)*) | 20. 41–7 | 13 |
| **Instrument rating** | 20. 42 | 14 |
| Demonstration of aeronautical knowledge (*CAA policies which apply to 20.42 (a)*) | 20. 42–1 | 14 |
| Prerequisites for taking the instrument written (*CAA policies which apply to 20.42 (a)*) | 20. 42–2 | 14 |
| Qualifying instrument flight experience (*CAA interpretations which apply to 20.42 (b) (2)*) | 20. 42–3 | 15 |
| Demonstration of skill—general (*CAA policies which apply to 20.42 (c) and (d)*) | 20. 42–4 | 15 |
| Instrument flight tests for helicopter and glider pilots (*CAA policies which apply to 20.42 (e)*) | 20. 42–5 | 15 |

## CERTIFICATE RULES


| | Paragraph | Page |
|---|---|---|
| **Application** | **20. 50** | 15 |
| Where to obtain applications (*CAA policies which apply to 20.50*) | 20. 50–1 | 15 |
| **Duration** | **20. 51** | 15 |
| Reissuance of certificates held by aliens (*CAA policies which apply to 20.51 (c)*) | 20. 51–1 | 16 |
| **Temporary certificates** | **20. 52** | 16 |
| Issuance of temporary pilot certificates (*CAA policies which apply to 20.52*) | 20. 52–1 | 16 |
| **Exchange of certificates** | **20. 54** | 16 |
| Validity dates of expired certificates (*CAA interpretations which apply to 20.54 (b)*) | 20. 54–1 | 16 |
| Reissuance of certificates (*CAA policies which apply to 20.54 (b)*) | 20. 54–2 | 16 |
| **Military competence** | **20. 55** | 16 |
| Demonstration of aeronautical knowledge—private or commercial pilot (*CAA policies which apply to 20.55*) | 20. 55–1 | 17 |
| Evidence of membership or civilian employment and of flight status—private or commercial pilot (*CAA policies which apply to 20.55*) | 20. 55–2 | 17 |
| Evidence of discharge or release—private pilot or commercial (*CAA policies which apply to 20.55*) | 20. 55–3 | 18 |
| Requirements for aircraft category, class, and type ratings (*CAA policies which apply to 20.55 (c)*) | 20. 55–4 | 18 |
| Requirements for instrument rating (*CAA policies which apply to 20.55 (d)*) | 20. 55–5 | 18 |
| **Change of address** | **20. 56** | 18 |
| **Termination of certificates** | **20. 57** | 18 |
| **Identification** | **20. 58** | 18 |
| Airman identification card (*CAA rules which apply to 20.58*) | 20. 58–1 | 18 |
| Other identification cards acceptable to the Administrator (*CAA rules which apply to 20.58*) | 20. 58–2 | 18 |
| Application (*CAA rules which apply to 20.58*) | 20. 58–3 | 18 |
| Scheduled air carrier airmen (*CAA interpretations which apply to 20.58*) | 20. 58–4 | 20 |
| Other chairman certificate (*CAA interpretations which apply to 20.58*) | 20. 58–5 | 20 |


## EXAMINATIONS AND TESTS


| | | |
|---|---|---|
| **General** | **20. 60** | 20 |
| Who conducts examinations and tests (*CAA policies which apply to 20.60*) | 20. 60–1 | 20 |
| Who accompanies applicant on flight test (*CAA policies which apply to 20.60*) | 20. 60–2 | 20 |
| **Physical examination** | **20. 61** | 20 |
| Physical prerequisites for flight tests (*CAA policies which apply to 20.61*) | 20. 61–1 | 20 |
| **Aircraft used in flight tests** | **20. 62** | 21 |
| Certificated aircraft usable for flight tests (*CAA interpretations which apply to 20.62 (a)*) | 20. 62–1 | 21 |
| Airplanes usable for instrument rating flight tests (*CAA interpretations which apply to 20.62 (a)*) | 20. 62–2 | 21 |
| **Time and place** | **20. 63** | 21 |
| Time and place of examinations (*CAA policies which apply to 20.63*) | 20. 63–1 | 21 |
| **Reapplication after failure** | **20. 64** | 21 |
| Individuals authorized to give instruction for reexamination (*CAA policies which apply to 20.64 (a) and (c)*) | 20. 64–1 | 22 |


## APPENDIXES


| | |
|---|---|
| Appendix A. Pilot flight tests | 23 |
| Appendix B. Aircraft type ratings | 47 |

# Pilot Certificates

## Student Pilot Certification

**"20.1 *Issuance.* A student pilot certificate will be issued by the Administrator or his authorized representative to an applicant who meets the applicable requirements."**

20.1–1 *Where to obtain student pilot certificates (CAA policies which apply to sec. 20.1).* Student pilot certificates may be obtained by qualified applicants from Aviation Safety Agents in Aviation Safety District Offices, or from private and commercial pilot examiners at most airports and flight schools.

**"20.2 Age.**

**"(a) Powered Aircraft: 16 years.**

**"(b) Gliders: 14 years.**

**"If an applicant is less than 21 years of age and is not a regular or reserve member of the armed forces of the United States or enrolled in an established ROTC or other training programs of such armed forces at the time of making application, he shall submit with his application the written consent of either parent or of his legal or natural guardian."**

20.2–1 *Minors in the armed forces (CAA policies which apply to sec. 20.2).* An applicant under 21 who is a regular or reserve member of the armed forces or enrolled in an established ROTC or other armed forces training program should indicate such membership on his application and include his military serial number, or attach to the application a written statement from his appropriate commanding officer certifying that the applicant is a member of such armed forces.

20.2–2 *Other minors (CAA interpretations which apply to sec. 20.2).* Unmarried applicants under 21 years of age must furnish the written consent of either parent or legal or natural guardian in the space provided on the application, or on a separate sheet attached to such application. No consent is required for a married male applicant under 21, but a married female applicant under 21 must furnish the consent of her husband, who may be under 21.

**"20.3 *Citizenship.* An applicant for a student pilot certificate may be a citizen of any country or a person without nationality."**

**"20.4 *Education.* Applicant shall be able to read, write, speak, and understand the English language or an appropriate operation limitation will be placed on the student pilot certificate."**

20.4–1 *Language limitation (CAA policies which apply to sec. 20.4).* A student pilot certificate issued to a person who cannot read, write, speak, and understand the English language will bear the limitation NOT VALID FOR FLIGHTS REQUIRING THE USE OF ENGLISH FOR TRAFFIC INSTRUCTIONS.

20.4–2 *Removal of limitation (CAA policies which apply to sec. 20.4).* The language limitation will be removed by an Aviation Safety Agent when the holder demonstrates that he can read, write, speak, and understand English.

**"20.5 *Physical Standards.***

**"(a) *Powered Aircraft.* Applicant shall meet the physical standards of the third class prescribed in part 29 of this subchapter: *Provided,* That an applicant who is unable to distinguish aviation signal red, aviation signal green, and white shall be issued an airman certificate appropriately endorsed to prohibit the holder thereof from exercising the privileges of such certificate except under such conditions, or with the use of such equipment which would not require the ability to distinguish such aviation signal colors.**

**"(b) *Glider.* Applicant shall have no known physical defect which renders him incompetent to pilot a glider, and shall so certify."**

20.5–1 *Evidence of meeting physical standards (CAA policies which apply to sec. 20.5 (a)).* The Administrator, or his representative will accept a first-, second-, or third-

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class medical certificate issued within 24 months preceding the date of application as evidence of the applicant's meeting the physical standards.

20.5–2 *Color deficiency limitation (CAA interpretations which apply to sec. 20.5 (a)).* When an applicant holds a medical certificate bearing the notation DEFECTIVE COLOR VISION, the student pilot certificate will bear the limitation NOT VALID FOR NIGHT FLIGHT OR BY COLOR SIGNAL CONTROL.

This limitation may be removed by the successful completion of a special medical flight test authorized by the CAA Medical Division, W–265, Washington 25, D. C.

20.5–3 *Glider pilot certification of physical condition (CAA policies which apply to sec. 20.5 (b)).* An applicant for a student glider pilot certificate should either present a medical certificate, or certify on his application that he has no known physical defect which renders him incompetent to pilot a glider.

**"20.6 *Aeronautical Knowledge.* None."**

## Pilot Certificates and Ratings

**"20.10 *Issuance.* A pilot certificate shall be issued to an applicant who meets the minimum requirements prescribed herein. A private or commercial pilot rating, aircraft category, class, and type ratings, instrument rating, flight instructor rating, and any other necessary special ratings for which the pilot has been found qualified shall be issued in connection with a pilot certificate."**

20.10–1 *Types of certificates, and by whom issued (CAA policies which apply to sec. 20.10)*

(a) Private pilot certificates will be issued to qualified applicants by Aviation Safety Agents or by private and commercial pilot examiners.

(b) Commercial pilot certificates will be issued to qualified applicants by Aviation Safety Agents or by commercial pilot examiners.

(c) Additional aircraft category, class, and type ratings will be issued to qualified applicants by Aviation Safety Agents, or by appropriately rated pilot examiners as follows:

(1) Private pilots—private, commercial, or airline transport pilot examiners.

(2) Commercial pilots—commercial or airline transport pilot examiners.

(d) Instrument ratings will be issued to qualified applicants by instrument or airline transport pilot examiners.

(e) Flight instructor ratings will be issued to qualified applicants by Aviation Safety Agents only.

**"20.11 *Graduates of certificated flying schools.* A graduate of a certificated flying school shall be deemed to have met the areonautical experience requirements of this part, if he presents an appropriate certificate of graduation within 60 days after graduation date: *Provided,* That an individual who has completed a flight instructor course shall not be eligible for such rating unless he has a commercial pilot rating, or if he holds a private pilot rating he has met the aeronautical experience requirements of section 20.35, and an individual who has completed an instrument flight course shall not be eligible for such rating unless he has a commercial pilot rating, or if he holds a private pilot rating he has had at least 150 hours as pilot-in-command, of which not less than 50 hours shall be cross-country, in addition to the time acquired in such course."**

**"20.12 *Limited pilot certificate.* A citizen of a foreign government who holds a currently effective pilot certificate or license issued by his government, upon submitting to the Administrator reliable evidence showing his pilot time and aeronautical experience, may be issued a Limited Pilot Certificate appropriate to his pilot time and aeronautical experience shown. The holder of such certificate shall be familiar with the air traffic rules and shall not transport passengers or cargo where a charge is made for such transportation. The certificate shall contain such limitations as the Administrator finds necessary for safety, including, but not limited to, those which may be required by reason of the pilot's inability to speak and understand the English language."**

20.12–1 *Demonstration of aeronautical knowledge (CAA policies which apply to sec. 20.12).* The applicant for a limited pilot certificate will be given a short examination on the United States air traffic rules. This examination may be written or oral, at the discretion of the agent accepting the application.

20.12–2 *Evidence of meeting physical standards (CAA policies which apply to sec. 20.12).* The applicant for a limited pilot certificate should present evidence of currently meeting the physical requirements of his own country, or may present a current CAA medical certificate of a grade appropriate to the certificate applied for.

20.12–3 *Eligibility for a limited private pilot certificate (CAA policies which apply to sec. 20.12).* An applicant who holds a pilot certificate or license issued by his own government which conveys non-commercial pilot privileges, and who meets the pilot experience requirements of section 20.25 may be issued a limited private pilot certificate.

20.12–4 *Eligibility for a limited commercial pilot certificate (CAA policies which apply to sec. 20.12).* An applicant who holds a pilot certificate or license issued by his own government which conveys commercial pilot privileges, and who meets the pilot experience requirements of section 20.35 may be issued a limited commercial pilot certificate.

20.12–5 *Aircraft and instrument ratings on limited pilot certificates (CAA policies which apply to sec. 20.12).* A limited pilot certificate will bear those aircraft ratings shown on the pilot certificate issued by the holders own government. In the event the foreign pilot certificate does not list aircraft ratings equivalent to those issued by the United States, the applicant may be issued ratings for those aircraft in which he has flown at least 10 hours as pilot-in-command during the preceding 12 months.

The holder of a limited pilot certificate may obtain an instrument rating by meeting the appropriate experience requirements and passing the prescribed examinations and tests.[1]

20.12–6 *Language limitation (CAA policies which apply to sec. 20.12).* A limited pilot certificate issued to an applicant who is unable to speak and understand the English language will contain the following limitation, or the equivalent: NOT VALID FOR FLIGHTS REQUIRING THE USE OF ENGLISH FOR TRAFFIC INSTRUCTIONS.

**"20.13 *Computation of Flight Time.* Flight time shall be computed as follows:**

**"(a) *Powered Aircraft.* Flight time in powered aircraft shall be computed in hours and minutes.**

**"(b) *Glider.* Flight time had in a glider may be computed either in hours and minutes, or by number of flights. Ten short-patterned and released glider flights may be counted as 1 hour of flight time."**

## Private Pilot Rating

**"20.20 *Age.***

**"(a) *Powered Aircraft:* 17 years.**

**"(b) *Glider:* 16 years."**

**"20.21 *Citizenship.* An applicant for a pilot certificate with a private pilot rating may be a citizen of any country or a person without nationality."**

**"20.22 *Education.* Applicant shall be able to read, write, speak, and understand the English language, or an appropriate operation limitation will be placed on the pilot certificate."**

20.22–1 *Language limitation (CAA policies which apply to sec. 20.22).* A private pilot certificate issued to a person who cannot read, write, speak, and understand the English language will bear the limitation NOT VALID FOR FLIGHTS REQUIRING THE USE OF ENGLISH FOR TRAFFIC INSTRUCTIONS.

20.22–2 *Removal of limitation (CAA policies which apply to sec. 20.22).* The language limitation will be removed by an Aviation Safety Agent when the holder demonstrates that he can read, write, speak, and understand English.

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[1] A Radio Operator's License is required by the Federal Communications Commission for the operation of a radio transmitter in an aircraft, as elsewhere. The possession of an FCC radio license is not a prerequisite for a CAA instrument rating, however, because the FCC allows radio transmission by an unlicensed person if a licensed operator is in the airplane. Foreign nationals are not eligible for FCC radio operator licenses.

"20.23 *Physical Standards.*

"(a) *Powered Aircraft.* Applicant shall meet the physical standards of the third class prescribed in part 29 of this subchapter: *Provided,* That an applicant who is unable to distinguish aviation signal red, aviation signal green, and white shall be issued an airman certificate appropriately endorsed to prohibit the holder thereof from exercising the privileges of such certificate except under such conditions or with the use of such equipment which would not require the ability to distinguish such aviation signal colors.

"(b) *Glider.* Applicant shall have no known physical defect which renders him incompetent to pilot a glider, and shall so certify."

20.23–1 *Evidence of meeting physical standards (CAA policies which apply to sec. 20.23 (a)).* The Administrator or his representative will accept a first-, second-, or third-class medical certificate issued within 24 months preceding the date of application as evidence of the applicant's meeting the physical standards.

20.23–2 *Color deficiency limitation (CAA policies which apply to sec. 20.23 (a)).* When an applicant holds a medical certificate bearing the notation DEFECTIVE COLOR VISION, the private pilot certificate will bear the limitation NOT VALID FOR NIGHT FLIGHT OR BY COLOR SIGNAL CONTROL.

This limitation may be removed by the successful completion of a special medical test authorized by the CAA Medical Division, W–265, Washington 25, D. C.

20.23–3 *Glider pilot certification of physical condition (CAA policies which apply to sec. 20.23 (b)).* An applicant for a private glider pilot certificate should either present a medical certificate or certify on his application that he has no known physical defect which renders him incompetent to pilot a glider.

"20.24 *Aeronautical knowledge.*

"(a) *Powered aircraft.* An applicant for a powered aircraft rating shall have passed within the preceding 24 months a written examination based on parts 43, 60, and 62 of the Civil Air Regulations and on practical aspects of cross-country flight planning, weather recognition, pilotage, dead reckoning, and general safety practices in the operation of aircraft.

"(b) *Glider.* An applicant for a glider rating shall demonstrate a knowledge of such portions of parts 43, 60, and 62 as are pertinent to glider operations and of aeronautical charts, meteorology in relation to glider flights, navigation and other instruments used in the operation of gliders, theory of flight, and glider operating limitations."

20.24–1 *Demonstration of aeronautical knowledge (CAA policies which apply to sec. 20.24).* Applicants will be required to answer correctly, within one hour, 45 of the 50 questions on the examination provided by the Administrator appropriate to the category of aircraft for which rating is sought.[2]

The applicant's student pilot certificate will be endorsed by an Aviation Safety Agent to show the results obtained on the examination.

"20.25 *Aeronautical experience.*

"(a) *Powered aircraft.* Each applicant for a powered aircraft rating, whether he has obtained his flight experience in spinnable, nonspinnable, two-control, or three-control aircraft, shall have not less than 25 hours of solo flight time and 15 hours of dual instruction time given by a rated flight instructor: *Provided,* That if the applicant holds a private or commercial pilot certificate with a glider rating, he may receive credit for not more than 10 hours of the required solo flight time for equal flight time obtained in gliders. Each applicant shall in addition meet the requirements of subparagraphs (1) through (3).

"(1) At least 10 hours of the required solo flight time shall be cross-country flight time. Each solo cross-country flight shall include a landing at a point more than 25 miles from the point of departure, and at least one flight shall include a landing at a point more than 100 miles from the point of departure.

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[2] Complete information on the coverage of the private pilot written examination is found in the CAA booklet *Questions and Answers for Private Pilots,* for sale at most airports, and at the U. S. Government Printing Office, Washington, D. C. (20c).

"(2) After the applicant's first solo flight, at least 5 hours of dual instruction time shall be given in cross-country flying, of which not less than 3 hours shall be given before his first solo cross-country flight.

"(3) Dual instruction time shall include instruction in the prevention of and recovery from power-on and power-off stalls entered from all normally anticipated flight attitudes.

"(b) *Glider.* Each applicant for a glider rating shall have made at least 100 glider flights or have acquired 10 hours of glider flight time including at least 50 glider flights. The total number of required flights shall include at least (1) 25 glider flights during each of which a 360° turn is made; (2) 1 hour of flight instruction in the recovery from stalls entered from all normally anticipated flight attitudes; (3) 2 hours in the aggregate during which the applicant is the sole occupant of the glider; and (4) at least 3 hours in a glider suitable for cross-country flight."

20.25–1 *Evidence of flight experience (CAA policies which apply to sec. 20.25).* Flight experience required by this paragraph should be substantiated by a logbook maintained in accordance with the requirements of section 43.43.

20.25–2 *Qualifying dual instruction (CAA interpretations which apply to sec. 20.25 (a)).* The words dual instruction as used in section 20.25 (a) are defined in section 20.74. In the case of foreign or military pilots, such instruction must be given by a pilot authorized by the licensing authority of his country or the branch of his military service.

