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AC 61.117-1C

FLIGHT TEST GUIDE

COMMERCIAL PILOT
Airplane . . .

Revised 1969

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

PREFACE

This flight test guide has been prepared by the Flight Standards Service of the Federal Aviation Administration to assist the commercial pilot certificate applicant in preparing for his certification flight test.

It contains information concerning the procedures and maneuvers required by Part 61 of the Federal Aviation Regulations in the flight test required for a commercial pilot certificate. Both the applicant and his flight instructor should find the guide helpful in flight test preparation.

This revised edition supersedes the *Flight Test Guide—Commercial Pilot, Airplane . . .* AC 61.117–1B, dated 1967, and all other instructions pertinent to commercial pilot tests in airplanes.

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GENERAL INFORMATION

An applicant for a commercial pilot flight test is required by section 61.21 of the Federal Aviation Regulations to: (1) Have passed the commercial pilot written test within 24 months before the date he takes the flight test, (2) have the aeronautical experience required for a commercial pilot certificate, (3) hold a second class or better medical certificate issued within the past 12 months, and (4) have the written recommendation of an appropriately rated flight instructor. Application for the test should be made to a Federal Aviation Administration operations inspector, or to a designated pilot examiner.

The applicant is required by FAR 61.25 to provide a certificated airplane for the flight test. This airplane must be capable of, and its operating limitations must not prohibit, the flight maneuvers required in the test. The following equipment will be necessary for the completion of the procedures and maneuvers required by FAR 61.117 for the commercial pilot flight test:

1. Two-way radio suitable for voice communications with aeronautical ground stations;
2. A radio receiver suitable for the use of available radio navigation facilities (may be the same radio used for communications);
3. Functioning gyroscopic flight instruments necessary to control and maneuver the airplane under instrument flight conditions;

4. Fully functioning dual controls, except that prearrangement by the examiner is permitted to modify this requirement;
5. A suitable view-limiting device for simulating instrument flight conditions, which should be readily removable and installable in flight; and
6. The approved *Airplane Flight Manual,* if required for the airplane used. The applicant should have the operator's handbook, and an appropriate checklist.

The procedure and maneuvers described in the commercial pilot flight test guide are required by FAR 61.117. This guide is intended only to describe the maneuvers required by the regulations, and the performance of each which will be accepted by the examiner[1] as evidence of pilot competence.

The commercial pilot flight test is conducted in four phases: *Oral operational test, basic techniques, precision maneuvers,* and *cross-country flight.* The failure of any required item constitutes the failure of the phase involved, and of the flight test. A flight test may be discontinued at any time by the examiner or the applicant, but in the event of a failure of incomplete flight test, credit will be allowed on subsequent reexamination for each successfully completed phase.

The items listed under each phase outline the required procedures and maneuvers and contain three divisions: *Objective, Description,* and *Acceptable performance.*

The *Objective* states briefly the purpose of the procedure or maneuver required on the flight test. It specifies the principles which the pilot must apply, and the piloting operations which he must perform properly to

[1] The word "examiner" is used in this guide to denote either an FAA inspector or a designated pilot examiner who conducts an official flight test.

demonstrate that he has mastered the element of pilot qualification involved.

The *Description* explains the procedure or maneuver, and the means which have been found most effective in accomplishing and demonstrating its objectives. These descriptions must not be confused with the objectives. How one enters a stall, for example, is not so important as his demonstration of the ability to recognize stalls and to use the proper recovery techniques, which are the objectives of the maneuver.

The *Acceptable performance* described includes the factors which are taken into account by the examiner in deciding whether the applicant has met the objectives of the procedure or maneuver. The airspeed, altitude, and heading tolerances are not hard-and-fast, but represent the performance expected in good flying conditions with a typical personal-type airplane. The practice of consistently exceeding these tolerances before corrective action is initiated, however, is indicative of an unsatisfactory performance.

The applicant's performance will be evaluated by the examiner on the basis of the judgment, knowledge, accuracy, and smoothness displayed on the test. A competent performance of a flight maneuver is a performance in which the pilot is obviously the master of the airplane, and the successful completion of the maneuver is never seriously in doubt.

Emphasis will be placed on the maneuvers and procedures which are most critical to a safe performance as a pilot. The demonstration of prompt stall recognition and adequate recovery techniques will receive special attention from inspectors and examiners conducting flight tests.

During the whole flight test, attention will

be given to the applicant's vigilance for other air traffic, and his adequate clearance of the area before performing any flight maneuver which might result in a hazard of collision with another aircraft.