"20.26 *Aeronautical Skill.* The applicant shall exercise reasonable judgment, coordination, and smoothness in the execution of all flight maneuvers, any of which, however, may be modified or eliminated if not consistent with the characteristics of the aircraft used in the flight test and if appropriate operation limitations are entered on the rating record. If an applicant's medical certificate shows a structural defect or limitation such additional maneuvers and tests shall be required as may be necessary to demonstrate the competence of the applicant to pilot aircraft safely, and appropriate operation limitations shall be entered on the rating record. Except as thus provided, each applicant shall satisfactorily accomplish a practical examination with respect to the following procedures and maneuvers:

"(a) *Airplane.*

"(1) Preflight inspection, starting, taxiing, and run-up check of aircraft before takeoff;

"(2) Planning of a cross-country flight to a specified destination, reckoning with weather conditions, fuel requirements, check points, estimated time of arrival, and available alternate airports, and accomplishing such portion of the planned flight, including change of course to an alternate airport, as is necessary to demonstrate proficiency in cross-country flying;

"(3) Straight and level flight, left and right medium banked turns, left and right climbing and gliding turns at normal and at minimum controllable speeds, and recovery from power-on and power-off stalls entered from all normally anticipated flight attitudes;

"(4) Turns while maintaining a constant radius, or track, around a point, or area, including a 720° turn in each direction in a banked attitude of more than 45°;

"(5) Normal and cross-wind takeoffs and landings following appropriate traffic control procedures of the airport involved, using power, flaps, and slips at the applicant's discretion for assistance in landing;

"(6) Simulated emergencies, including one short or soft-field takeoff, and one landing, if in single-engine aircraft, with engine throttled and using flaps, slips, or both, for assistance; or, if in multiengine aircraft, in accordance with proper engine-out procedure.

"(b) *Glider*

"(1) At least 2 flights, one of which shall include a 360° approach to the right and one to the left, landing each time within 200 feet beyond a designated line or point;

"(2) Recovery from stalls entered from all normally anticipated flight attitudes.

**(Stall maneuvers may be demonstrated in airplanes.)**

**"(c) *Rotorcraft.* As prescribed by the Administrator appropriate to the type of rotorcraft used."**

20.26–1 *Demonstration of skill—general (CAA interpretations which apply to sec. 20.26).*

(a) *Quality of performance.* The applicant will be required to demonstrate his ability to exercise reasonable judgment, coordination, and smoothness in all required flight maneuvers in the following manner:

(1) *Judgment.* Exercise of reasonable judgment will be demonstrated when the conduct of the flight maneuver results in (i) compliance with part 60, (ii) flight within each operating limitation of the aircraft being used, (iii) avoidance of critical situations which require corrective action by the agent or examiner to maintain continued safe operation, and (iv) the observance of accepted good operating practices for flight conditions encountered.

(2) *Coordination.* Exercise of reasonable coordination will be demonstrated when there are no unnecessary conspicuous slips or skids in the conduct of the flight maneuver.

(3) *Smoothness.* Exercise of reasonable smoothness will be demonstrated when the conduct of the flight maneuver in gust free air results in a positive and definite change of aircraft attitude without any unintentional abrupt or sudden aircraft motions.

(b) *Modification and elimination of required maneuvers.* Required maneuvers will be modified or eliminated only when their performance is prohibited by the aircraft's flight manual or the operating limitations of the aircraft's airworthiness certificate. When this is the case, the pilot certificate issued will be limited to aircraft of that type.

(c) *Applicants with physical limitations.*[3] The additional maneuvers and tests required for applicants who have certain structural physical limitations will be those which will demonstrate that the limitation does not adversely affect the ability to perform the necessary cockpit procedures and motions to effect safe flight in one or more types of aircraft.

The operating limitations entered on the applicant's rating record of his certificate, upon successful completion of all other tests and maneuvers, will be only those found necessary by the applicant's inability to cope with one or more operating conditions.

20.26–2 *Flight test—airplanes (CAA policies which apply to sec. 20.26 (a)).* The private pilot practical examination in airplanes will be given in two phases. The failure of any maneuver or procedure will constitute the failure of the phase of which that maneuver is a part, and of the flight test. In the event of such failure, the applicant for reexamination will be required to repeat the phase, or phases, failed.

The phases of the private pilot practical examination and flight test maneuvers required in airplanes are:[4]

PHASE I—*Piloting technique*

Preflight check and oral equipment examination.
Starting, warm-up, and stopping.
Taxiing, or sailing and docking.
Run-up.
Flight at normal speeds—straight and level, medium turns, climbing and gliding turns.
Flight at minimum controllable speeds—straight and level, medium turns, climbing and gliding turns.
Stalls, with and without power.
Turns about a point.
Normal takeoffs and landings.
Crosswind takeoffs and landings.
Emergencies: (a) Short field and soft field takeoff, and power-off landings in single-engine airplanes; (b) engine-out procedure in multiengine airplanes.

PHASE II—*Cross-country*

Cross-country flight planning.
Cross-country flying.

20.26–3 *Flight test—gliders (CAA policies which apply to sec. 20.26 (b)).* The agent or examiner will accompany the applicant in a glider or an airplane during his demonstration of stalls and slow flight. All other items on the flight test may be observed from the ground.

The private glider pilot flight test will be divided in two phases. The failure of any maneuver or procedure constitutes the failure

[3] See section 29.5 for Waiver of Physical Standards.

[4] See appendix A for details of flight test requirements.

of the phase of which it is a part, and of the flight test. Upon reexamination, the applicant must repeat the phase failed.[4]

PHASE I—*Basic techniques*

Preflight check and oral equipment examination.

Auto, auto pulley, or winch tow; or airplane tow.

360° approaches, right and left.

Accuracy landings.

PHASE II—*Special and critical maneuvers*

Stalls and slow flight (may be demonstrated in an airplane).

20.26–4 *Flight test—rotorcraft (CAA policies which apply to sec. 20.26 (c)).* The private pilot flight test in rotorcraft will be given in two phases. The failure of any maneuver or procedure will constitute the failure of the phase of which it is a part, and of the flight test. In the event of such failure, the phase failed will be repeated on reexamination.

The phases of the private pilot flight test on rotorcraft, and the required maneuvers are as follows:[4]

PHASE I—*Basic techniques*

Preflight inspection.

Engine and rotor starting and stopping, cockpit procedures.

Taxiing.

Normal takeoffs and landings.

High altitude takeoffs and roll-on landings.

Crosswind takeoffs and landings.

Climbs and descents.

Emergencies.

PHASE II—*Precision maneuvers*

Hovering—upwind, downwind, and crosswind.

Hovering turns.

Turns with medium banks.

S-turns.

Pattern flying.

## Commercial Pilot Rating

"20.30 *Age.* 18 years."

**"20.31 *Citizenship.* An applicant for a pilot certificate with a commercial pilot rating may be a citizen of any country or a person without nationality."**

[4] See appendix A for details of flight test requirements.

**"20.32 *Education.* Applicant shall be able to read, write, speak, and understand the English language."**

**"20.33 *Physical Standards.***

**"(a) *Powered Aircraft.* Applicant for a powered aircraft rating shall meet the physical standards of the second class prescribed in part 29 of this subchapter: *Provided,* That an applicant who is unable to distinguish aviation signal red, aviation signal green, and white shall be issued an airman certificate appropriately endorsed to prohibit the holder thereof from exercising the privileges of such certificate except under such conditions, or with the use of such equipment which would not require the ability to distinguish such aviation signal colors.**

**"(b) *Glider.* Applicant shall have no known physical defect which renders him incompetent to pilot a glider, and shall so certify."**

20.33–1 *Evidence of meeting physical standards (CAA policies which apply to sec. 20.33 (a)).* The Administrator, or his representative, will accept a first- or second-class medical certificate issued within 12 months preceding the date of the application as evidence of the applicant's meeting the physical standards.

20.33–2 *Color deficiency limitation (CAA policies which apply to sec. 20.33 (a)).* When the applicant holds a medical certificate bearing the notation DEFECTIVE COLOR VISION, the commercial pilot certificate will bear the limitation NOT VALID FOR NIGHT FLIGHT OR BY COLOR SIGNAL CONTROL.

This limitation may be removed by the successful completion of a special medical flight test authorized by the CAA Medical Division, W–265, Washington 25, D. C.

20.33–3 *Glider pilot certification of physical condition (CAA policies which apply to sec. 20.33 (b)).* An applicant for a commercial glider pilot certificate should either present a third-class or better medical certificate issued within the preceding 24 months or certify on his application that he has no known physical defect which renders him incompetent to pilot a glider.

"20.34 *Aeronautical Knowledge.*

"(a) *Powered Aircraft.* Applicant shall pass a written examination covering such of the provisions of parts 43 and 60 of this subchapter as are pertinent; meteorology as applied to the recognition of weather conditions while flying, the analyzing of weather maps and sequence reports furnished by the United States Weather Bureau; practical air navigation problems including the use of maps, navigation by terrain and dead reckoning, and the use of navagational instruments and aids; the theory and practice of flight; the maintenance of aircraft and the maintenance and use of aircraft powerplants in common use.

"(b) *Glider.* Applicant shall pass a written examination on such of the provisions of parts 43 and 60 of this subchapter as are pertinent or hold a powered aircraft rating."

20.34–1 *Demonstration of aeronautical knowledge—powered aircraft (CAA policies which apply to sec. 20.34 (a)).* The applicant for a commercial pilot certificate with a rating on powered aircraft will be required to pass within 5 hours a written examination provided by the Administrator. A passing grade of 70 percent is required. Applicants who pass the written examination will be given a report of grade achieved. This report, and reports previously issued, will be accepted within a maximum period of 24 months as evidence of having met this certificate requirement.

20.34–2 *Demonstration of aeronautical knowledge—gliders (CAA interpretations which apply to sec. 20.34 (b)).* Applicants for commercial glider pilot ratings need pass only that portion of the commercial pilot written examination relating to Civil Air Regulations.

"20.35 *Aeronautical experience.*

"(a) *Powered aircraft.* An applicant for a commercial pilot rating shall comply with the following flight experience requirements:

"(1) 200 hours of flight time credited in accordance with part 43 of this subchapter, of which at least 100 hours shall be as pilot in command;

"(2) 20 hours of cross-country flight time as pilot in command, which shall include at least one flight of not less than 350 miles in the course of which three full-stop landings are made at different points, one of which shall be not less than 150 miles from the initial point of departure;

"(3) 5 hours of night flight time which shall include not less than 10 takeoffs and 10 landings as pilot in command and as sole manipulator of the controls; and

"(4) 10 hours of instrument flight experience, of which not less than 5 hours shall be instrument flight instruction given by a rated instrument pilot and not more than 5 hours under simulated instrument flight conditions accompanied by a safety pilot, or in a mechanical trainer acceptable to the Administrator.

"(5) The requirements for night flight time and instrument flight experience apply only to applicants for airplane category ratings provided for in this part.

"(6) An applicant who does not meet the night flight time or instrument flight experience requirements of subparagraphs (3) and (4) but does meet the other requirements of this paragraph may be issued a pilot certificate with a commercial rating, and in that event the Administrator shall appropriately endorse such certificate to show that the holder thereof does not meet the night flight time or instrument flight experience requirements.[1] At such time as the holder of a certificate so endorsed submits reliable documentary evidence to the Administrator that he has met such night flight time or instrument flight experience requirements, he shall be reissued a certificate without such endorsement or with the endorsements appropriately modified.

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"[1] Paragraphs 2.4.1.3 (c) and (d) of Annex 1 (Personnel Licensing Standards) to the Convention on International Civil Aviation provides that an applicant for a commercial pilot certificate shall have 5 hours of night flight time and 10 hours of instrument flight instruction. An individual holding a pilot certificate with a commercial rating issued after October 1, 1951, who does not meet such requirements may not participate in international flight as a commercial pilot unless he receives permission from the State or States whose territory is entered. Further, pursuant to the provisions of article 32 of the Convention on International Civil Aviation he shall have endorsed on his certificate the particulars in which he does not meet the International Standards. However, such endorsement on a commercial certificate issued by the Administrator does not prohibit the holder thereof from exercising all the privileges of a commercial pilot rating while flying within the United States and its possessions.

**"(b) Glider. An applicant for a glider rating shall have had at least 250 glider flights, or 25 hours of glider flight time including at least 125 glider flights. At least 25 of the required total number of flights shall have included 360° turns. As a part of his aeronautical experience an applicant shall have had at least 1 hour of flight instruction in the recovery from stalls entered from all normally anticipated flight attitudes."**

20.35–1 *Evidence of flight experience (CAA policies which apply to sec. 20.35).* Flight experience required by section 20.35 should be substantiated by a logbook maintained in accordance with sec. 43.43.

20.35–2 *International operating limitations (CAA policies which apply to sec. 20.35 (a) (6)).* A commercial pilot who does not meet the experience requirements of section 20.35 (a) (3) and/or section 20.35 (a) (4) will, if otherwise qualified, receive a certificate with one of the following endorsements, as appropriate:

HOLDER DOES NOT MEET THE NIGHT FLIGHT REQUIREMENTS OF ICAO

or

HOLDER DOES NOT MEET THE INSTRUMENT FLIGHT REQUIREMENTS of ICAO

or

HOLDER DOES NOT MEET THE NIGHT AND INSTRUMENT FLIGHT REQUIREMENTS OF ICAO.

A new certificate without these endorsements will be issued at any time by an Aviation Safety Agent to the holder of a commercial pilot certificate who presents documentary evidence (see section 43.43) that he has met the appropriate requirement.

The above endorsements do not restrict nor affect in any way the privileges of the certificate for flight in the United States or its possessions. However, they do restrict the holder of the certificate from piloting airplanes commercially in foreign countries (members of ICAO) without specific consent.

**"20.36 *Aeronautical skill.* Applicant shall competently perform the following maneuvers:**

**"(a) *Powered aircraft.***

**"(1) A series of 3 landings from an altitude not to exceed 1,000 feet with engine throttled and a 180° change in direction, the aircraft touching the ground in normal landing attitude beyond and within 200 feet of a designated line or point. At least one landing shall be accomplished from a forward slip;**

**"(2) A spiral in each direction of not less than 3 full turns in a banked attitude of not less than 60°, with engine throttled;**

**"(3) 3 shallow on-pylon figure eights, 3 steep on-pylon figure eights, and one 720° power turn in each direction in a banked attitude of at least 60°. During each of these maneuvers the total variation in altitude shall not exceed 100 feet;**

**"(4) (Revoked.)**

**"(5) Straight climbs, climbing turns, slips, maneuvers at minimum controllable speeds, and emergency maneuvers such as simulated forced landings and recovery from power-on and power-off stalls entered from all normally anticipated flight attitudes.**

**"Any of the maneuvers required by this section may be modified or eliminated if such action is appropriate to the characteristics of the aircraft used in the test and appropriate operation limitations are entered on the rating record.**

**"(b) *Glider.***

**"(1) At least 2 flights, one of which shall include a 360° approach to the right and one to the left, landing each time within 100 feet beyond a designated line or point;**

**"(2) a spiral in each direction of not less than 3 full turns in a banked attitude of not less than 45°;**

**"(3) a demonstration of satisfactory technique in the performance of glider flight when towed by an automobile or a winch;**

**"(4) a demonstration of satisfactory technique in the performance of glider flight when towed by an airplane during climb, and when above, below, and to one side of the tow-**

**ing airplane slipstream while in level flight; and**

**"(5) recovery from stalls entered from all normally anticipated flight attitudes. (Stall maneuvers may be demonstrated in airplanes.)"**

20.36-1 *Demonstration of skill—general (CAA policies which apply to sec. 20.36).* The practical examination for a commercial pilot certificate will consist of a flight test given by an Aviation Safety Agent or a commercial pilot examiner. This flight test may be taken either before or after the written examination is passed.

20.36-2 *Flight test—airplanes (CAA policies which apply to sec. 20.36 (a)).* The commercial pilot flight test in airplanes will be given in two phases. The failure of any maneuver or procedure constitutes the failure of the phase of which that maneuver is a part, and of the flight test. After such failure, the applicant for reexamination will be required to repeat the phase, or phases, failed.

The phases of the commercial pilot flight test in airplanes and the required maneuvers and procedures are as follows:[4]

PHASE I—*Basic techniques*

Preflight check and oral equipment examination.
Starting, taxiing, and run-up.
Normal takeoffs and accuracy landings.
Crosswind takeoffs and landings.
Airport traffic pattern.
Climbs and glides.
Slips.
Emergencies.

PHASE II—*Precision maneuvers*

Spirals.
Pylon eights.
720° power turns.
Flight at minimum controllable speed.
Stalls.
Engine-out procedure (if test taken in multiengine airplane).

20.36-3 *Flight test—helicopters (CAA policies which apply to sec. 20.36 (a)).* The commercial pilot flight test in helicopters will be given in two phases. The failure of any maneuver or procedure will constitute the failure of the phase of which that maneuver is a part, and of the flight test. After such failure, the applicant for reexamination will be required to repeat the phase, or phases, failed.

The phases of the commercial pilot flight test in helicopters, and the required maneuvers and procedures are as follows:[4]

PHASE I—*Basic techniques*

Preflight check and oral equipment examination.
Engine and rotor starting and stopping, and cockpit procedures.
Taxiing.
Normal takeoffs and landings.
Crosswind takeoffs and landings.
Running takeoff and roll-on landing.
Climbs and descents.
Airport traffic pattern.
Emergencies.

PHASE II—*Precision maneuvers*

Hovering—upwind, downwind, and crosswind.
Hovering turns.
Pattern flying with constant heading.
S-turns.
Turns with medium banks.
Rapid decelerations (quick stops).

20.36-4 *Flight test—gliders (CAA policies which apply to sec. 20.36 (b)).* The agent or examiner conducting the test will accompany the applicant for a commercial glider pilot flight test in a glider or an airplane during his demonstration of stalls and slow flight. Other items on the test may be observed from the ground, or from within the glider.

The commercial glider flight test will be given in two phases. The failure of any maneuver constitutes the failure of the phase of which that maneuver is a part, and of the flight test. After such failure, the applicant for reexamination will be required to repeat the phase, or phases, failed.

The phases of the commercial pilot glider flight test, and the required maneuvers and procedures are as follows:[4]

[4] See appendix A for descriptions of and standards for required flight maneuvers and procedures.

[4] See appendix A for descriptions of and standards for required flight maneuvers and procedures.

PHASE I—*Basic techniques*

Preflight check and oral equipment examination.
Auto, auto pulley, or winch tow.
Airplane tow.
360° approaches, right and left.
Accuracy landings.

PHASE II—*Special and critical maneuvers*

Spirals.
Stalls and slow flight (may be demonstrated in an airplane).

## Aircraft, Flight Instructor, and Instrument Rating

**"20.40 *Aircraft rating competence.***

**"(a) An applicant for any additional aircraft rating subsequent to the original issuance of a pilot certificate shall demonstrate competency in aircraft of the category and class and, if the aircraft has a maximum certificated takeoff weight of over 12,500 pounds, of the type for which the rating is sought.**

**"(b) A private pilot limited by his rating to nonspinnable airplanes may have this limitation removed by making application to the Administrator and by showing that he meets the experience requirements of section 20.25. In this case the dual cross-country instruction required need not have been received before any solo cross-country flight.**

**"(c) A pilot limited by his rating to gliders, when applying for a pilot rating in powered aircraft, shall meet the aeronautical knowledge, experience, and skill requirements appropriate to the pilot rating sought."**

20.40–1 *Demonstration of competancy for additional aircraft ratings (CAA interpretations which apply to sec. 20.40 (a)).* The applicant for an additional aircraft rating will be required to establish his competency by demonstrating enough of the maneuvers and procedures appropriate to his basic pilot certificate to prove his proficiency in all operations not covered by ratings he already holds. These maneuvers and procedures must be performed with the degree of competency specified for the issuance of the basic certificate he holds.

**"20.40a *Aircraft category rating.* The following aircraft category ratings are issued:**

**"(a) Airplane.**
**"(b) Glider.**
**"(c) Autogiro.**
**"(d) Helicopter."**

**"20.40b *Airplane class ratings.* The following airplane class ratings are issued:**

**"(a) Single-engine land.**
**"(b) Single-engine sea.**
**"(c) Multiengine land.**
**"(d) Multiengine sea."**

**"20.40c *Aircraft type ratings.* An aircraft type rating shall be issued for each type of aircraft having a maximum certificated takeoff weight of over 12,500 lbs."**

20.40c–1 *Aircraft types (CAA policies which apply to sec. 20.40c).* Aircraft type ratings will be issued for only those aircraft of which at least one has been certificated for civil use.[5] Ratings may be issued on prototype and experimental aircraft bearing United States civil registration and experimental or restricted category airworthiness certificates.

**"20.41 *Flight instructor rating.* A flight instructor rating may be issued to an applicant who meets the following requirements:**

**"(a) *Age.* 18 years.**

**"(b) *Knowledge.* An applicant shall pass a theoretical and practical examination on his competency to instruct students in flight.**

**"(c) *Experience.* An applicant shall be a commercial pilot or a private pilot who has met the experience requirements for the issuance of a pilot certificate with a commercial pilot rating.**

**"(d) *Skill.* An applicant shall demonstrate in each category of aircraft in which he desires to give flight instruction his ability to perform with precision and to teach such flight maneuvers as are necessary and appropriate for instruction in the safe piloting of that category of aircraft."**

20.41–1 *Demonstration of knowledge (CAA policies which apply to sec. 20.41 (b).* The applicant for a flight instructor rating will be required to pass, before any practical exam-

[5] A current list of such large aircraft is found in appendix B of this manual.

ination is given, a written examination furnished by the Administrator which consists of two sections relating to (a) the fundamentals of flight instruction, and (b) the performance and analysis of flight maneuvers appropriate to the category of aircraft for which he desires a flight instructor rating. The examination must be completed within 4 hours at one sitting. To pass, the applicant must obtain a grade of 70 percent on each section.

20.41–2 *Prerequisites for taking the written examination (CAA policies which apply to sec. 20.41 (b)).* The flight instructor written examination will be given to any person who meets the experience requirements of section 20.41 (c).

20.41–3 *Demonstration of skill—aircraft categories (CAA policies which apply to sec. 20.41 (d)).* Each certificate issued with a flight instructor rating will bear a notation showing the category of aircraft in which the holder has demonstrated his competence to give flight instruction. The flight instructor categories issued are:

Flight Instructor—Airplane.
Flight Instructor—Glider.
Flight Instructor—Helicopter.

20.41–4 *Demonstration of skill—general (CAA policies which apply to sec. 20.41 (d)).* The applicant for a flight instructor rating will be required to pass a practical examination which includes a flight demonstration of all common flight training maneuvers, and a demonstration of the ability to give clear, accurate, and effective flight instruction. The practical examination will be conducted by Aviation Safety Agents only.

The practical examination will be conducted in two phases, Performance of Flight Training Maneuvers and Flight Instruction Methods. The failure of any portion of a phase will constitute the failure of that phase and of the practical examination. An applicant who has failed the practical examination for a flight instructor rating will be required to repeat the complete test upon reexamination. However, if the reexamination is given by the agent who previously tested and disapproved the applicant, he may, at his own discretion, require only the phase of the test which was previously found unsatisfactory.

*The CAA Flight Instruction Manual—Technical Manual No. 100*—will be used as the basis for evaluating the applicant's knowledge of flight maneuvers and the instruction methods used. The manual may also be used for an open book test in which the applicant will locate and discuss for the agent the material on any principle or maneuver.

20.41–5 *Practical examination — airplanes (CAA policies which apply to sec. 20.41 (d)).*

PHASE I—*Performance of flight training maneuvers*

The applicant will be required to demonstrate his ability to perform correctly the standard flight training maneuvers and procedures as they would be shown to primary flight students.

On flight tests in airplanes, these maneuvers and procedures include, but are not limited to:[6]

Preflight check and oral equipment examination.
Taxiing or sailing and docking.
Run-up.
Normal takeoffs and accuracy landings.
Crosswind takeoffs and landings.
Flight at normal speeds—straight and level, turns, climbs, and glides.
Flight at minimum controllable speed—straight and level, turns, climbs, and glides.
Stalls, with and without power.
Spins (two turns each way).
Spirals (three turns each way).
720° power turns.
Pylon eights.
Airport traffic pattern.
Traffic control procedures.
Simulated emergencies—short and soft field takeoffs; slips; landing to a spot using power, flaps, and slips as desired; and simulated forced landings.
Cross-country flight planning.

PHASE II—*Flight instruction methods*

The applicant will be required to demonstrate his knowledge of and skill in applying effective instruction methods. This demonstration will include the following:

[6] See appendix A for descriptions of and standards for required flight maneuvers and procedures.

(a) *Knowledge of effective instruction methods.* To demonstrate his knowledge of effective instruction, the applicant will be required to orally describe and illustrate the principles of good instruction involving (1) advance instructor preparation, (2) student preparation, (3) instructor demonstration, (4) student participation, and (5) instructor followup inspections.

(b) *Knowledge of safe flying habits and principles.* To demonstrate his knowledge of safe flight habits and principles to follow by a pilot in extricating himself from a critical situation, the applicant will be required to describe orally basic habits and principles that are applicable to getting lost, running low on fuel, encountering turbulent air, getting caught above clouds or in adverse atmospheric conditions, unexpected radio aid shutdown, motor trouble, and operations in high temperatures/altitudes and in mountainous terrain.

(c) *Correctness and clarity of explanations.* To demonstrate his ability to explain clearly and correctly, the applicant will answer orally questions such as those a student might ask, and will simulate instruction—using the agent as a student—in the performance of maneuvers and procedures, both on the ground and in flight. The applicant will be required to instruct the agent as he would a beginning student, and the agent will attempt to fly various maneuvers just as the applicant directs. Explanations and directions should be clear, concise, and correct.

(d) *Recognition and correction of student errors.* To demonstrate his ability to recognize and correct errors in flight performance, the applicant will be required to analyze the performance of the agent when he simulates the performance of a typical student, and make appropriate corrections for any errors committed. The applicant should recognize not only the apparent error, but the basic fault which caused it, and should require a correction which a student can readily understand. For example, repetition of hazardous errors—such as stalling in turns, should be dealt with in a different manner from minor errors—such as gaining or losing altitude.

20.41–6 *Practical examination—gliders (CAA policies which apply to sec. 20.41 (d)).*

PHASE I—*Performance of flight training maneuvers*

The applicant will be required to demonstrate the correct and complete performance of standard flight training maneuvers and procedures used in glider flight training. Tolerances for the flight test maneuvers will be those allowed a commercial pilot applicant. (See sec. 20.36–4.) These maneuvers and procedures include, but are not limited to:[6]

Preflight check and oral equipment examination.
Auto, auto pulley, or winch tow.
Airplane tow.
360° approaches.
Accuracy landings.
Spirals.
Stalls and slow flight.
Spins.

PHASE II—*Flight instruction methods*

The applicant will be required to complete satisfactorily the same demonstration of ability, using a glider, as is required for applicants with airplanes under section 20.41–5, Phase II.

20.41–7 *Practical examination—helicopters (CAA policies which apply to sec. 20.41 (d)).*

PHASE I—*Performance of flight training maneuvers*

The applicant will demonstrate the correct and competent performance of standard flight training maneuvers and procedures used in helicopter flight training. Tolerances for the flight test maneuvers will be those allowed a commercial pilot applicant (sec. 20.36–3). These maneuvers and procedures include, but are not limited to:[6]

Preflight check and oral equipment examination.
Starting, stopping, and cockpit procedures.
Taxiing (with helicopters appropriately equipped).
Normal takeoffs and landings.
Crosswind takeoffs and landings.

[6] See appendix A for descriptions and standards for required flight maneuvers and procedures.

Running takeoff and roll-on landing.
Autorotative approaches; straight, 180°, and 360°.
Autorotative landing.
Hovering; upwind, crosswind, and downwind.
Hovering turns.
Turns with medium banks.
S-turns.
Pattern flying with constant heading.
Pattern flying with changing heading.
Rapid decelerations.
Climbs and descents.
Emergencies.

PHASE II, *Flight instructor methods*

The applicant will be required to complete satisfactorily the same demonstration of ability using a helicopter, as that required for applicants with airplanes under section 20.41–5, Phase II.

**"20.42 *Instrument rating.***

**"(a) *Knowledge.* Applicant shall pass a written examination demonstrating his familiarity with the use of such instruments and other navigational aids, both in the aircraft and on the ground, as are necessary for the navigation of aircraft by instruments, with instrument flight rules, and with flight planning in relation to air traffic control services and aircraft performance. An applicant who is a private pilot shall, in addition, meet the knowledge requirements of section 20.34 (a), except those pertinent to the maintenance of aircraft and aircraft engines.**

**"(b) *Experience.* An applicant shall hold a private or commercial pilot rating and shall have at least;**

**"(1) 150 hours of flight time as pilot in command, of which not less than 50 hours shall be cross-country flight time, and**

**"(2) 40 hours of instrument time under actual or simulated instrument flight conditions, of which not less than 20 hours shall have been in actual flight.**

**"(c) *Aeronautical skill.* Applicant shall competently perform the following maneuvers solely by reference to instruments:**

**"(1) Straight and level flight,**

**"(2) Moderately banked 180° and 360° turns in both directions,**

**"(3) Straight and level flight at minimum safe speeds, minimum glides, maximum climbs, and approaches to stalled attitudes of flight,**

**"(4) Climbing turns,**

**"(5) Stalls, skids, slips, spirals, banks in excess of 45°, and recovery from unusual positions,**

**"(6) A demonstration of estimating arrival time, taking into account speed, wind, and drift.**

**"(d) *Radio skill.* Applicant shall demonstrate his competence while flying solely by reference to instruments with respect to the following items:**

**"(1) Tuning radio,**

**"(2) Orientation,**

**"(3) Operation along a radio range leg,**

**"(4) Locating cone of silence,**

**"(5) Let-down using approved instrument approach procedure for the particular airport.**

**"(e) *Modified tests.* Any of the maneuvers or procedures required in paragraphs (c) and (d) of this section may be modified or eliminated if such action is appropriate to the characteristics of the aircraft or equipment used in the test and appropriate operation limitations are noted."**

20.42–1 *Demonstration of aeronautical knowledge (CAA policies which apply to sec. 20.42 (a)).* The applicant must pass, within 5 hours, the instrument written examination furnished by the Administrator, which consists of three sections; Civil Air Regulations, Meteorology, and Radio Navigation. All three sections will be given at one sitting. To pass, a grade of 70 percent is required on each section.

An applicant for an instrument rating who is the holder of a private pilot certificate will be required to demonstrate compliance with section 20.34 (a) by passing, in addition to the instrument rating written examination, the section of the commercial pilot examination which covers Civil Air Regulations. A passing grade on the instrument rating written examination is accepted as evidence of the knowledge of navigation and meteorology required by section 20.34 (a).

In the event of the failure on any of the three parts, the applicant will retake only the part failed upon reexamination. The instrument rating written examination will be conducted by Aviation Safety Agents only.

20.42–2 *Prerequisites for taking the instrument written examination (CAA policies which apply to sec. 20.42 (a)).* The applicant for the instrument rating written examination will be required to show that he meets the experience requirements of section 20.42 (b).

20.42–3 *Qualifying instrument flight experience (CAA interpretations which apply to sec. 20.42 (b) (2)).* Instrument time under simulated instrument flight conditions means instrument flight practice or instruction (a) in an aircraft while under a hood or other device which limits the pilot's range of vision to the cockpit, or (b) in a synthetic trainer.

Instrument time in actual flight means the time spent controlling an aircraft in flight by reference to instruments only, either in actual instrument weather or under a hood or similar device.

20.42–4 *Demonstration of skill—general (CAA policies which apply to sec. 20.42 (c) and (d)).* No instrument flight test will be given until the applicant has passed the required written examination.

The flight test will be conducted in two phases: (a) Instrument Flying, and (b) Navigation and Approach Procedures. The failure of any item in either phase constitutes the failure of that phase, and of the flight test. In the event of failure, the applicant will be required to repeat the phase, or phases, failed upon reexamination.

The applicant will be required to demonstrate his ability to perform all items of Phase I by the use of the minimum aircraft equipment and instrumentation required for instrument flight by section 43.30 (c) (primary panel). He may use all available equipment and instrumentation for Phase II.

The phases and required maneuvers and procedures for the instrument rating flight test are as follows:[6]

PHASE I—*Basic instrument flying technique.*

Straight and level flight at normal, approach, and minimum safe speeds.
Turns, climbs, and descents at normal, approach, and minimum control speeds.
Stalls.
Steep turns.
Recovery from unusual attitudes.
Engine-out procedure on tests taken in multiengine aircraft.

PHASE II—*Radio navigation and approach procedures.*

Estimating arrival times.
Use of radio equipment.
Orientation.
Beam bracketing.
Locating range station.
Instrument letdown and approach procedures.
Airway traffic control procedures.
Missed approach procedures.

20.42–5 *Instrument flight tests for helicopter and glider pilots (CAA policies which apply to sec. 20.42 (e)).* Instrument flight tests will be given in airplanes only, but instrument rating privileges are not restricted to any aircraft category.

## Certificate Rules

**"20.50 *Application.* Application for a student pilot certificate, pilot certificate, or any rating shall be made on a form furnished by the Administrator."**

20.50–1 *Where to obtain applications (CAA policies which apply to sec. 20.50).* Application forms are obtainable from a representative of the Administration or one of its regional, district, or field offices.

Applications for a student pilot certificate may be mailed to an Aviation Safety District Office. All other applications are presented in person to an Aviation Safety Agent or a designated pilot examiner.

Applicants qualifying on the basis of military competency (sec. 20.55), or for a flight instructor rating (sec. 20.41), will apply to an Aviation Safety Agent.

**"20.51 *Duration.***

**"(a) A student pilot certificate issued to a United States citizen shall remain in effect**

[6] See appendix A for descriptions of and standards for required flight maneuvers and procedures.

**for a period no longer than 24 months after the date of issuance.**

**"(b) A pilot certificate with a private or commercial rating issued to a United States citizen shall remain in effect until surrendered, suspended, revoked, or otherwise terminated by order of the Board.**

**"(c) A student pilot certificate or a pilot certificate with a private or commercial rating issued to an applicant other than a United States citizen shall remain in effect for a period no longer than 12 months after the date of issuance, but it may be reissued without further demonstration of technical competence.**

**"(d) A limited pilot certificate shall remain in effect for a period no longer than 12 months after date of issuance, but it may be reissued without further demonstration of technical competence.**

**"(e) After revocation, and upon request after suspension, the certificate shall be returned to the Administrator.**

**"(f) Nothing in this section shall be construed to deny or defeat the jurisdiction of the Federal courts, the Administrator, or the Board to impose any authorized sanction, including revocation of the certificate, for a violation of the Act or of the Civil Air Regulations occurring during the effective period of the certificate."**

20.51–1 *Reissuance of certificates held by aliens (CAA policies which apply to sec. 20.51 (c)).* Pilot certificates held by individuals other than United States citizens, which are about to expire, or have expired, will be reissued by Aviation Safety Agents upon receipt of application for renewal in accordance with current citizenship qualifications.

**"20.52 *Temporary certificates.* The Administrator or his authorized representative may issue a temporary student pilot certificate or a temporary pilot certificate with a private or commercial rating for a period of not to exceed 90 days, subject to the terms and conditions specified therein by the Administrator."**

20.52–1 *Issuance of temporary pilot certificates (CAA policies which apply to sec. 20.52).* Temporary pilot certificates are issued to qualified applicants by Aviation Safety Agents and designated pilot examiners pending the examination of the applicants' records and the issuance of certificates of greater duration by the Administrator.

**"20.54 *Exchange of certificates.***

**"(a) A private or commercial pilot certificate which was effective on or after January 1, 1942, and which was issued prior to July 1, 1945, will expire on July 1, 1947. Such certificate may be exchanged at any time prior to July 1, 1947, for a pilot certificate and the appropriate ratings provided for in this part.**

**"(b) *Reissuance.* Any person who on June 30, 1947, held a valid private or commercial certificate, and who failed to exchange such certificate in accordance with paragraph (a) of this section, may, notwithstanding such failure and without other showing, obtain a pilot certificate with appropriate ratings upon application to the Administrator."**

20.54–1 *Validity dates of expired certificates (CAA interpretations which apply to sec. 20.54 (b)).* A private pilot certificate issued or last endorsed on or after January 1, 1941, or a commercial pilot certificate issued or last endorsed on or after July 1, 1941, was valid June 30, 1947, unless revoked, suspended, or otherwise terminated.

20.54–2 *Reissuance of certificates (CAA policies which apply to sec. 20.54 (b)).* Certificates which have expired in accordance with section 20.54 (a) will be reissued upon application to an Aviation Safety Agent or an ASDO. Such reissuance constitutes a certificate issuance, and current required ICAO qualification notations will be made a part thereof.

The holder of a valid pilot certificate who so desires may voluntarily exchange it for a photographically issued type of wallet size by presenting it with an application to an Aviation Safety Agent.