If a commercial pilot flight test is taken in a multiengine airplane, the description and acceptable performance in the FAA *Multiengine Flight Test Guide,* AC 61–4B, will be used for each required maneuver which is performed differently in multiengine airplanes, rather than those in this guide.

PHASE I. ORAL OPERATIONAL TEST

1. Airplane registration, airworthiness and equipment documents

a. Objective.—To determine that the applicant can identify and find the documents required in a certificated airplane.

b. Description.—The applicant will be requested to present or point out in the airplane the aircraft registration, airworthiness records, *Airplane Flight Manual* (if required), equipment list, and weight and balance documents required to be carried in the airplane.

c. Acceptable performance.—The applicant should be able to identify, find, and explain the purpose and significance of each required item.

2. Airplane logbooks and airworthiness inspection reports

a. Objective.—To determine that the applicant knows what airworthiness inspections are required for a certified airplane, and what evidence of these inspections is acceptable for flight operations.

b. Description.—The applicant will be required to present and explain the aircraft and engine logbooks, or other required airworthiness inspection reports.

c. Acceptable performance.—The applicant should be able to identify, find, and explain the significance, to a pilot, of the required inspection reports.

3. Airplane performance, range, and operation

a. Objective.—To determine that the applicant knows what performance data and oper-

ating information is important to the pilot, and can obtain them for the airplane to be used for the test.

b. Description.—The applicant will be required to demonstrate a practical knowledge of the performance capabilities, approved operating procedures, and limitations for the airplane furnished. This includes power settings, placard speeds, range, fuel and oil requirements, the operation of aircraft systems and special equipment, critical performance speeds, and other emergency procedures.

He will be required to use the *Airplane Flight Manual,* if required, for determining the effects of temperature, density, altitude, wind, surface conditions, and gross weight on flight performance. He is expected to be familiar with the general effects of power settings and altitude on the cruising range, and to know the airspeeds for the best performance in the airplane used.

A practical knowledge will be expected of the control system; the fuel, lubrication, hydraulic, and electrical systems; and the operation of the supercharger(s), landing gear and flaps, radio, pressurization, heating, and special emergency equipment.

c. Acceptable performance.—The inability to obtain essential pilot information which is available in the airplane or a faulty knowledge of operating data or procedures is disqualifying.

4. Airplane loading, including fuel, oil, and baggage capacities

a. Objective.—To determine that the applicant can make practical, accurate determinations of permissible loading and load distribution in an airplane.

b. Description.—The applicant will be required to apply the approved weight and balance data for the airplane used in the test to make practical computations of the permissible fuel and payload distribution. It is preferred that a loading graph or computer supplied with the airplane be used for this purpose, if available.

c. Acceptable performance.—The applicant should be able to make accurate determinations of permissible gross weight loadings, and load distribution within the gross weight.

5. Airplane line check

a. Objective.—To determine that the applicant can make a practical determination of whether or not an airplane is ready for flight.

b. Description.—The applicant will be expected to use an orderly procedure in conducting a preflight check of the airplane, preferably in accordance with a checklist provided by the manufacturer or owner. This check covers the airplane's readiness for flight, including fuel and oil supply, the presence of all required equipment and documents, and its airworthiness so far as can be determined by external inspection.

c. Acceptable performance.—The applicant should know the significance of each item checked, and not overlook any obvious unairworthy condition. He should know the appropriate remedial action for a pilot to initiate for the correction of each unsatisfactory item detected.

6. Use of radio for voice communication (includes item 5 of phase IV)

a. Objective.—To determine that the applicant can use two-way radio effectively for ground and flight communications.

b. Description.—During his flight test, the applicant will be expected to use two-way

radio for obtaining information, clearances, and making requests pertinent to the flight.

c. Acceptable performance.—Performance will be evaluated on the basis of the applicant's ability to determine and tune to the correct radio frequencies. The use of the proper radio procedures and phraseology is desired.

PHASE II. BASIC PILOTING TECHNIQUE TEST

1. Preflight operations

a. Objective.—To determine that the applicant knows how to start and warm up the engine, and that he can determine the airplane's immediate readiness for flight.

b. Description.—The applicant will be expected to use proper procedures in engine starting, warmup, and runup; the setting of aircraft systems and equipment; and the checking of the flight controls.

c. Acceptable performance.—Performance will be evaluated on the basis of the accuracy of the procedures used, and the thoroughness of the engine, systems, and airplane checks. The use of a checklist provided by the manufacturer or the airplane owner is recommended.

2. Taxiing

a. Objective.—To determine that the applicant can maneuver the airplane expeditiously and safely on the surface.

b. Description.—The demonstration of taxiing will include the operation of the airplane on the surface, the initial and continuing determination that the taxi path is clear of obstructions, and compliance with local taxi rules and tower instructions.

Seaplane applicants will be required to demonstrate taxiing at slow speeds and on the step, sailing, docking, a simulated or actual approach to a buoy, and turns to downwind headings.

c. Acceptable performance.—Performance will be evaluated on the basis of the accuracy of taxi operations; safety; consideration for other aircraft and personnel on ramps and taxiways; the use of the flight controls and brakes for steering; and the use of the water rudder, if the seaplane used is so equipped. Consideration will be given to the use of appropriate taxiing speeds, considering safety and the expeditious movement of airport traffic.

3. Takeoffs and landings

a. Objective.—To determine that the applicant can consistently make accurate, smooth, safe takeoffs and landings under all normally anticipated conditions.

b. Description.—Demonstrations of the following takeoff and landing operations will be required:

(1) A slip to a landing, if a three-control airplane is used;
(2) A crosswind takeoff and landing;
(3) A short field takeoff, and power approach and landing;
(4) A soft field takeoff and landing;
(5) A wheel landing if a tailwheel type airplane is used, or a stall landing if a nosewheel type airplane is used; and
(6) Three accuracy landings within 200 feet beyond a designated mark.

These landing operations may be performed separately, or may be combined as feasible. A sideslip used in the performance of a crosswind landing may be used to demonstrate (1) and (2), for example, or if crosswind techniques must be used on all landings because of the direction of the wind, no separate demonstration need be required.

All takeoff and landing demonstrations are expected to be made in compliance with the established traffic pattern for the airport

used, and in accordance with control tower instructions. Crosswind landings must be performed with full consideration for other air traffic.

A slip to a landing may be demonstrated from a moderate forward or sideslip, as appropriate to the circumstances. Slips may be performed with or without flaps, if not prohibited by the operating limitations of the airplane used.

At least one crosswind takeoff and landing subject to sufficient crosswind component to require the use of crosswind techniques will be required. The use of the sideslip, crabbing, or combined technique for drift correction will be acceptable.

The short field takeoff procedure assumes a firm, smooth short surface with surrounding obstructions. Rotation should be initiated just as the best angle of climb airspeed is attained, and that speed maintained until the altitude of the assumed obstructions (usually 50 feet) is reached. The flap setting and airspeed prescribed by the manufacturer are expected.

The power approach and landing procedure is that appropriate to landing over obstructions on a short field. The most effective approach speed is approximately 1.3 times the power-off stalling speed in landing configuration. The smoothest performance can be achieved by controlling the airspeed primarily by adjusting the pitch attitude, and the angle of descent by adjusting the power. Full flaps are used for the last segment of the approach, and moderate slips may be used in airplanes with or without flaps.

The soft field takeoff and landing demonstrates the procedure appropriate to very soft or very rough surfaces. The takeoff run is made with the wing at a relatively high angle of attack to lighten the load on the

wheels as much as possible. Liftoff is made at the minimum possible airspeed, and the wheels are held just clear of the surface until the best angle of climb airspeed is attained and climb initiated at that speed. The flap setting recommended by the *Airplane Flight Manual* is important.

The soft field landing may be completed from a normal approach, with touchdown at the slowest possible airspeed. The nosewheel is held clear of the surface during rollout. In tailwheel type airplanes, the tailwheel is held solidly on the surface from the instant of touchdown.

Stall landings in nosewheel-type airplanes are made from normal approaches flared just above the surface, touching down on the main wheels with the nosewheel held well clear of the runway, at, or very near the power-off stalling speed.

Wheel landings in tailwheel-type airplanes are made from normal approaches flared to cruising flight attitude just before the wheels touch the surface. As airspeed is lost and the airplane settles, the wheels are held in contact with the surface with a slight forward force on the controls, and the tailwheel is allowed to settle to the runway as flying speed is lost.

The three accuracy landings are demonstrated from approaches at a uniform angle of descent from an altitude of not more than 1,000 feet above the surface through a 180° change in direction. They terminate with a touchdown in normal landing attitude beyond and within 200 feet of a line or mark assigned by the examiner. Flaps and moderate slips may be used in a normal manner.

c. Acceptable performance.—The applicant's performance of all takeoff and landing demonstrations will be evaluated on the basis

of the correctness of his procedures, planning, his use of prescribed speeds, correction for wind drift, airspeed control, coordination, smoothness, and accuracy of landings. Faulty operation of airplane and airplane systems, use of improper airspeeds or airplane configurations, violent maneuvering, or landing with excessive drift will be disqualifying.