**"20.55 *Military competence.* Pilot certificates and appropriate ratings granted on the basis of military competence shall be issued in accordance with the provisions of paragraphs (a), (b), (c), and (d) of this section.**

"(a) *Private pilot rating.* An applicant for a pilot certificate with a private rating shall be deemed to have met the aeronautical knowledge, experience, and skill requirements for the issuance of such certificate if he passes a written examination on parts 43 and 60 and presents reliable documentary evidence showing—

"(1) That he is a member of the armed forces of the United States or a civilian employee of the ferry or transport services thereof, and either is on solo flying status as a rated pilot or the equivalent or has, within 12 months preceding the date of application, been graduated from and rated as a pilot by a military flying school; or

"(2) That he has been honorably discharged or released from such forces and was, at the time of such discharge or release, on solo flying status as a rated pilot or the equivalent or had been graduated from and rated as a pilot by a military flying school: *Provided,* That if he has been honorably discharged or released from such forces, for a period longer than 12 months preceding the date of application, he shall pass the flight test prescribed by section 20.26, unless he can show that he has had, within 12 months preceding the date of application, at least 10 hours of flight time as pilot in command in military aircraft.

"(b) *Commercial pilot rating.* An applicant for a pilot certificate with a commercial rating shall be deemed to have met the aeronautical knowledge, experience, and skill requirements for the issuance of such certificate, if he passes a written examination on parts 43 and 60 and presents reliable documentary evidence showing:

"(1) That he is a member of the armed forces of the United States or a civilian employee of the ferry or transport services thereof, and has been on active duty on solo flying status as a rated pilot or the equivalent for a period of at least 6 consecutive months prior to the date of application or has, within 12 months preceding the date of application, been graduated from and rated as a pilot by a military flying school; or

"(2) That he has been honorably discharged or released from such forces, and had been on active duty on solo flying status as a rated pilot or the equivalent for a period of 6 consecutive months preceding such discharge or release or had been graduated from and rated as a pilot by a military flying school: *Provided,* That if he has been honorably discharged or released from such forces for a period longer than 12 months preceding the date of application, he shall pass the flight test prescribed by section 20.36.

"(c) *Aircraft category, class, and type ratings.* An applicant for a particular category, class, and type rating who has applied for or holds a pilot certificate issued on the basis of military competence or otherwise, shall be issued appropriate ratings upon the presentation of reliable documentary evidence that he has had, within 12 months preceding the date of application, at least 10 hours of flight time as pilot in command in military aircraft of a category, class, and type for which the rating is sought, or has taken a flight test.

"(d) *Instrument rating.* An instrument rating shall be issued to an applicant who holds a currently effective instrument rating if the requirements for the issuance of such rating and the privileges authorized by it are not less than those of the Civil Air Regulations with respect to such rating."

20.55–1 *Demonstration of aeronautical knowledge—private or commercial pilot (CAA policies which apply to sec. 20.55).* The applicant for private or commercial pilot rating will be required to accomplish satisfactorily within one hour, an examination on Parts 43 and 60 of the Civil Air Regulations with a passing grade of 70 percent.

20.55–2 *Evidence of membership or civilian employment and of flight status—private or commercial pilot (CAA policies which apply to sec. 20.55).* An official identification card indicating that the applicant is a member of the armed forces of the United States, or a civilian employee of the ferry or transport services thereof, is acceptable documentary evidence.

Documentary evidence of flight status will consist of (1) official orders to solo flight status,

or (2) a copy of USAF Form 5 or a copy of a USN flight log properly endorsed to show solo flight status, or (3) official orders showing graduation from and rating as a pilot by a military flying school, or (4) a copy of orders showing duty involving flying as a rated pilot, or (5) a properly executed Certificate of Pilot Status, Form ACA–2042, signed by the appropriate commanding officer.

20.55–3 *Evidence of discharge or release—private or commercial pilot (CAA policies which apply to sec. 20.55)* Documentary evidence of honorable discharge or release from the armed forces should consist of an original or photostatic copy of such discharge or release. Discharge or removal from flight status for reasons of flight proficiency or disciplinary action will not be accepted as qualification for the issuance of a pilot certificate.

20.55–4 *Requirements for aircraft category, class, and type ratings (CAA policies which apply to sec. 20.55 (c))*. Documentary evidence of pilot-in-command flighmt time will consist of certified military logbooks, USAF Form 5, or official written statements from commanding officers (on Form ACA–2042 or the equivalent). In addition, checkout sheets may be required for ratings for aircraft on which the applicant's total flight time is marginal.

Any holder of a valid private or commercial pilot certificate is eligible for additional ratings on the basis of pilot-in-command experience in military aircraft.

20.55–5 *Requirements for instrument rating (CAA policies which apply to sec. 20.55 (d))*. The requirements for the issuance of an instrument rating will be deemed met if the applicant holds an equivalent, or better, military instrument card (AF Form 8A [green], or Navy NAV-AER–4120D [green]).

The military pink and white instrument cards do not convey privileges equivalent to those of the CAA instrument rating.

**"20.56 *Change of address.* Within 30 days after any change on the permanent mailing address of a holder of a student pilot certificate or a pilot certificate with a private or commercial rating, the holder shall notify the Administrator in writing of such change. Such notice shall be mailed to the Administrator of Civil Aeronautics, Attention Airman Records Branch, Washington 25, D. C."**

**"20.57 *Termination of certificates.* All student pilot certificates and pilot certificates with private or commercial ratings issued to individuals other than United States citizens prior to September 27, 1950, shall expire on September 26, 1951, but they may be reissued with a duration of 12 months without further demonstration of technical competence."**

**"20.58 *Identification.* The holder of a certificate issued under the provisions of this part shall not, except while engaged in operations conducted by a scheduled air carrier, exercise the privileges conferred by the certificate unless he has in his personal possession a current airman identification card or other identification card acceptable to the Administrator which duly describes him. The airman identification card may be obtained from the Administrator who shall prescribe its form and manner of applying for it."**

20.58–1 *Airman identification card (CAA rules which apply to sec. 20.58)*. An Airman Identification Card, Form ACA–2135, is issued by the Administrator and may be used to meet the requirements of section 20.58.

20.58–2 *Other identification cards acceptable to the Administrator (CAA rules which apply to sec. 20.58)*. Identification cards which are acceptable in lieu of Form ACA–2135 to meet the requirements of section 20.58 are as follows:

(a) Aircrewman Identification Card, Form ACA–2116.1, issued by CAA.

(b) Crew Member Certificate, Form ACA–2116.1, issued by CAA. This certificate is a current revision of the Aircrewman Identification Card.

(c) Current identification cards issued to members on active duty or on reserve status by:

(1) U. S. Army.
(2) U. S. Navy.
(3) U. S. Air Force.
(4) U. S. Marine Corps.
(5) U. S. Coast Guard.
(6) U. S. Merchant Marine.

(7) National Guard.

(8) Civil Air Patrol.

20.58–3 *Application (CAA rules which apply to sec. 20.58).* An applicant for an airman identification card shall comply with the following procedure:

(a) *Application.* The applicant shall apply in person to an Aviation Safety Agent, or an Aviation Safety District Office.

(b) *Form.* Application for Airman Identification Card, Form ACA–2134, shall be completed in single copy, typed or printed in ink, and contain precise information on each item.

(c) *Proof of identity.* The applicant shall furnish proof of his identity. The agent may exercise his discretion in the method by which he identifies the applicant. Identification of the applicant may be established by one or more of the following means:

(1) Airman Identification Card, Form ACA–935, issued by the CAA to the applicant during World War II.

(2) The agent's knowledge of the applicant's identity.

(3) The applicant's identification by a person known to the agent.

(4) Combinations of identification cards and licenses held by the applicant.

(5) Comparison of the applicant's signature with that on other cards and licenses held by him.

(d) *Proof of place and date of birth.* The following documentary evidence is satisfactory evidence of place and date of birth.

(1) Airman Identification Card, Form ACA–935, issued by CAA during World War II. (If he held this card and lost it, he may write to CAA, Airman Records Branch, Washington 25, D. C., and obtain confirmation that it was issued to him and the information it contained.)

(2) Birth certificate. (When the applicant's birth certificate does not contain the exact name now used by him, he shall explain the difference on the application form.)

(3) Baptismal record, if it contains the full name and place and date of birth.

(4) Naturalization papers, if place and date of birth are shown.

(5) Passport, expired or current.

(6) Aircrewman Identification Card, or Crew Member Certificate, Form ACA–2116.1.

(7) Statement from any State or Federal Government agency which has the applicant's birth certification on file.

(8) Statement from any military, State, municipal, local, or Federal Government agency which has established, by investigation or otherwise, the applicant's place and date of birth.

Applicants who cannot furnish any of the documents listed in (1) through (8) may present affidavits from attending physician, either parent, brother, sister, relative, or acquaintances who have personal knowledge of the applicant's place and date of birth.

Military identification cards, service records, discharge papers, drivers' licenses, and the like are not acceptable documentary evidence of place and date of birth.

(e) *Evidence of citizenship.* The following documentary evidence is satisfactory evidence of citizenship.

(1) Any document listed in paragraph (d) if citizenship is claimed in the country of birth.

(2) Naturalization papers.

(3) Currently valid passport.

(4) Statement from an appropriate official of a foreign government that the applicant is a citizen of that country.

(5) Civil Aeronautics Board waiver of citizenship requirements for the issuance of an airman certificate to stateless or other persons.

(6) Certified statements from persons, courts, or agencies in authority on cases of derivative citizenship, uncompleted naturalization, or other complex citizenship status. Such statements must contain information on the current status of the applicant's citizenship.

(f) *Photographs.* The applicant shall furnish two photographs which are:

(1) Taken from the same negative.

(2) One-inch square, full face, head only.

(3) Taken within the past 12 months, and

(4) Readily recognizable as photographs of applicant.

(g) *Fingerprints.* The applicant shall be fingerprinted only by an Aviation Safety Agent or other CAA employee authorized by the agent.

(h) *Reissuance of lost card.* An applicant who has lost his Airman Identification Card, Form ACA–2135, may obtain another by making application exactly as required for his original card, or by:

(1) Writing to the CAA Airman Records Branch, W–253, Washington 25, D. C., and explaining the circumstances of the loss, and requesting a letter verifying that such card had been issued, and

(2) Presenting the letter and two photographs, as required for original issuance, to an Aviation Safety Agent who will issue a duplicate card.

20.58–4 *Scheduled air carrier airmen (CAA interpretations which apply to sec. 20.58).* An airman certificated under section 20.58 is not required to hold an identification card when he is exercising the privileges of his certificate in operations conducted by a scheduled air carrier. This includes any operation in which the airman is carrying out his duties as an employee of a scheduled air carrier.

20.58–5 *Other airman certificate (CAA interpretations which apply to sec. 20.58).* An identification card which meets the requirements of section 20.58 for pilots will also meet the identification card requirements for any other airman certificates which he may hold.

## Examinations And Tests

**"20.60 *General.* The prescribed examinations and tests shall be given by a person designated by the Administrator."**

20.60–1 *Who conducts examinations and tests (CAA policies which apply to sec. 20.60).* The examinations and tests required by this part for a certificate or rating will be conducted by the persons indicated below:

| *Type of Examination* | *Conducted by* |
|---|---|
| Written Examinations (for all certificates). | Aviation Safety Agents. |
| Practical Examinations: Private Pilot | Aviation Safety Agents, Private and Commercial Pilot Examiners. |
| Commercial Pilot | Aviation Safety Agents, and Commercial Pilot Examiners. |
| Additional Aircraft Ratings. | Aviation Safety Agents, and Private or Commercial Pilot Examiners according to certificate held. Also, ATR examiners for holders of commercial pilot certificates. |
| Instrument Rating | Aviation Safety Agents, Instrument Rating and ATR Examiners. |
| Instructor Rating | Aviation Safety Agents. |
| Physical Examination: | |
| First Class | Designated ATR Medical Examiners. |
| Second Class | Designated ATR and 2d Class Medical Examiners.[7] |
| Third Class | Designated ATR, 2d Class Medical Examiners, or a competent licensed physician. |

20.60–2 *Who accompanies applicant on flight test (CAA policies which apply to sec. 20.60).* An Aviation Safety Agent or a CAA designated pilot examiner will accompany the applicant for a flight test (except certain glider tests) in the aircraft during the performance of all required maneuvers. In addition, the agent or examiner may, at his discretion, require the performance of solo takeoffs and landings, unless the Aircraft Flight Manual prohibits solo operation of the aircraft used.

**"20.61 *Physical examination.* Prior to taking a flight test for a rating, an applicant shall have met the appropriate physical requirements within the time limitations hereinafter prescribed:**

**"(a) *Private rating.* Within the preceding 24 months.**

**"(b) *Commercial rating.* Within the preceding 12 months."**

20.61–1 *Physical prerequisites for flight tests (CAA policies which apply to sec. 20.61).*

(a) *Original private and commercial flight tests—powered aircraft.* A CAA first or second class medical certificate will be acceptable for flight tests for a commercial pilot certificate if issued within the preceding 12 months. A first, second, or third class medical certificate will be acceptable for a private pilot certificate, if issued within the preceding 24 months.

[7] See Regulations of the Administrator, section 406.12a, as amended December 30, 1950, for physical examination procedures for military pilots.

(b) *Original private and commercial flight tests, and flight instructor tests—gliders.* The applicant should certify that he has no known physical defect which would render him incompetent to pilot gliders, or present a CAA medical certificate of any class.

(c) *Instrument, flight instructor, and additional aircraft ratings—powered aircraft.* The holder of a private or commercial pilot certificate who applies for an additional rating will be required to hold a medical certificate appropriate to his basic certificate and which has been issued within the time limits specified in section 20.61–1.

**"20.62 *Aircraft used in flight tests.***

**"(a) *Powered aircraft.* Applicant shall furnish a certificated aircraft which must be equipped with complete dual controls and accommodate the applicant and examiner and parachutes for both. In addition, aircraft used for instrument flight tests shall be equipped as specified in section 43.30 (c).**

**"(b) *Glider.* Applicant shall furnish a certificated glider."**

20.62–1 *Certificated aircraft usable for flight tests (CAA interpretations which apply to sec. 20.62 (a)).* An aircraft which contains a current United States airworthiness certificate may be used for a flight test, provided it is in airworthy condition; the certificate contains no limitations excluding pilot flight tests; its operating limitations permit the carriage of the applicant, the examiner, and all necessary equipment and fuel; and its equipment and instruments are all in good working condition.

A foreign registered aircraft having a valid airworthiness certificate issued by the proper authorities of the country in which the aircraft is registered may be used for pilot flight tests at the discretion of the agent or examiner. When required, the applicant for the flight test shall obtain an appropriate certificate or other authorization from the foreign government involved authorizing the agent or examiner to act in such capacity aboard the foreign aircraft.

Military aircraft on operational status may also be used at the discretion of the agent or examiner, provided permission from the appropriate military authority is obtained.

20.62–2 *Airplanes usable for instrument rating flight tests (CAA interpretations which apply to sec. 20.62 (a)).* An airplane used for an instrument flight test must be equipped, in addition to the equipment required for instrument flight by section 43.30 (c), with a hood, or other device which limits the pilot's range of vision to the cockpit for simulating instrument flight conditions. This installation must exclude all outside visual reference for the pilot, yet not restrict the vision of the safety pilot, agent, or examiner. Sufficient visibility for the safety pilot is required to permit clearance for turns in either direction. When incomplete visibility to the left is afforded, in side-by-side seating airplanes, a safety observer must be provided to maintain a watch to the left. This observer must be in uninterrupted contact with the safety pilot.

**"20.63 *Time and place.* All examinations and tests will be held at such times and places as the Administrator may designate."**

20.63–1 *Time and place of examinations (CAA policies which apply to sec. 20.63).* Each CAA region publishes an itinerary schedule monthly or quarterly showing when and where its Aviation Safety Agents will be available for written and practical examinations. These itinerary schedules are posted at all active airports and at Aviation Safety District Offices.

Appointments for examinations by designated examiners should be arranged directly with the examiners concerned.

**"20.64 *Reapplication after failure.* Applicants who have failed in any examination will be subject to the following rules in making application for reexamination:**

**"(a) An applicant for a pilot certificate with a powered aircraft rating or for an additional rating who fails to pass any prescribed theoretical examination may reapply after the expiration of 30 days from the date of such failure or after he has received not less than 5 hours of instruction from a certificated ground instructor in each subject failed.**

**"(b) An applicant who has failed to pass any prescribed practical examination or test**

**on powered aircraft may reapply only after an appropriately rated flight instructor has checked his competency and certified in the applicant's logbook that he considers such applicant qualified for the certificate or rating sought, or after the expiration of 30 days from the date of such failure.**

**"(c) An applicant for a glider rating who has failed to pass any prescribed theoretical examination may reapply at any time after the expiration of 30 days or after he has received not less than 5 hours of instruction on each subject failed from a certificated ground instructor.**

**"(d) An applicant for a glider rating who has failed to pass any prescribed practical examination or test may reapply only after he has made at least 20 additional gliding flights."**

20.64–1 *Individuals authorized to give instruction for reexamination (CAA policies which apply to sec. 20.64 (a) and (c)).* An applicant who has failed a subject of the prescribed theoretical examination may be reexamined after 5 hours of instruction on such subject from an individual holding a ground instructor certificate or a flight instructor rating with a rating for the particular subject.

# Appendix A

# Pilot Flight Test Procedures and Standards

This appendix contains the maneuvers, procedures, standards, and preparative guide helps with which an applicant is concerned when seeking a private or commercial pilot certificate. It includes similar material relating to an instrument rating and to additional aircraft ratings. Relative portions of the private and commercial pilot material are also applicable to the Phase I maneuvers required of an applicant for a flight instructor rating. The composition of the information herein is as follows:

| | |
|---|---|
| Procedure | The way the maneuver or item will be carried out on the test. |
| Standard | The degree of skill or accuracy required for a passing performance. |
| Preparative guide | Factors and helps to the applicant in preparing himself for the flight test. |

## Private Pilot Flight Tests

### General

**Overall Test Requirement.** The flight test standards and tolerances set forth herein are those that are expected in smooth air, and which can be attained on a repeated basis. Allowance will be made by the examiner for gusty air and other extenuating circumstances encountered during the actual flight test.

The applicant will be required to demonstrate his ability to exercise reasonable judgment, coordination, and smoothness in all required flight maneuvers in the following manner:

JUDGMENT. Exercise of reasonable judgment will be demonstrated when the conduct of the flight maneuver results in (1) compliance with CAR 60, (2) flight within each operating limitation of the aircraft being used, (3) avoidance of critical situations which require corrective action by the agent or examiner to maintain continued safe operation, and (4) the observance of accepted good operating practices for flight conditions encountered.

COORDINATION. Exercise of reasonable coordination will be demonstrated when there are no unnecessary conspicuous slips or skids in the conduct of the flight maneuver.

SMOOTHNESS. Exercise of reasonable smoothness will be demonstrated when the conduct of the flight maneuver in gust free air results in a positive and definite change of aircraft attitude without any unintentional abrupt or sudden aircraft motions.