4. Airport traffic patterns

a. Objective.—To determine that the applicant can make safe, expedient airport departures and arrivals with full consideration for other air traffic and in compliance with established traffic patterns.

b. Description.—The applicant will be expected to conform with the established traffic pattern for the airport used during all maneuvers involved on the flight test. In the event control tower instructions or special traffic procedures prevent the demonstration of a normal rectangular traffic pattern, the examiner may request the applicant to fly a rectangular pattern about an area elsewhere, making the usual entries and departures.

c. Acceptable performance.—Performance will be evaluated on the basis of planning, maintenance of altitude, airspeed control, correction for wind drift, the observance of safe clearance from other aircraft, acknowledgement of and compliance with control tower instructions and local taxi and air traffic patterns. He should be able to maintain an altitude within 100 feet of the prescribed traffic pattern altitude.

5. Forced landings (single-engine only) and simulated emergencies

a. Objective.—To determine that the applicant can act correctly, effectively, and

promptly to cope with foreseeable emergency situations in flight.

b. Description.—The examiner will close the throttle at unannounced times during the flight test, and request the applicant to proceed as he would in the event of an actual power failure. His procedure is expected to include a check of instruments, engine controls, and fuel selectors such as he will use to identify the reason for an actual failure. No simulated forced landing will be given where an actual landing could not normally be completed, if one should become necessary, nor where a simulated landing approach might constitute a violation of the Federal Aviation Regulations.

c. Acceptable performance.—The applicant's performance will be evaluated on the basis of the safety and effectiveness of his operations. Consideration will also be given to his planning, technique, accuracy, and the thoroughness of his cockpit check to identify the failure.

6. Emergency operation of airplane equipment

a. Objective.—To determine that the applicant can perform accurately and promptly the emergency operation of the equipment and components of the airplane used.

b. Description.—The demonstrations required will necessarily vary with each type of airplane used, and with the special equipment installed. The applicant will be required to demonstrate, or have a practical operating knowledge of all aircraft systems and special equipment installed.

Emergency operations such as the emergency extension of the landing gear and flaps, replacing fuses or resetting circuit

breakers, emergency fuel system management, manual operation of pressurization, and use of standby hydraulic and electrical systems will be actually performed when practicable. Emergency operations such as the discharge of pressure fire extinguisher systems may be simulated.

c. Acceptable performance.—Performance will be evaluated on the basis of the applicant's knowledge of procedures, and his accuracy in their application.

7. Engine-out emergencies, if multiengine airplane is used

A commercial pilot flight test conducted in a multiengine airplane will include the engine-out emergency procedures described in phase III of the *Multiengine Airplane Class or Type Rating Flight Test Guide,* AC 61–4B.

PHASE III. PRECISON MANEUVERS

1. Gliding spirals about a point on the ground

a. Objective.—To determine that an applicant can control his gliding speed, maintain his orientation, and correct for wind drift during steep gliding spirals, as might be appropriate in making a forced landing after a power failure at a relatively high altitude.

b. Description.—Gliding spirals through three full turns, both right and left, will be expected, with a bank of at least 50° at the steepest point in each turn. A uniform radius should be maintained about a reference point on the ground.

c. Acceptable performance.—Performance will be evaluated on the basis of drift correction, airspeed control, coordination, orientation, and vigilance for other air traffic. Observance of the following limits will be accepted as a competent performance:

Airspeed within 8 knots,
Bank between 45° to 55° at steepest point,
Heading on recovery within 10° of entry heading.

2. Three consecutive shallow on-pylon eights

a. Objective.—To determine that the applicant can maneuver an airplane accurately, and with correct coordination while his attention is diverted to points outside of the airplane.

b. Description.—Three eights-on-pylons

will be performed with banks which do not exceed a medium bank at the steepest sector of each turn. The applicant may elect to use one turn about a pylon to establish his pivotal altitude and the appropriate starting bank before performing the three required eights-on-pylons. The pylons selected should be at equal elevations, crosswind, and sufficiently close that very little straight flight between the turns will be involved.

c. Acceptable performance.—Performance will be evaluated on the basis of planning, altitude control, coordination, smoothness, and the ability to hold the pylons. The line-of-sight reference from the airplane (parallel to its lateral axis) should be held within 1 foot of the pylon.