**Modification and elimination of required maneuvers.** Required maneuvers will be modified or eliminated only when their performance is prohibited by the Aircraft Flight Manual or the operating limitations of the aircraft's airworthiness certificate. When this is the case, the pilot certificate issued will be limited to aircraft of that type.

**Waivers of physical standards.** An applicant who holds a medical certificate which lists a specific structural defect or the limitation VALID FOR STUDENT PILOT PRIVILEGES ONLY, or both, may be issued a private pilot certificate only after he obtains a waiver of physical standards. Certificates issued on the basis of such waivers will bear appropriate operating limitations.

Waivers of physical standards will be issued on the basis of a study of the applicant's operation record, ability, and judgment; or on the results of a special medical flight test. Authorization for special medical flight tests will

be issued to applicants who meet all experience requirements for a private pilot certificate upon written request made to the CAA Medical Division, W–265, Washington 25, D. C.

## Private Pilot Flight Test—Airplanes

The private pilot flight test on airplanes will be given in two phases. The failure of any maneuver or procedure in either phase will constitute the failure of that phase, and of the whole test. In the event of such failure, the applicant for reexamination will be required to repeat the phase failed.

The phases of the private pilot flight test are: Phase I—Piloting Technique, and Phase II—Cross Country.

The maneuvers and procedures required of applicants in airplanes, under each phase, are as follows:

PHASE I—PILOTING TECHNIQUE

(1) Preflight check and oral equipment examination.
(2) Starting, warmup, and stopping.
(3) Taxiing, or sailing and docking.
(4) Runup.
(5) Flight at normal speeds: straight and level, medium turns, climbing and gliding turns.
(6) Flight at minmum controllable speeds: straight and level, medium turns, climbing and gliding turns.
(7) Stalls, with and without power.
(8) Turns about a point.
(9) Normal takeoffs and landings.
(10) Crosswind takeoffs and landings.
(11) Emergencies, Single engine airplanes—Short and soft field takeoffs, and power-off landings in single-engine airplanes.
(12) Emergencies, Multiengine airplanes—Engine out procedure in multiengine airplanes.

PHASE II—CROSS-COUNTRY

(1) Cross-country flight planning.
(2) Cross-country flying.

The following paragraphs set forth the procedures for performing the required tests, standards and the tolerances of error allowed for a passing performance, and guide factors to aid the applicant in preparing for the flight test.

### Phase I—Piloting Technique

#### (1) PREFLIGHT CHECK AND ORAL EQUIPMENT EXAMINATION

*Procedure.* This check is the physical inspection of the airplane to see that there is no visible evidence of unairworthiness, and that it is properly certificated and serviced for the flight proposed.

*Standard.* The applicant will be required to demonstrate his ability to make a complete check and to display an accurate knowledge of the preflight inspection procedure recommended by the manufacturer, or by CAA TM–100, Flight Instruction Manual.

*Preparative guide.* Check the outside and inside of the airplane. Check for presence of all required equipment and documents. Check the fuel and oil supply by accepted methods. Use the prescribed (by the manufacturer or CAA TM–100) preflight inspection procedure.

#### (2) STARTING, WARMUP, AND STOPPING

*Procedure.* The applicant will use the starting, warmup, and stopping procedures recommended in the Airplane Flight Manual or by the engine manufacturer.

*Standard.* The applicant will be expected to take precautions to prevent fire, propeller blast damage, and hazards to personnel; and will demonstrate precautions to be taken for starting when no competent assistance is available.

#### (3) TAXIING, OR SAILING AND DOCKING

*Procedure.* The applicant will be required to demonstrate the operation of his airplane on the surface between the loading ramp and the takeoff position. Seaplane applicants will also demonstrate taxiing at slow speeds and on the step, sailing, and turns to downwind headings.

*Standard.* The applicant must maintain control, maintain visual contact with his taxi path, avoid obstructions, and comply with local taxi rules and control tower instructions.

*Preparative guide.* The applicant should use safe taxi speeds, care in watching for ob-

structions and other traffic, and make efficient use of flight and engine controls and brakes.

Seaplane applicants should be able to demonstrate considerations necessary in taxiing under typical conditions of wind, current, and rough water experienced in normal seaplane operations. The use of the water rudder is important.

(4) RUNUP

*Procedure.* The applicant will be required to conduct a runup check in accordance with the recommended procedure. It will include the runup of the engine(s), the check of ignition, engine accessories, propeller operation, engine smoothness and power output; the check of the flight controls for freedom of movement; and the use of the checklist when provided.

*Standard.* The runup must be complete and conducted so as to avoid hazard to persons and property, and detrimental effect to the engine.

*Preparative guide.* The applicant should use a planned procedure in executing his runup, preferably that recommended by the Airplane Flight Manual or the engine manufacturer.

(5) FLIGHT AT NORMAL SPEEDS

*Procedure.* Normal basic flight maneuvers will be demonstrated at the airspeeds appropriate to the airplane used. These maneuvers include: straight and level flight, 10°–30° bank climbing turns, 10°–30° bank gliding turns, and 10°–30° bank turns in level flight. These may be combined with the other required maneuvers.

*Standard.* The standards for these maneuvers are as follows:

Straight and level flight (5 minutes):
- Altitude—within 50 feet.
- Heading—within 10°.
- Airplane must not be held in slipping flight.

Climbing turns (through 360°):
- Airspeed—within 10 m. p. h. of that recommended for best rate of climb.
- Bank—within 10°.
- Power setting—as recommended for climb.

Gliding turns (through 360°):
- Airspeed—within 10 m. p. h. of that recommended for final approach to landing.
- Bank—within 10°.

Turns in level flight (through 360°):
- Airspeed—within 10 m. p. h.
- Bank—within 10°.
- Power setting—cruising power or slightly above.

(6) FLIGHT AT MINIMUM CONTROLLABLE SPEEDS

*Procedure.* The applicant is to perform the maneuvers required by (5) at a minimum controllable flight speed. This will be at a speed such that a reduction of not more than 5 m. p. h. will result in immediate indications of a stall.

At least once during the demonstration of slow flight, the applicant will be required to close the throttle and allow the airplane to stall. During power-on slow flight, indications of a stall should appear immediately when the throttle is closed.

*Standard.*

Straight and level flight:
- Altitude—within 100 feet.
- Airspeed—within 5 m. p. h. of a stall. No unintentional stall permitted.
- Power setting—as required to maintain level flight.

Climbing turns:
- Airspeed—within 5 m. p. h. of stall.
- Bank—within 10°.
- Power setting—as recommended for climb.

Gliding turns:
- Airspeed—within 5 m. p. h. of stall.
- Bank—within 10°.
- Power setting—idling power.

*Preparative guide.* The applicant's performance should show an appreciation of the difference in the relative effectiveness of the flight controls at critically slow flight speeds as compared with normal flight speeds.

Coordination, positive flight and power control usage are important factors. Violent or abrupt control usage which tends to slow airspeed unnecessarily should be avoided. If airplane is equipped with retractable gear and flaps, applicant should be able to demonstrate control with gear/flaps up or down.

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### (7) STALLS, WITH AND WITHOUT POWER

*Procedure.* Stalls and stall recoveries will be demonstrated from three flight conditions which simulate normal situations from which stalls have been found to be most critical. These three occur during a takeoff and departure, an approach to a landing, and when engaging in accelerated maneuvering at reduced speeds.

*Takeoff and departure stalls* will be simulated with the airplane in a 10° to 30° banked climbing turn with retractable gear up and flaps in takeoff position, and with full climb power. The climbing attitude will be progressively increased as the turn continues until the angle of attack producing a stall is attained.

*Approach to landing stalls* will be simulated from a 10° to 30° banked gliding turn with and without flaps and retractable gear extended and with fast idling power. The gliding attitude will be progressively flattened while the turn continues until the angle of attack necessary to produce a stall is attained.

*Accelerated maneuver stalls* will be performed from 10° to 30° gliding turns with fast idling power by rapidly increasing the pressure on the elevators at speeds 10 to 15 m. p .h. above the normal unaccelerated stalling speed, and will be performed from 45° to 60° banked turns in level flight with sufficient power to maintain altitude.

*Note: Accelerated stalls will not be performed at airspeeds more than 15 m. p. h. above the unaccelerated stalling speed because of the extremely high structural loads that are imposed on the wings and tail surfaces, particularly in gusty air.*

Recovery from each stall is to be completed to straight flight with wings leveled and with the least loss of altitude consistent with immediately regaining full flight control.

*Standard.*

Stall recognition:

Promptly detect and identify, without aid of stall warning device.

Recovery:

To full level flight with wings level, both upon stall detection and after a short delay (1–3 seconds.)

Altitude loss:

Not to exceed 100 feet using power for recovery.

Airspeed:

Not to exceed cruising speed at any time.

*Preparative guide.* Stall recoveries should be prompt, positive, and unhurried. The applicant should have an appreciation of the aerodynamic fact that the angle of attack of the airflow with the wing, and not the airspeed, is the primary factor in producing a stall condition (as illustrated by the accelerated stall). Thus, the correct use of the elevator is of primary importance. The application of throttle in stall recoveries should be smooth and positive, but not held so long as to result in excessive airspeed and r. p. m. The recovery should be executed with a constant increase in airspeed from the stall to cruising or gliding flight. In stalls from turns, emphasis should be placed on obtaining straight flight immediately upon the recognition of the stall, by getting flight control through a reduction of angle of attack and the leveling of wings in a smooth and coordinated maneuver.

### (8) TURNS AROUND A POINT OR AREA

*Procedure.* Turns around a point or area will include at least two full turns in each direction about a point or small area selected by the examiner. The banked attitude at the steepest point of the turns should be at least 45° and the flight path should approximate a circle or oval about the point or area selected. Bank and power setting may be varied as necessary. The airplane should have its gear and flaps up, if retractable.

The point chosen may be any prominent point or area not within a congested area. The turns should be flown at an altitude of approximately 500 feet above the ground, building, or highest terrain feature. The examiner may ask questions about the area surrounding the point to divert the applicant's attention from the operation of the airplane.

*Standard.*

Altitude—5–700 feet above terrain or structure.

Flight control—No loss of airspeed or control which results in an indication of an impending stall.

*Preparative guide.* The applicant should be able to maintain his track and altitude without slipping or skidding while his attention is diverted to objects on the ground. It is intended that the turns are to be made to enable the pilot to closely observe the designated point as they would have to be made if one were taking a close look at a house or other ground object of special interest.

### (9) NORMAL TAKEOFFS AND LANDINGS

*Procedure.* The applicant will be required to make at least two normal takeoffs and landings, using the established traffic procedures for the airport involved.

Approaches may be performed with a gradual reduction of power from the beginning of the approach to the point where the pilot feels sure of reaching the runway.

Landings will be appropriate to the airplane used. Landings with and without the use of flaps will be required in airplanes so equipped (unless prohibited by the Airplane Flight Manual). In airplanes equipped with tailwheels, the applicant will demonstrate at least one wheel landing of a type suitable for gusty air. In airplanes equipped with nose wheels, the applicant will demonstrate at least one full stall landing of a type suitable for rough fields.

*Standard.* The applicant will be required to comply with the established traffic pattern, fly a straight path over the airport when taking off and landing, maintain traffic pattern altitudes within 100 feet, and maintain the best angle of climb and recommended glide speeds within 5 m. p. h. Touchdown must be made within the designated portion of the runway (usually the first third) and in a normal landing attitude. Slips, if used, must be entered and stopped smoothly, controlled throughout, and always made to the windward side.

*Preparative guide.* Important factors are the applicant's takeoff preparations, his maintenance of ample clearance distances with other traffic, and compliance with tower instructions and traffic patterns. When there is no formal traffic control at the airport used the examiner will question the applicant on radio and light gun procedures used at controlled airports. Takeoffs and landings should be smooth, well within the performance capabilities of the airplane used, and give evidence of the applicant's mastery of the airplane being used.

### (10) CROSSWIND TAKEOFFS AND LANDINGS

*Procedure.* At least one takeoff and landing subject to a crosswind component of 30°–60° will be required.

*NOTE: No additional demonstration will be required if the demonstrations of normal takeoffs and landings involve a crosswind which necessitates corrections for drift prior to landing and after takeoff.*

*Standard.* The applicant must correct for drift on climb-outs and approaches, make landings and takeoffs without side loads on the landing gear and maintain directional control during takeoff and landing roll.

*Preparative guide.* The method used to correct for drift and to avoid landing gear side loads should show the application of a definite and planned technique.

### (11) EMERGENCIES, SINGLE-ENGINE AIRPLANES

#### Power-Off Approaches and Landings

*Procedure.* A power-off landing on an airport will be made from both a low and a high altitude. The low altitude demonstration will be started in a traffic pattern, engine throttled, and approach continued to a landing through a 180° change of direction. The high altitude demonstration will be started from an altitude of at least 2,000 feet, engine throttled—may be cleared periodically during descent—and descent effectuated to conform to traffic flow in pattern, and a landing made.

*Standard.* A normal landing is required on a designated portion of the runway or landing area with sufficient margin to permit a controlled roll to a stop.

#### Short Field Takeoffs

*Procedure.* Short field takeoff procedures will be demonstrated (a firm surface is assumed) by utilizing (if practicable) a "running turn" into the takeoff run, a start from extreme end of available takeoff area, obtaining a liftoff as soon as possible, and attaining and maintaining the recommended best angle of climb

airspeed and attitude as promptly as possible after leaving the ground.

*Standard.*

Airspeeds—Within 5 m. p. h. of recommended best angle of climb speed.

Takeoff run—No loss of control and maximum utilization of available area.

SOFT FIELD TAKEOFFS

*Procedure.* Soft field takeoff procedures will be demonstrated for taking off from a soft surface, such as deep grass or snow. The demonstration will be made by keeping the tail surfaces low throughout the run to lighten the load on the wheels to ease ground drag, and the airplane will be flown off the ground at the minimum controllable speed, and held just off the ground until normal takeoff and climb speed is attained.

*Standard.*

Takeoff distance—To approximately equal that set forth in the Airplane Flight Manual for operation at 5,000 feet with outside air temperature 70°.

HIGH TEMPERATURE/ALTITUDE TAKEOFFS

*Procedure.* High temperature/altitude takeoff procedures will be demonstrated for operating from fields where high temperature and/or altitude markedly reduces the airplane's power and climb performance. This type of takeoff will be demonstrated with power reduced as necessary to simulate full load performance at not less than 5,000 feet altitude and with a temperature of at least 70° F., as indicated in the Airplane Flight Manual.

*Standard.*

Airspeed—Liftoff to be at a speed not in excess of 5 m. p. h. above the power on stalling speed. Climb-out speed to be within 5 m. p. h. of recommended best rate of climb speed.

*Preparative guide.* On airplanes equipped with flaps, the recommended flap usage for quick takeoff should be applied for short, soft, and high field takeoffs. Short and high field takeoff procedure may be demonstrated to advantage with reduced power settings. The applicant should be conversant with all aspects and principles of conducting operations under such conditions in order to assure optimum safety and the exercise of sound judgment.

(12) EMERGENCIES, MULTIENGINE AIRPLANES

*Procedure.* Applicants for flight tests in multiengine airplanes will be required to demonstrate the operation of the airplane with one engine inoperative, and the use of emergency equipment. Propeller feathering will be demonstrated in all airplanes equipped with propellers which can be feathered and unfeathered in flight without damage to the engine.

No applicant will be required or allowed to feather an engine of a twin-engine airplane on takeoff or in other critical positions where the failure of another engine would endanger safety. Failure may be simulated in such positions by throttling an engine to zero thrust to simulate a feathered propeller.

The applicant will be expected to make turns with medium banks with and against the dead engine.

*Standard.* The applicant will be required to demonstrate his ability to make 10°–20° bank turns with and against the dead engine; to secure optimum performance by maintaining recommended airspeed within 5 m. p. h.; to maintain headings within 10°; to maintain altitude within the airplane's limitations; to trim the airplane and make correct power settings; and to conduct a complete cockpit check in accordance with the appropriate check list.

**Phase II—Cross-Country**

(1) CROSS-COUNTRY FLIGHT PLANNING

*Procedure.* Before takeoff, the applicant will be required to plan a flight to a point designated by the examiner. The point chosen will be at a distance equivalent to at least two hours of flying in the airplane used.

Planning will consist of obtaining available weather information; plotting the course and establishing check points and distances; and estimating the time required, heading, and fuel requirements.

*Standard.* The flight plan will be correctly computed and course plotted on an aeronautical chart. The applicant must show familiarity

with weather report facilities, with elementary navigation procedures, and with the cruising speed and fuel consumption of the airplane to be used.

*Preparative guide.* The applicant should be able to evaluate the weather data obtained and determine whether the proposed flight can be completed safely; he should be able to plot and measure his course; and be able to make accurate estimates of the time and fuel required, based on the available information.

(2) CROSS-COUNTRY FLYING

*Procedure.* The applicant will be required to start the cross-country flight he has planned and to follow his planned course until he has established the compass heading necessary to stay on the track. He will identify at least three planned check points and compute his actual ground speed.

At an unannounced point on his course, the examiner will ask him to proceed to an alternate airport. (The examiner may ask the applicant to select a suitable alternate.) If practicable, the applicant will approach and land at an unfamiliar airport.

*Standard.* On his planned course, the applicant is to establish within 10 minutes his compass heading to hold within 10°, maintain a track within one mile of his plotted course, and fly within 200 feet of the selected cruising altitude. His ETA for the planned destination should be accurate within 10 minutes on the basis of his observed time over check points.

On his flight toward an alternate, the applicant is to select a suitable alternate airport and establish a heading toward it, within 10 minutes, with a heading accuracy within 15°.

His approach to an unfamiliar airport is to be made in accordance with either the known traffic pattern, a standard left pattern, by reference to traffic directional markers, or control tower instructions when available.

*Preparative guide.* The applicant should have a familiarity with the elements of flying a compass course, and with the use of pilotage. He should be sufficiently at ease over strange terrain to observe landmarks and keep a watch for other aircraft. The use of a written flight log is recommended to note the time over check points and to compute ground speeds. The correlating of the aeronautical chart with the terrain traversed and the noting of compass headings only when in straight and stabilized flight are important considerations.

When requested to plot a course to a suitable alternate, the applicant should be able to use his chart and plotter with reasonable accuracy while maintaining straight and level flight. If he is required to select his own alternate, he should make his selection on the basis of all known factors, such as weather, size and facilities of the airport, distance, and terrain which must be traversed to reach it.

The approach to and landing on an unfamiliar airport should demonstrate observance of all considerations and safety practices which apply to flight where local procedures and traffic may not be known.

## Private Pilot Flight Test—Gliders

The agent or examiner will accompany the applicant in a glider or an airplane during his demonstration of stalls and slow flight. Other items on the flight test may be observed from the ground, or from within a glider.

The flight test maneuver tolerances set forth below for determination of the competency of an applicant are those that are expected in smooth air and which can be attained on a repeated basis. Allowance will be made by the agent or examiner for gusty air or for other extenuating circumstances encountered during the actual flight test demonstration.

The private glider pilot flight test will be divided into two phases. The failure of any maneuver or procedure constitutes the failure of the phase of which it is a part, and of the flight test. Upon reexamination, the applicant must repeat the phase failed.

PHASE I—BASIC TECHNIQUES

Preflight check and oral equipment examination.
Auto, auto pulley, or winch tow; or airplane tow.
360° approaches, right and left.
Accuracy landings.

PHASE II—SPECIAL AND CRITICAL MANEUVERS

Stalls and slow flight (may be demonstrated in an airplane).

The following paragraphs set forth procedures for performing the tests, the standards

and tolerances of error allowed for a passing performance, and guide factors to aid the applicant in preparing for the flight test.

Phase I—Basic Techniques

(1) PREFLIGHT CHECK AND ORAL EQUIPMENT EXAMINATION

*Procedure.* The applicant will be required to perform a preflight check of the glider to be used, with special attention to the control system and the tow cable release. He will be expected to identify and present, if requested, the airworthiness and registration certificates and operation limitations placards.

*Standard.* The applicant must not overlook any apparent unairworthy condition.

*Preparative guide.* The preflight check should include a thorough check of the exterior and interior of the glider, noting all critical items. The operation of the controls and of the tow cable release should be checked by manual operation.

(2) AUTO, AUTO PULLEY, OR WINCH TOW; OR AIRPLANE TOW

*Procedure.* The applicant will be required to demonstrate his ability to make correct takeoffs when launched by auto, auto pulley, or winch tow; or by airplane tow.

*Standard.* The applicant will be expected to make a controlled takeoff, select an efficient angle of climb, and to release the tow line when the optimum altitude has been reached (in auto or winch tows). If an airplane tow is demonstrated, the applicant will be expected to stay clear of the airplane's slip stream, avoid any unnecessary maneuvering which would slow the airplane's takeoff, and at no time allow the tow line to slacken during flight.

*Preparative guide.* Takeoffs should be smooth, controlled, and give evidence of a knowledge of the flight characteristics of the glider used. The applicant should be familiar with and use appropriate hand signals.

(3) 360° APPROACHES, RIGHT AND LEFT

*Procedure.* 360° approaches, right and left, are to be demonstrated from a prescribed glider flight pattern around the landing area, or from a position directly over the landing spot.

*Standard.* The applicant should be able to follow the prescribed pattern at an airspeed within 10 m. p. h. of the stall speed (without spoilers). Spoilers and slips may be used in the normal manner on final approach only.

*Preparative guide.* The applicant should plan his approach so that the excessive use of slips or spoilers is unnecessary, should compensate for wind drift in the pattern, and should use no rough and abrupt control movements.

(4) ACCURACY LANDINGS

*Procedure.* Accuracy landings will be made in which normal landings are made within 200 feet beyond a designated line. Spoilers or slips may be used.

*Standard.* On accuracy landings the glider must touch down in a normal landing attitude. Spoilers or slips may be used. The applicant must comply with the prescribed glider flight pattern.

*Preparative guide.* The normal glider traffic pattern should be observed all through the performance of accuracy landings. Abnormal variations in speed, excessively steep turns, and violent slips should be avoided.

Phase II —Special and Critical Maneuvers

(1) STALLS AND SLOW FLIGHT

*Procedure.* Stalls and slow flight may be demonstrated in a glider or an airplane. Stalls will be demonstrated from both straight and turning flight attitudes. At least one stall should be an accelerated (high speed) stall, entered from a 30°–45° banked turn.

*Standard.* Recovery is to be completed within 100 feet and without exceeding approach operating speeds and load factors. Recovery will not be completed until straight gliding flight has been obtained.

*Preparative guide.* The applicant should recognize stalls promptly and take immediate coordinated corrective action. He should have an appreciation of the difference in glider control response and structural loads experienced at critically slow speeds in comparison to high speeds.

## Private Pilot Flight Test—Rotocraft

A private pilot practical examination on helicopters will be given by an Aviation Safety

Agent or by a designated private or commercial pilot examiner. The examination will be given in two phases. The failure of any maneuver or procedure in either phase will constitute the failure of that phase and of the practical examination. In the event of such failure, the phase failed will be repeated on reexamination.

The flight test maneuver standards set forth below for determination of the competency of an applicant are those that are expected in smooth air and which can be attained on a repeated basis. Allowance will be made by the agent or examiner for gusty air or for other extenuating circumstances encountered during the actual flight test demonstration.

PHASE I, BASIC TECHNIQUES

(1) Preflight inspection.
(2) Engine and rotor starting and stopping, and cockpit procedures.
(3) Taxiing.
(4) Normal takeoffs and landings.
(5) High altitude takeoffs and roll-on landings.
(6) Crosswind takeoffs and landings.
(7) Climbs and descents.
(8) Emergencies.

PHASE II, PRECISION MANEUVERS

(1) Hovering; upwind, downwind, and crosswind.
(2) Hovering turns.
(3) Pattern flying.
(4) Turns with medium banks.
(5) S-turns.

The following paragraphs set forth procedures for performing the required tests, the standards and tolerances of error allowed for a passing performance, and guide factors to aid the applicant in preparing for the flight test.

**Phase I—Basic Techniques**

### (1) PREFLIGHT INSPECTION.

*Procedure.* The applicant will be required to conduct a preflight check of the aircraft in accordance with the recommendation of the Aircraft Flight Manual, or the manufacturer's maintenance manual.

*Standard.* The applicant will be expected not to overlook any apparent unairworthy item or condition, and to display an accurate knowledge of the recommended preflight inspection procedure.

### (2) ENGINE AND ROTOR STARTING AND STOPPING, AND COCKPIT PROCEDURE.

*Procedure.* The applicant will be required to start the engine, engage the rotor, and bring it up to operating speed. Rotor stopping and engine shutoff will also be accomplished.

*Standard.* The applicant will be required to demonstrate his ability to carry out the procedures correctly and completely, and to exercise safety precautions.

### (3) TAXIING

*Procedure.* The applicant will be required to taxi over assigned courses if the rotocraft used is equipped with wheels for that purpose.

*Standard.* The applicant will be expected to maintain control, avoid obstructions, and comply with local taxi rules and control tower instructions.

*Preparative guide.* The applicant should use safe efficient taxi speeds, care in watching for obstructions and other traffic, and make efficient use of the flight and engine controls.

### (4) NORMAL TAKEOFFS AND LANDINGS

*Procedure.* For a normal takeoff demonstration, the rotocraft is to be lifted off, and forward speed increased to the recommended autorotational speed before any significant amount of altitude is gained. For demonstration of normal, hover-type landings, the rotorcraft is to be allowed to settle to the ground without excessive forward or lateral movement from a hovering position just clear of the ground.

*Standard.* The applicant will be required to make normal landings consistently within 20 feet of a mark, from a correctly flared approach following a 180° and a 360° change in direction, and to maintain correct approach speeds.

### (5) HIGH ALTITUDE TAKEOFFS AND ROLL-ON LANDINGS

*Procedure.* The procedure used will simulate that necessary for making rolling takeoffs in high altitude (low air density) conditions. Under normal circumstances, these conditions will be simulated by allowing the applicant to use insufficient power to lift the aircraft until translational lift is obtained.

The applicant will also be expected to demonstrate roll-on landings, such as those which are necessary under conditions of low air density or reduced power output. These landings will be accomplished from shallow descents, with at least minimum autorotational speed, and descent slowed for touch down at 5 to 10 m. p. h., with a roll to a stop.

When an applicant furnishes a rotorcraft with skids or floats, these maneuvers may be deleted at the discretion of the examiner.

*Standard.* The applicant will be expected to hold a constant airspeed within 10 m. p. h., but in no case less than the minimum autorotative speed, and a heading within 10°; to flare in advance so as not to endanger the tail rotor; and to correct for drift on approach.

### (6) CROSSWIND TAKEOFFS AND LANDINGS

*Procedure.* Crosswind takeoffs and landings from a hovering position are to be demonstrated with the wind from both right and left.

*NOTE: This maneuver may be critical in some rotorcraft, so the Aircraft Flight Manual should be consulted in case of doubt about the amount of crosswind which can be safely controlled.*

*Standard.* On takeoff, the applicant will be expected to hold his heading within 10° and his lateral movement within 10 feet. On landings, touchdown is to be made without drift.

*Preparative guide.* Liftoffs and touchdowns should be smooth, and should impose no abnormal or excessive loads on the landing gear.

### (7) CLIMBS AND DESCENTS

*Procedure.* Climbs and descents of uniform rates with constant airspeeds are to be demonstrated both in straight flight and turns.

*Standard.* Power must be coordinated with the application of collective pitch so as to prevent noticeable variations in r. p. m., and the airspeeds in stabilized climbs or descents should be maintained within 10 m. p. h. The airspeed must in no case be allowed to become less than the minimum autorotative speed.

*Preparative guide.* Coordination of power with pitch should be smoothly applied. Transition to and from climbs and descents should be flared smoothly into level flight.

### (8) EMERGENCIES

#### Power Plant Failures and Autorotative Approaches

*Procedure.* The examiner will throttle the engine at a speed near cruising and at the minimum autorotational speed. Autorotational approaches will be completed by the applicant, with the engine throttled, to predesignated areas through straight, 180°, and 360° patterns.

*Standard.* Recovery from autorotational approaches are to be initiated at sufficient altitude to insure that the tail boom does not strike the ground. A safe normal landing must be possible within the predesignated area.

#### Loss of Lift at Altitude

*Procedure.* The applicant will *either* demonstrate at a safe altitude *or* verbally describe, the procedures relating to the flight condition in which excessive vertical descent is encountered due to the rotor operating in the rotor vortices. If a demonstration is made, the rapid vertical descent condition is to be established at sufficient altitude to allow a minimum of 500 feet for recovery to level flight.

*Standard.* The applicant will be expected *either* to demonstrate his ability to cope with and overcome such a flight condition *or* to display a knowledge of the correct procedures to follow under such circumstances.

*Preparative guide.* For power plant failures, immediate action should be taken to enter autorotation, obtain and maintain recommended autorotational speed within 10 m. p. h., and execute a planned approach to the selected area.

In effecting a recovery from rapid descent due to rotor vortex effects, preference should be given to obtaining forward speed, rather than by the application of additional power. The latter sometimes aggravates the condition. A constant heading should be held throughout the maneuver.

## Phase II—Precision Maneuvers

### (1) HOVERING; UPWIND, DOWNWIND, CROSSWIND

*Procedure.* The applicant will be required to demonstrate hovering at an altitude of his own selection on headings specified by the

examiner. The headings specified will include upwind, crosswind, and downwind.

The hovering altitude is to be selected by the applicant after his first takeoff and landing. Different altitudes may be selected for different maneuvers, but all hovering altitudes should be within the ground effect. Care should be taken to see that the limits of cyclic pitch control are not approached on crosswind and downwind headings, and that the rearward airspeed limit is not exceeded.

*Standard.* The applicant must maintain hovering altitude within 5 feet, and his position within a 20-foot circle, and maintain a steady rotor speed.

(2) HOVERING TURNS

*Procedure.* At the discretion of the examiner, the applicant will be required to make 180° and 360° turns while hovering.

*Standard.* The applicant must maintain his position within a 20-foot circle, and his altitude within 5 feet.

(3) PATTERN FLYING

*Procedure.* Pattern flying will be accomplished at hovering altitude about a square or rectangle with sides approximately 25 yards in length. The heading is to be held constant, preferably directly into the wind.

*Standard.* The applicant must demonstrate his ability to follow the prescribed pattern within 20 feet, maintain a constant altitude within 5 feet, and a heading within 10°.

(4) TURNS WITH MEDIUM BANKS

*Procedure.* Turns are to be executed in cruising forward flight at an altitude in excess of 500 feet above the ground. The resulting bank is to be between 30° and 45°, and turns are to be made both to the right and left.

*Standard.* The applicant is to perform turns without yaw, recover on and hold predetermined headings, and hold a constant altitude and rotor r. p. m.

(5) S-TURNS

*Procedure.* The applicant will be expected, at an altitude, of 500 feet, to fly S-turns back and forth across any straight ground reference line, which is, as nearly as possible, 90° to the wind.

*Standard.* The applicant must hold altitude within 50 feet, airspeed within 10 m. p. h., correct for drift, maintain a constant rotor r. p. m., and make a symmetrical ground track pattern.

## Commercial Pilot Flight Tests

### General

**Overall Test Requirements.** The commercial pilot flight test may be taken before or after the written examination.

The flight test tolerances and standards set forth herein are those that are expected in smooth air, and which should be attained on a repeated basis. Allowance will be made by the examiner for gusty air and other extenuating circumstances encountered during the actual flight test.

**Modification or elimination of required maneuvers.** Required maneuvers will be modified or eliminated only if their performance is prohibited by the Aircraft Flight Manual or operating limitations. When this is the case, the commercial pilot certificate issued will be limited to that type of aircraft.

**Special medical flight tests.** Special medical flight tests authorized by the CAA Medical Division for applicants who do not meet the second-class medical requirements of CAR 29 will include all of the commercial pilot required maneuvers, and, in addition, special maneuvers prescribed by the Medical Division to determine that the applicant can fly safely, notwithstanding his physical deficiency.

Certificates issued on the basis of such tests will bear appropriate operating limitations, or a notation showing that such a test has been satisfactorily accomplished.

**Commercial pilot flight test—airplanes.** The Commercial pilot flight test on airplanes will be given in two phases. The failure of any maneuver or procedure will constitute the failure of the phase of which the maneuver is a part, and of the flight test. In the event of

such failure, the applicant for reexamination will be required to repeat the phase or phases failed.

The phases of the commercial pilot flight test in airplanes are: Phase I—Basic Techniques, and Phase II—Precision Maneuvers.

The maneuvers and procedures under each phase are as follows:

PHASE I—BASIC TECHNIQUES

(1) Preflight check and oral equipment examination.
(2) Starting, taxiing, and runup.
(3) Normal takeoffs and accuracy landings.
(4) Crosswind takeoffs and landings.
(5) Airport traffic pattern.
(6) Climbs and glides.
(7) Slips.
(8) Emergencies.

PHASE II—PRECISION MANEUVERS

(1) Spirals.
(2) Pylon eights.
(3) 720° power turns.
(4) Flight at minimum controllable speed.
(5) Stalls.

The following paragraphs set forth the procedures for performing the required tests, the standards and tolerances of error allowed for a passing performance, and guide factors to aid the applicant in preparing for the flight test.

Phase I—Basic Techniques

(1) PREFLIGHT CHECK AND ORAL EQUIPMENT EXAMINATION.

*Procedure.* The applicant will be required to conduct a preflight check of the airplane to determine that it is in airworthy condition, properly serviced, and ready for the flight proposed.

The preflight check will be accompanied or preceded by an oral examination on the equipment used, in order to demonstrate a knowledge of the airplane, engine, and equipment to be used, and their operation.

*Standard.* The applicant will be expected to recognize any apparent unairworthy item, make a complete check, and display a precise knowledge of the airplane and equipment to be used.

*Preparative guide.* All procedures and information should be based on the practical operation of the airplane, on the contents of the Airplane Flight Manual, or the manufacturer's recommended procedures.

(2) STARTING, TAXIING, AND RUNUP

*Procedure.* The applicant will be required to demonstrate starting procedures and techniques, taxiing techniques appropriate to the airplane, the runup of the engine(s) to check power output and smooth operation. A radio check, when applicable, and a flight control check for freedom of movement are to be included.

If a seaplane test is being taken, the demonstration will include sailing, taxiing slowly and on the step, and turns to downwind headings.

Procedures for starting the engine when no competent assistance is available will be required of applicants in single-engine airplanes.

*Standard.* Starting and runup procedures are to be conducted in accordance with the Airplane Flight Manual or the engine manufacturer's recommendations. Taxiing is to be accomplished with the correct use of power, flight controls, brakes, tail wheel lock, and in accordance with established taxi patterns or control tower instructions.

*Preparative guide.* Use a checklist whenever available.

(3) NORMAL TAKEOFFS AND ACCURACY LANDINGS.

*Procedure.* A series of three takeoffs will be required, in which the applicant attains the recommended best rate of climb speed before starting climb, and corrects for drift during takeoff and initial climb.

Three accuracy landings will be required which involve a 180° change in direction of approach. Power may be used only momentarily for clearing the engine. At least one of these accuracy landings is to be made in which a forward slip is used.

*Standard.* On the accuracy landings, touchdown must be made in a normal landing attitude within 200 feet beyond a point or line designated by the examiner. Violent slips or airspeeds below minimum controllable speeds will not be acceptable.

(4) CROSSWIND TAKEOFFS AND LANDINGS.

*Procedure.* At least one takeoff and landing with or without the use of flaps will be required. Any crosswind component which necessitates

the use of a definite technique to overcome drift is acceptable for this demonstration.

*NOTE: If the demonstrations of normal takeoffs and landings involve an appreciable crosswind component requiring drift correction, this demonstration will not be required.*

*Standard.* The applicant must maintain a straight departure and landing path over the airport, land without side load on the gear, and use the flaps in accordance with the Airplane Flight Manual. (Any accepted technique may be used for overcoming drift.)

### (5) AIRPORT TRAFFIC PATTERN

*Procedure.* During his performance of takeoffs and landings and during operations in the airport vicinity, the applicant will be expected to conform to the established traffic pattern for the airport used on the flight test.

*Standard.* The prescribed altitude shall be maintained within 100 feet, recovery from turns must be made on the correct flight path headings, and correction for drift must be made on the crosswind legs of the pattern.

*Preparative guide.* The applicant should display preplanning, accurate selection of headings and altitudes, and observance of safe operating distances from other traffic.

### (6) CLIMBS AND GLIDES

*Procedure.* During the flight test, the applicant will be expected to demonstrate normal uniform climbs and glides, in straight flight and in turns in both directions.

*Standard.* Climbs are to be made at the recommended best rate of climb and airspeed with the recommended climb power setting, and glides made at the normal gliding speed for the airplane used. Airspeeds should be maintained within 5 m. p. h. and the bank of a steady turn within 5°.

### (7) SLIPS

*Procedure.* The applicant will be expected to demonstrate slips in both directions while following a straight or curved flight track.

*NOTE: This demonstration is in addition to that required for accuracy landings.*

*Standard.* Entry to and recovery from slips are to be executed without abrupt control or airplane movements. The airspeed must be maintained constant within 5 m. p. h. and the track made good to effect a landing at a predesignated location.

*Preparative guide.* The applicant should be capable of making a smooth transition from and to slips, maintain a stabilized slip condition to the right or left, follow a desired ground track to a landing with the low wing in the slip always on the inside of a turn or upwind for a crosswind landing.

### (8) EMERGENCIES

*Procedure.* Forced landing procedures will be required in single-engine airplanes. The examiner will close the throttle at unannounced times during the flight, and request the applicant to proceed as he would in the event of a genuine engine failure. Handling the throttle and the carburetor heat throughout the simulated forced landing will be the responsibility of the examiner. No simulated forced landing will be continued below 200 feet above the ground unless an immediate landing is practicable.

Engine-out procedure will be required on flight tests in multiengine airplanes. An engine may be throttled or cut off, depending on conditions. Propeller feathering will be demonstrated on airplanes equipped with propellers which can be feathered and unfeathered in flight without damage to the engine. The examiner will not require the feathering of a propeller on takeoff or in any other critical situation in which the failure of another engine would endanger safety.

Other emergencies, such as encountering severe storms, the failure of the landing gear extension mechanism, etc., may be presented orally, and the applicant required to demonstrate or explain a suitable course of action.

*Standard.* On simulated forced landings the applicant must decide on a course of action, establish a normal glide, avoid violent maneuvering, and pursue the course of action without change unless a modification is considered to offer a better probability of effecting the least injury or damage.

In executing engine-out procedures, with an engine throttled, or set to zero thrust to simulate a feathered propeller, the applicant will

be expected to execute straight flight and 10° to 20° banked turns in either direction while maintaining the recommended engine-out airspeed within 5 m. p. h., the altitude within 100 feet, and the straight flight heading within 5°.

The applicant is expected to present correct solutions to other emergency problems, and to demonstrate a knowledge of the correct emergency operation of airplane accessories.

*Preparative guide.* The applicant should be conversant with recommended procedures and principles to follow in all types of critical situations such as: engine failure, severe turbulence, unexpectedly strong headwinds, mountainous terrain effects on vertical air currents, being lost, instrument or equipment failures, etc.

Phase II—Precision Maneurers

(1) SPIRALS

*Procedure.* The applicant will demonstrate a gliding spiral of three full turns in either direction with a bank of at least 60°. No spiral is to be practiced or demonstrated above or in the traffic pattern of an airport except by prearrangement with the airport authorities or the control tower.

*Standard.* The applicant must be able to maintain a constant airspeed within 10 m. p. h., a bank within 5°, and to recover on a heading within 10° of that on which the spiral was started.

(2) PYLON EIGHTS

*Procedure.* Shallow and steep pylon eights will be required. These will be demonstrated over unpopulated areas where no hazard or annoyance to persons or livestock might result.

*Standard.* The turn and bank around each pylon are to be so planned and executed that the pylon remains within one wing chord length of the reference point (near the wing tip) which is used by the pilot. This reference point should be established on a line from the pilot's eye that is parallel to the lateral axis of the airplane.

*Preparative guide.* CAA Technical Manual 100, Flight Instruction Manual has some useful guide material.

(3) 720° POWER TURNS

*Procedure.* The applicant will be required to make 720° power turns in each direction at a bank of at least 60°.

*Standard.* During 720° power turns, the bank must be held between 55° and 65°, the altitude within 100 feet of the starting altitude, and recovery accomplished on a heading within 15° of that on which entry was made. No slips or skids will be allowed.

(4) FLIGHT AT MINIMUM CONTROLLABLE AIRSPEED

*Procedure.* Flight at a minimum controllable speed is to be demonstrated in the below specified flight maneuvers at an airspeed from which a reduction of 5 m. p. h. or less would result in immediate indications of a stall. The demonstration will include: (a) a 10°–30° banked climb with normal climb power and gear/flaps up if retractable; and (b) a 10°–30° banked glide with normal low gliding power and gear/flaps down—if retractable type.

At least once during his demonstration of slow flight the applicant will be required to close the throttle and allow the airplane to stall. Indication of a stall should appear immediately if the proper slow flight speed has been maintained.

*Standard.* The applicant will be required to demonstrate his ability to maintain control of the airplane in sustained flight at an airspeed within 5 m. p. h. of the stalling speed without allowing any unintentional stalls to occur.

*Preparative guide.* The applicant should be capable of smooth and positive control usage at extremely slow flight speeds to avoid unintentional stalls and possess the ability to recognize critically slow airspeeds.

(5) STALLS

*Procedure.* Stalls and stall recoveries will be demonstrated from three flight conditions which simulate normal situations from which stalls have been found to be most critical. These three occur during a takeoff and departure, an approach to a landing, and when engaging in accelerated maneuvering at reduced speeds.

*Takeoff and departure stalls* will be simulated with the airplane in a 10° to 30° banked

climbing turn with retractable gear up and flaps in takeoff position, and with full climb power. The climbing attitude will be progressively increased as the turn continues until the angle of attack producing a stall is attained.

*Approach to landing stalls* will be simulated from a 10° to 30° banked gliding turn with and without flaps and retractable gear extended and with fast idling power. The gliding attitude will be progressively flattened while the turn continues until the angle of attack necessary to produce a stall is attained.

*Accelerated maneuver stalls* will be performed from 10° to 30° gliding turns with fast idling power by rapidly increasing the pressure on the elevators at speeds 10 to 15 m. p. h. above the normal unaccelerated stalling speed, and will be performed from 45° to 60° banked turns in level flight with sufficient power to maintain altitude.

*NOTE: Accelerated stalls will not be performed at airspeeds more than 15 m. p. h. above the unaccelerated stalling speed because of the extremely high structural loads that are imposed on the wings and tail surfaces, particularly in gusty air.*

Recovery from each stall is to be completed to straight flight with wings leveled and with the least loss of altitude consistent with immediately regaining full flight control.

*Standard.*

Stall recognition:

Promptly detect and identify, without aid of stall warning device.

Recovery:

To full level flight with wings level, both upon stall detection and after a short delay (1–3 seconds).

Altitude loss:

Not to exceed 100 feet using power for recovery.

Airspeed:

Not to exceed cruising speed at any time.

*Preparative guide.* Stall recoveries should be prompt, positive, and unhurried. The applicant should have an appreciation of the aerodynamic fact that the angle of attack of the airflow with the wing, and not the airspeed, is the primary factor in producing a stall condition (as illustrated by the accelerated stall). Thus, the correct use of the elevator is of primary importance. The application of throttle in stall recoveries should be smooth and positive, but not held so long as to result in excessive airspeed and rpm. The recovery should be executed with a constant increase in airspeed from the stall to cruising or gliding flight. In stalls from turns, emphasis should be placed on obtaining straight flight immediately upon the recognition of the stall by getting flight control through a reduction of angle of attack and the leveling of wings in a smooth and coordinated maneuver.

**Commercial Pilot Flight Test—Rotorcraft**

The commercial pilot flight test on rotorcraft will be given in two phases. The failure of any maneuver or procedure will constitute the failure of the phase of which the maneuver is a part, and of the flight test. In the event of such failure, the applicant for reexamination will be required to repeat the phase or phases failed.

The flight test maneuver tolerances set forth below for determination of the competency of an applicant are those that are expected in smooth air and which can be attained on a repeated basis. Allowance will be made by the agent or examiner for gusty air or for other extenuating circumstances encountered during the actual flight test demonstration.

The phases of the commercial pilot test in rotorcraft are: Phase I—Basic Techniques, and Phase II—Precision Maneuvers. The maneuvers and procedures under each phase are as follows:

PHASE I—BASIC TECHNIQUES

(1) Preflight inspection and oral equipment examination.
(2) Engine and rotor starting and stopping; cockpit procedures.
(3) Taxiing.
(4) Normal takeoffs and landings.
(5) Crosswind takeoffs and landings.
(6) High altitude takeoffs and roll-on landings.
(7) Climbs and descents.
(8) Airport traffic pattern.
(9) Emergencies.

PHASE II—PRECISION MANEUVERS

(1) Hovering—upwind, crosswind, and downwind.
(2) Hovering turns.
(3) Pattern flying with constant heading.
(4) S turns.

(5) Turns with medium banks.
(6) Rapid decelerations (quick stops).

The following paragraphs set forth procedures for performing the required tests, the standards and tolerances of error allowed for a passing performance, and guide factors to aid the applicant in preparing for the flight test.

Phase I—Basic Techniques

(1) PREFLIGHT INSPECTION AND ORAL EQUIPMENT EXAMINATION

*Procedure.* The applicant will be required to conduct a preflight inspection of the aircraft used in accordance with the Aircraft Flight Manual or the manufacturer's maintenance manual. This preflight check will cover the items necessary to determine that the aircraft is in a generally satisfactory state of airworthiness, and is properly certificated and serviced for the flight proposed.

As a part of the preflight check, the applicant will be given a brief oral examination to determine his knowledge of the rotorcraft, engine, accessories, operating limitations, and any special equipment installed.

*Standard.* The applicant will be expected not to overlook any apparent unairworthy item, or condition, and to display an accurate knowledge of the recommended preflight inspection procedure. He will be expected to identify, and present if requested, all required certificates, documents, and placards which pertain to the aircraft.

On his oral examination he will be expected to display a precise knowledge of the operational procedures and limitations of the rotorcraft used.

(2) ENGINE AND ROTOR STARTING AND STOPPING; AND COCKPIT PROCEDURES

*Procedure.* The applicant will be expected to start the engine, engage the rotor, bring the rotor up to operating speed, and stop the rotor and the engine. He will be expected to display a knowledge of the cockpit procedures and to take all applicable safety precautions.

*Standard.* The applicant must not use any procedure which might create a hazard to persons or be detrimental to the airworthiness of the aircraft or engine. He will be required to carry out the procedures correctly and completely.

(3) TAXIING

*Procedure.* The applicant will demonstrate correct taxiing procedures in rotorcraft equipped with wheels for that purpose.

*Standard.* The applicant will be expected to maintain control, avoid obstructions, and comply with local taxi rules and control tower instructions.

*Preparative guide.* The applicant should use safe taxi speeds, follow the desired taxi path, observe other traffic and obstructions, and make efficient use of flight and engine controls.

(4) NORMAL TAKEOFFS AND LANDINGS

*Procedure.* For a normal takeoff demonstration, the rotorcraft is to be lifted off, and accelerated to a safe autorotational speed before a significant amount of altitude is gained. For demonstration of normal, hover-type landings, the rotorcraft is to be allowed to settle to the ground without forward motion or lateral movement from a hovering position just clear of the ground.

*Standard.* The applicant will be required to make normal landings consistently within 10 feet of a mark, from a correctly flared approach following a 180° and a 360° change in direction, and to maintain correct approach speeds.

*Preparative guide.* The applicant should be able to control power correctly, to maintain correct rotor speeds, and to flare his approaches to landings without endangering the tail rotor. Takeoffs and landings should be smooth, and executed without side loads on the landing gear.

(5) CROSSWIND TAKEOFFS AND LANDINGS

*Procedure.* Crosswind takeoffs and landings are to be demonstrated with a crosswind component allowable for the rotorcraft used and in accordance with its Helicopter Flight Manual.

*Standard.* Lift offs must be precise, on a constant heading, and with minimum possible

sideward movement. Crosswind landings are to be made from a hovering position without drift.

### (6) HIGH ALTITUDE TAKEOFFS AND ROLL-ON LANDINGS

*Procedure.* The procedure used will simulate that necessary to make a running takeoff as used in high altitude (low air density) conditions. Under normal circumstances, these conditions will be simulated by allowing the applicant to use insufficient power to lift the aircraft until translational lift is obtained.

The applicant will also be expected to demonstrate roll-on landings, such as those which are necessary under conditions of low air density or reduced power output. These landings will be accomplished from shallow descents with at least minimum autorotational speed, and descent slowed for touch down at a low ground speed and a roll to a stop.

When the applicant furnishes a rotorcraft with skids or floats these maneuvers may be deleted at the discretion of the examiner.

*Standard.* The applicant must be able to hold a constant airspeed within 10 m. p. h., but in no case less than the minimum autorotative speed, a heading within 5°, and to flare correctly without drifting or without endangering the tail rotor.

### (7) CLIMBS AND DESCENTS

*Procedure.* Climbs and descents of uniform rates with constant airspeeds are to be demonstrated both in straight flight and in turns.

*Standard.* Power must be coordinated with the application of collective pitch so as to prevent noticeable variations in RPM, and the airspeeds in stabilized climbs or descents should be maintained within 10 m. p. h. The airspeed must in no case be allowed to become less than the minimum autorotative speed. The climbs and descents must be maintained within 50 feet per minute of the uniform rate.

*Preparative guide.* Coordination of power with pitch should be smoothly applied. Transition to and from climbs and descents should be flared smoothly into level flight.

### (8) AIRPORT TRAFFIC PATTERN

*Procedure.* During takeoff and landing demonstrations, as well as on other maneuvers on the flight test, the applicant is to conform to the established traffic pattern for the landing area used for the test.

*Standard.* The applicant should be able to maintain the prescribed traffic pattern altitude within 50 feet, to recover from turns on the designated headings, and to correct for drift on the crosswind legs of the pattern.

### (9) EMERGENCIES

#### Power Plant Failures and Autorotative Approaches

*Procedure.* The examiner will throttle the engine at a speed near cruising and at the minimum autorotational speed. Autorotational approaches will be completed by the applicant, with the engine throttled, to pre-designated areas through straight, 180°, and 360° patterns.

*Standard.* Recovery from autorotational approaches are to be initiated at sufficient altitude to insure that the tail boom does not strike the ground. A safe normal landing must be possible within the predesignated area.

#### Loss of Lift at Altitude

*Procedure.* The applicant will *either*, demonstrate at a safe altitude, *or* verbally describe the procedures relating to the flight condition in which excessive vertical descent is encountered due to the rotor operating in the rotor vortices. If a demonstration is made, the rapid vertical descent condition is to be established at sufficient altitude to allow a minimum of 500 feet for recovery to level flight.

*Standard.* The applicant will be expected *either* to demonstrate his ability to cope with and overcome such a flight condition, *or* to display a knowledge of the correct procedures to follow under such circumstances.

*Preparative guide.* For power plant failures, immediate action should be taken to enter autorotation, obtain and maintain recommended autorotational speed within 10 m. p. h., and execute a planned approach to the selected area.

In effecting a recovery from a rapid descent due to rotor vortex effect, preference should be given to obtaining forward speed, rather than by the application of additional power. The latter sometimes aggravates the condition. A constant heading should be held throughout the maneuver.

Phase II—Precision Maneuvers

(1) HOVERING—UPWIND, CROSSWIND, AND DOWNWARD

*Procedure.* The applicant will be required to demonstrate hovering at an altitude of his own selection on headings specified by the examiner. The headings specified will include upwind, crosswind, and downwind.

The hovering altitude should be selected by the applicant after his first takeoff and landing. Different altitudes may be selected for different maneuvers, but all hovering altitudes should be within the ground effect. Care should be taken to see that the limits of cyclic pitch control are not approached on crosswind and downwind headings, and that the rearward airspeed limit is not exceeded.

*Standard.* The applicant must maintain hovering altitude within 5 feet, his position within a 10-foot circle, and a constant rotor speed.

(2) HOVERING TURNS

*Procedure.* The applicant will be required to make 180° and 360° turns in both directions while hovering.

*Standard.* The applicant must hold his position within a 10-foot circle, his altitude within 5 feet, maintain a constant rate of heading change, and a constant rotor RPM.

(3) PATTERN FLYING

*Procedure.* Pattern flying will be accomplished at hovering altitude about a square or rectangle with sides approximately 25 yards in length. The heading used is to be that of the side most nearly alined with the wind.

*Standard.* The applicant should be able to follow the sides of the pattern within 10 feet, maintain a constant heading without yaw, and maintain the hovering altitude within 5 feet.

(4) TURNS WITH MEDIUM BANKS

*Procedure.* Turns are to be executed in cruising forward flight at an altitude in excess of 500 feet above the ground. The resulting bank should be between 30° and 45°, and turns are to be made both to the right and the left.

*Standard.* The applicant must recover within 15° of the desired heading, maintain altitude within 50 feet, and maintain a constant rotor RPM.

(5) S-TURNS

*Procedure.* The applicant will be expected, at an altitude of 500 feet, to fly S-turns back and forth across any straight reference line, which is, as nearly as possible, 90° to the wind on the ground.

*Standard.* The applicant must hold altitude within 25 feet, airspeed within 5 m. p. h., correct for drift, maintain a constant rotor RPM, and make a symmetrical ground track pattern.

(6) RAPID DECELERATIONS (QUICK STOPS)

*Procedure.* Rapid deceleration from cruising flight to hovering is to be demonstrated at an altitude chosen by the applicant. This altitude is to be sufficiently high to insure that there is no danger to the tail rotor, and must not be within the altitude limits placarded against hovering.

*Standard.* The applicant must be able to use correct power control, maintain altitude within 15 feet, and heading within 10° during the deceleration maneuver.

## Commercial Pilot Flight Test—Gliders

The commercial pilot flight test in gliders will be given in two phases. The failure of any maneuver or procedure will constitute the failure of the phase of which that maneuver is a part, and of the flight test. In the event of such failure, the applicant for reexamination must repeat the phase failed.

The examiner will accompany the applicant in the glider or airplane during his performance of stalls and slow flight. Other items on the flight test may be observed from the ground, or from within the aircraft, at the discretion of the examiner.

The phases of the commercial pilot flight test in gliders, and the required maneuvers and procedures, are as follows:

PHASE I—BASIC TECHNIQUES

(1) Preflight check and oral equipment examination.
(2) Auto, auto pulley, or winch tow.
(3) Airplane tow.
(4) 360° approaches, right and left.
(5) Accuracy landings.

PHASE II—SPECIAL AND CRITICAL MANEUVERS

(1) Spirals.
(2) Stalls and slow flight (may be demonstrated in an airplane).

The following paragraphs set forth procedures for performing the required tests, the standards and tolerances of error allowed for a passing performance, and guide factors to aid the applicant in preparing for the flight test.

Phase I—Basic Techniques

(1) PREFLIGHT CHECK AND ORAL EQUIPMENT EXAMINATION

*Procedure.* The applicant will be required to perform a preflight check of the glider used, with special attention to the control system and the tow cable release. He will be expected to identify and present, if requested, the airworthiness and registration certificates and operation limitations placards.

As a part of the preflight inspection, the applicant will be given a brief oral examination to determine that he has a practical knowledge of the operating procedures for the glider to be used.

*Standard.* The applicant must not overlook any apparent unairworthy condition, and is to display a correct knowledge of the operation of the glider to be used.

*Preparative guide.* The preflight check should include a thorough check of the exterior and interior of the glider, noting all critical items. The operation of the controls and of the tow cable release should be checked by manual operation. The applicant should be familiar with the details of such glider operating procedures as: safe climbing principles to be observed in all types of tows, holding a correct relative position in airplane tows, landing downwind safely, etc.

(2) AUTO, AUTO PULLEY, OR WINCH TOW

*Procedure.* The applicant will be required to demonstrate glider flight when launched by auto, auto pulley, or winch tow.

*Standard.* The applicant will be expected to make a controlled takeoff, select an efficient angle of climb, maintain a uniform tension on the tow cable, and to release the tow line when the optimum altitude has been reached.

(3) AIRPLANE TOW

*Procedure.* The applicant will be required to demonstrate glider flight when towed by an airplane. This will include: steady flight above, below, and to one side of the airplane's slipstream; a change of the glider's towing position to above, below, and to one side without encountering the slipstream; and a pass through the slipstream.

*Standard.* For a period of three minutes in each relative position, the applicant must maintain steady flight with a uniform tension on the tow line, must not impose excessive side or vertical loads on the tail of the tow plane, and must get and stay clear of the airplane's slipstream immediately upon getting off the ground on takeoff.

(4) 360° APPROACHES, RIGHT AND LEFT

*Procedure.* 360° approaches, right and left, are to be demonstrated from a prescribed glider flight pattern around the landing area, or from a position directly over the landing spot.

*Standard.* The applicant must conform to the approach pattern, and maintain the recommended approach speed within 10 m. p. h. Spoilers or slips may be used in a normal manner on final approach and landing only.

(5) ACCURACY LANDINGS

*Procedure.* Accuracy landings are to be demonstrated from the 360° approaches with the glider touching down in a roll-landing attitude within 100 feet beyond a designated line or point. Accuracy landings are to be made both upwind and crosswind. Spoilers and slips may be used in a normal manner on the final approach and landing.

*Standard.* The glider must touch down in a normal landing attitude within 100 feet beyond the designated line or point, and thereafter roll to a stop without bouncing or ballooning. Landings should be smooth, and final approach speeds normal to the glider used.

*Preparative guide.* The applicant should be capable of landing consistently close to a designated spot, to demonstrate good advance planning, coordination, and airspeed control.

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Phase II—Special and Critical Maneuvers

(1) SPIRALS

*Procedure.* A spiral of three full turns in each direction will be demonstrated in which the bank is at least 45°.

*Standard.* The applicant must maintain a constant bank within 5°, an airspeed within 5 m. p. h., and recover within 10° of the heading from which the spiral was started.

(2) STALLS AND SLOW FLIGHT

*Procedure.* Stalls and slow flight may be demonstrated in a glider or an airplane. Stalls and recoveries will be demonstrated from straight flight from a 30°–45° banked turn, and at least one accelerated (high speed) stall (entered from a steep turn).

Sustained slow flight is to be demonstrated in straight flight and in 30°–45° banked turns.

*Standard.* The applicant is expected to recognize stalls promptly and to take immediate corrective action. Recovery is to be made to normal gliding flight with the wings level and without exceeding approved operating speeds, load factors, or a 50 foot loss of altitude. Slow flight is to be made at an airspeed not over 5 m. p. h., above the stalling speed and is to be made for a period of at least one minute without losing control.

*Preparative guide.* The applicant should have the ability to keep a glider under complete flight control at a speed just above stalling, for sustained periods, and while maneuvering between level flight and steeply banked turns. He should have full knowledge of the interrelationship of airspeed, maneuvering loads, aerodynamic forces, and structural loads.

## Instrument Rating Flight Tests

### General

**Overall Test Requirement.** The instrument flight test will be given to an applicant who meets the experience requirements for an instrument rating, and who has passed the instrument written examination.

The flight test maneuver standards and tolerances set forth below are those which are expected in smooth air and which should be attained on a repeated basis. Allowance will be made by the examiner for gusty air or other extenuating circumstances encountered during the actual flight test.

The CAA *Flight Information Manual* and the U. S. Coast and Geodetic Survey *Radio Facility Charts* and *Instrument Approach Charts* prescribe the procedures and standards applicable to the radio navigation and instrument approach portions of the instrument flight test.

Airplanes used for instrument flight tests must be equipped with at least the minimum instrumentation and equipment prescribed by section 43.30 (c) for instrument flight, a suitable hood or other device for limiting the pilot's vision to the cockpit, and full dual controls.

### Modified Tests

The instrument flight test will be modified only when the characteristics of an airplane, or its operating limitations prevent the performance of any required maneuver. When this is the case, the instrument rating issued will be limited to that type of airplane.

### Instrument Flight Tests for Helicopter and Glider Pilots

Instrument flight tests are given in airplanes only, but the instrument rating privileges are not restricted to any aircraft category.

### Instrument Flight Test Phases and Required Maneuvers

The instrument flight test will be given in two phases: *Instrument Flying* and *Radio Navigation and Approach Procedures.* The failure of any maneuver or procedure in either phase constitutes the failure of the phase of which that maneuver is a part, and of the flight test. In the event of such failure, the applicant for reexamination will be required to repeat the phase failed.

The applicant will be required to complete Phase I with the use of the minimum aircraft equipment and instrumentation required by

section 43.30 (c) (primary panel). He may use all available equipment and instrumentation for Phase II.

The phases of the instrument flight test and the required maneuvers and procedures are as follows:

PHASE I—BASIC INSTRUMENT FLYING TECHNIQUE

(1) Straight and level flight.
(2) Turns, climbs, and descents.
(3) Stalls.
(4) Steep turns.
(5) Recovery from unusual attitudes.
(6) Engine out procedure on tests in multiengine airplanes.

PHASE II—RADIO NAVIGATION AND APPROACH PROCEDURES

(1) Estimating arrival times.
(2) Use of radio equipment.
(3) Orientation.
(4) Beam bracketing.
(5) Locating range station.
(6) Instrument letdown and approach procedure.
(7) Missed approach procedures.
(8) Airway traffic control procedures.

The following paragraphs set forth the procedures for performing the required maneuvers and procedures, the required tests, standards, and the tolerances of error allowed for a passing performance, and guide factors to aid the applicant in preparing for the flight test.

### Phase I—Basic Instrument Flying Technique

#### (1) STRAIGHT AND LEVEL FLIGHT

*Procedure.* The applicant will be required to demonstrate straight and level flight at normal cruising speed, at the recommended instrument approach speed, and at minimum safe airspeeds.

Flight at instrument approach speed is to be demonstrated with the retractable gear extended and flaps in approach position.

Flight at minimum safe speed is to be demonstrated at the lowest airspeed recommended for turbulent air for the airplane used, and with the recommended airplane gear/flap positions and engine RPM settings.

*Standard.* The applicant will be required to hold a heading within 10°, altitude within 100 feet, and airspeed within 10 m. p. h.

*Preparative guide.* The applicant should be familiar with procedures; be capable of maintaining full flight control and attitudes—in both smooth and rough air, and while making a smooth transition to and from different flight speeds. The applicant should be capable of maintaining positive control throughout the normal speed range of the airplane.

#### (2) TURNS, CLIMBS, AND DESCENTS

*Procedure.* The applicant will be required to demonstrate turns, climbs, and descents at normal flight speeds, at the recommended instrument approach speed, and at the recommended minimum safe speed.

*Standard.* The applicant must; reach an assigned altitude, from another altitude, within 10 seconds of an estimated time, maintain a standard rate of turn (3° per second or 90° for each 30 seconds of turn), without exceeding an error of ±20° for a 360° turn, and maintain the recommended climb and descent airspeed within 10 m. p. h.

*Preparative guide.* The applicant should be able to make uniform rates of climb, uniform rates of turn, and to recover from timed turns within 5° of the desired heading for each 90° of turn. Transition from climbs and descents to level flight should be smooth, and power settings appropriate to the performance desired.

#### (3) STALLS

*Procedure.* Partial stalls will be required in single and multiengine airplanes, and full stalls will be required in single-engine airplanes.

A partial stall is attained when the instruments reflect a noticeable decrease in the rate of climb or a noticeable increase in the rate of descent as the airplane approaches the maximum angle of attack. A full stall is attained when the nose pitches after the maximum angle of attack is passed.

*Standard.* The applicant must recognize and identify the partial and the full stall, take corrective action without exceeding cruising airspeed, and recover on a heading within 20° of the original heading.

*Preparative guide.* The applicant should develop a keen recognition of an impending stall, be prompt in initiating recovery, and effect a smooth and safe recovery.

(4) STEEP TURNS

*Procedure.* The applicant is to demonstrate 45°–60° bank turns in both directions through approximately 720°.

*Standard.* The applicant must maintain a uniform bank within 5°, and altitude within 100 feet.

(5) RECOVERY FROM UNUSUAL ATTITUDES

*Procedure.* The attitudes used will include approaches to stalls in turns, steep climbing and diving spirals, slips, skids, and straight climbs and dives. The applicant is to bring the airplane promptly to straight and level flight from the attitudes, unusual to normal flight, in which the examiner places it.

*Standard.* The applicant must promptly return the airplane to level flight without exceeding the airplane's approved operating limitations and load factors.

*Preparative guide.* The applicant should acquire the ability to recover promptly, safely, and smoothly from unusual flight attitudes without any great airspeed fluctuations or abrupt loads being imposed on the structure.

(6) ENGINE OUT PROCEDURES

*Procedure.* When the applicant for an instrument rating furnishes a multiengine airplane, he will be required to demonstrate flight with one engine shut off or throttled. Propeller feathering will be required on airplanes equipped with propellers which can be feathered and unfeathered in flight without damage to the engine. In other airplanes, one engine will be throttled to zero thrust to simulate a feathered propeller. In no event will an engine be feathered in such a position that the failure of another engine would endanger safety.

*Standard.* The applicant must maintain the recommended engine out airspeed within 10 m. p. h., a heading within 10°, make the correct power settings, and follow the appropriate checklist.

Phase II—Radio and Navigation and Approach Procedures

(1) ESTIMATING ARRIVAL TIMES

*Procedure.* The applicant will be required to demonstrate in the required written examination his ability to estimate correctly arrival times.

*Standard.* A passing grade on the instrument rating written examination will be accepted as evidence of the ability to estimate time of arrival.

(2) USE OF RADIO EQUIPMENT

*Procedure.* The applicant is to find the frequencies for available CAA radio aids, and to tune correctly to all radio aids he elects to use on his flight test. He will be required to demonstrate the correct selection of frequency, the use of the volume control, voice and range filter, and of dual radio equipment, if installed.

*Standard.* The applicant must demonstrate: a correctly tuned signal; and the correct use of the automatic manual volume controls, the CW selector, and the voice and range filter. He must know and use the proper frequencies for ground and air communication.

*Preparative guide.* The applicant should have an intimate knowledge of radio aids, the ability to find quickly the desired frequencies in available publications, a ready and comprehensive working familiarity with the procedures and phraseology in radio communication.

(3) ORIENTATION

*Procedure.* Orientation is to be demonstrated by the selection and execution of a method suited to the radio facility used and the conditions experienced.

The applicant may use the low frequency, VOR, or VAR range system for his orientation.

*Standard.* The applicant must decide upon and follow a planned course of action, maintain his altitude within 100 feet, and identify his position correctly. (The use of any planned action in flight, which results in the correct establishment of the aircraft's position, is acceptable.)

*Preparative guide.* The applicant should be able to select the orientation system that is most

applicable to the existing situation, carry out the system without hesitation, and make a correct report when his position is established.

(4) BEAM BRACKETING

*Procedure.* The applicant is to follow an assigned radio range leg or radial after intersecting it at an angle of 30°–60°.

*Standard.* The applicant must align the airplane with the assigned leg or radial, using bracketing heading changes of progressively lesser magnitude. He should maintain altitude during this procedure within 100 feet.

*Preparative guide.* The applicant should be capable of promptly and correctly interpreting range signals, computing successively lesser bracketing headings, and maintain altitude control in a smooth and effective manner.

(5) LOCATING RANGE STATION

*Procedure.* The applicant is to complete the procedure of beam bracketing and follow the range leg or radial to the range station, and to identify his arrival over the station.

*Standard.* Altitude must be maintained within 100 feet while approaching the station, no heading changes greater than 10° made within 1 minute before crossing the station, and the arrival over the station must be correctly identified.

*Preparative guide.* The applicant should be able to follow a leg or radial with a minimum number and magnitude of heading corrections, to identify the station accurately and promptly, and to maintain altitude. The applicant should obtain a definite indication of his presence above the station, such as a distinct cone of silence, or reversal of the to-from indicator with the course needle remaining in the center. The passing of the station should be confirmed by accepted methods.

(6) INSTRUMENT LETDOWN AND APPROACH PROCEDURE

*Procedure.* The applicant is to demonstrate a standard instrument approach for an airport of the examiner's choice, using either low frequency range signals, ADF, or the VOR and ILS system.

*Standard.* In an airplane equipped with only one receiver and with primary instruments only, the applicant must arrive within 100 feet above the minimum authorized altitude and be within sight of the airport (distance within the authorized minimum visibility of the airport used).

In an airplane equipped with additional navigational equipment, including a directional gyro, the applicant will be required to arrive within 100 feet above the minimum authorized altitude, in a position to land on a straight in approach or, to fly directly across the airport if no runway is alined with the approach heading.

When the airport used has standard approach minimums above 500 feet and 1 mile due to local conditions, the applicant will also be required to demonstrate his ability to conduct an approach to these minimums.

(7) MISSED APPROACH PROCEDURES

*Procedure.* The applicant will be required to execute correctly the missed approach procedure specified for the airport used. The applicant is to make all appropriate radio reports upon being instructed to execute his missed approach procedure.

*Standard.* Any error in altitude on the dangerous side will be disqualifying.

*Preparative guide.* The applicant should be able to effect smoothly the transition from approach procedure to the missed approach procedure, including the necessary airplane configuration and power changes, and to make correct advisory reports to the airport controller.

(8) AIRWAY TRAFFIC CONTROL

*Procedure.* The applicant is to contact airways traffic control and obtain an airway traffic clearance. He is to make all mandatory contacts and position reports, the same as would be done on an actual instrument flight.

ATC clearances may be simulated if actual clearances are impracticable, and simulated holding procedures may be required.

*Standard.* The applicant must use correct radio procedures, copy clearances correctly, and comply with ATC instructions.

*Preparative guide.* The applicant should be familiar with radio and flight planning procedures, should adhere strictly to his clearance and should make correct and complete position reports and estimates.

## Aircraft Rating Flight Tests

### Aircraft Category, Class, and Type Rating Tests—General

No mandatory set of maneuvers and procedures will be required on flight tests for applicants seeking the addition of aircraft category, class, and type ratings to a private or a commercial pilot certificate.

The maneuvers given will be selected from the list of maneuvers required for the issuance of the applicant's present grade of certificate (private or commercial). The maneuvers selected will depend on the applicant's background as a pilot, and on the other ratings he already holds. The maneuvers required will be those necessary to show proficiency in the safe and competent operation of aircraft not previously demonstrated for the ratings already held.

The standards and tolerances of performance will be those which apply to the applicant's basic pilot certificate.

To be prepared for the flight test, the applicant should be sure that he is thoroughly familiar with correct operation of the aircraft to be used, its operational limitations, flight characteristics and performance, and emergency procedures. He should also have run through all the maneuvers and items required for his basic grade of pilot certificate and be certain that he can meet the standards.

# Appendix B

## Aircraft Type Ratings

This appendix contains the type ratings which the holder of a pilot certificate may be issued upon meeting the flight test standards applicable thereto.

### Aircraft Type Ratings Issued

**I. Civil Aircraft***

| Manufacturer | Model designations | Certificate type ratings |
|---|---|---|
| Boeing | 80 or 80A1 | Boeing 80. |
| | 247A, 247D, or C73 | Boeing 247. |
| | 314 | Boeing 314. |
| | 307 or SA30781 | Boeing 307. |
| | 377 or C–97 | Boeing 377. |
| Budd | RB1 | Budd RB1. |
| Canadian Vickers | Stranraer | Canadian Vickers Stranraer. |
| Consolidated Vultee | 16, Commodore 1, Commodore 2 | Consolidated Vultee 16. |
| | 28–4, 28–5, PBY2, PBY5, OA10 | Consolidated Vultee PBY. |
| | Convair 240 or Convair 340 | Convair 240—340. |
| Curtiss | Condor | Curtiss Condor. |
| Curtiss-Wright | C46 or Commando | Curtiss-Wright C–46. |
| Douglas | DC3, DST, C47, C48, C49, C50, C51, C52, C53, C68, R4D. | Douglas DC3. |
| | Super DC3, DC3S | Douglas DC3S. |
| | DC4, C54, A, B, C, etc., R5D, 1, 2, 3, 4, etc. | Douglas DC4. |
| | DC6, DC6A, DC6B, DC7 or C118 | Douglas DC6—DC7. |
| | DC2, C32, C33, C34, C39, C42, R2D. | Douglas DC2. |
| | B18 | Douglas B18. |
| | B23 or UC67 | Douglas B23. |
| | DC5 or DC5 (G–102A) | Douglas DC5. |
| Ford | 5, 5ATB, 5ATC, or 5AT–BC | Ford 5. |
| Grumman | G73 or Mallard | Grumman G–73. |
| Lockheed | 14 | Lockheed 14. |
| | 18, C57, C59, C60, R50 | Lockheed 18. |
| | Constellation, 049, 649, 749, 1049, C–69, C121. | Lockheed Constellation. |
| Martin | 130 | Martin 130. |
| | 156 | Martin 156. |
| | 202 or 404 | Martin 202—404. |
| Sikorsky | S40 or S40A | Sikorsky S40. |
| | S41 or S41B | Sikorsky S41. |
| | S42, S42A or S42B | Sikorsky S42. |
| | S43, S43B, or S43W | Sikorsky S43. |
| | VS44 or VS44A | Sikorsky VS44. |

*Including civil counterpart of military aircraft.

**II. Military Aircraft**

Military aircraft which have been certificated but which have no civilian counterpart will be shown on the certificate by manufacturer and by basic military identification; e. g., Boeing B–17.

III. Amphibious Aircraft

For Amphibian types, such as Consolidated PBY, the certificate will bear a restriction of "Land" or "Sea" unless proficiency has been demonstrated on both land and water, for example: CONSOLIDATED PBY LAND. If proficiency is demonstrated on both land and water the type rating will read "CONSOLIDATED PBY LAND AND SEA."

IV. Other Aircraft

Applicants for type ratings on aircraft not listed above, or for those aircraft listed in Safety Regulation Release 277 as certificated in the limited category, will be required to present evidence that at least one aircraft of the type concerned has been issued a certificate by the CAA for civilian use.

PREPARED BY
CAA AVIATION INFORMATION

U. S. GOVERNMENT PRINTING OFFICE: 1934