3. Three consecutive steep on-pylon eights

a. Objective.—To determine that the applicant can maneuver an airplane accurately, and with correct coordination under flight situations requiring high control forces and very precise coordination while his attention is diverted to points outside the airplane.

b. Description.—Three eights-on-pylons will be performed with banks of at least 50° at the steepest sector of each turn. These may be performed either before or after the shallow pylon-eights described above. If they are performed first, the applicant may use one turn about a pylon to establish his pivotal altitude, or if they are performed after the shallow eights he will be expected to proceed directly from one to the other.

c. Acceptable performance.—Performance will be evaluated on the basis of planning, altitude control, coordination, smoothness, and the ability to hold the pylons. The line-of-sight reference line from the airplane (parallel to its lateral axis) is expected to

remain within 1 foot of the pylon. Corrections for variations in groundspeed about each pylon may be accomplished by very slight variations in altitude, or the reference line may be allowed to move back and forth within the acceptable limits described above. The consistent use of slips or skids to hold the reference line on the pylons will be disqualifying.

4. One right and one left 720° steep power turn

a. Objective.—To demonstrate the ability to maneuver an airplane accurately under conditions of high load factors and operation near the performance limit of the airplane.

b. Description.—Right and left 720° power turns with a bank of at least 50° will be expected. Turn entries and recoveries are accomplished promptly and smoothly, with appropriate power adjustments.

c. Acceptable performance.—Performance will be evaluated on the basis of planning, coordination, smoothness, prompt stabilization of the turns, maintenance of constant bank and altitude, and orientation. The ability to roll from one turn directly into a turn in the opposite direction will demonstrate the advanced coordination skills desired in this maneuver. Any of the following will be disqualifying:

Variations of more than 100 feet from the entering altitude,

Variations of more than 5° from the desired bank.

Recovery headings more than 15° from the entering headings, and

Slips or skids which are not immediately corrected.

5. Lazy eights

a. Objective.—Lazy eights are used to demonstrate a high degree of coordination, planning, airspeed, and altitude control.

b. Description.—Lazy eights are to be performed with moderate banks and gradual altitude changes. The applicant will be expected to maintain a symmetrical pattern, and to avoid slipping or skidding. At no time during the maneuver will control positions or forces remain constant.

c. Acceptable performance.—Performance will be evaluated on the basis of planning, orientation, coordination, smoothness, altitude control, and airspeed control. Repeated slipping and skidding, or persistent gain or loss of altitude will be disqualifying.

6. Chandelles

a. Objective.—The chandelle is used to demonstrate planning, coordination, and accuracy of control during a maximum performance maneuver.

b. Description.—The applicant will be expected to enter chandelles from level flight or a very slight dive, at approximately the entering speed prescribed in the *Airplane Flight Manual* or appropriate placard. The preferred procedure is to assume the optimum bank for the maximum of performance, then assume the pitch attitude which will produce the maximum climb. A coordinated recovery should begin at 90° of the turn and the maneuver should be completed at 180° of turn in laterally level straight flight at just above stalling airspeed. Other recognized procedures are acceptable when competently performed.

c. Acceptable performance.—Performance

will be evaluated on the basis of planning, airspeed control, coordination, smoothness, and orientation. The amount of altitude gained is not the measure of the quality of the applicant's performance, but the best climb performance consistent with the power used, the entering bank, and the existing conditions of flight is expected. The applicant is to complete chandelles consistently within 10° of the desired heading, and recover with the airspeed within 5 knots of stalling speed.

7. Maneuvering at minimum controllable airspeed

a. Objective.—To determine that the applicant can recognize critically slow airspeeds in various flight situations, and understands the changes in flight control response which are characteristic of such speeds.

b. Description.—The applicant will be asked to demonstrate straight flight and medium banked turns in level flight, climbs, and descents, at such airspeeds that any reduction in speed would result in effective loss of control. In airplanes for which stall warners are required equipment, the speed should be such that the stall warner is continuously activated. Demonstrations will be conducted in both cruising and landing configurations in airplanes with flaps and/or retractable landing gears.

c. Acceptable performance.—The applicant will be expected to use power settings which will not consistently result in a change of altitude in excess of 100 feet per minute in straight flight, and maintain an airspeed within 5 knots of the desired speed. Any unrecognized stall will be disqualifying. Performance will be evaluated on the basis of airspeed control, appropriate flight control usage, coordination, and smoothness.

8. Stalls from all normally anticipated flight attitudes with and without power

a. Objective.—To determine that an applicant can recognize a partial stall, and make prompt, effective recoveries from partial and complete stalls encountered in all normally anticipated flight situations.

b. Description.—The applicant will be required to perform recoveries from partial and full stalls entered from straight and turning flight, with at least 65 percent power, and with the engine idling. The flight test will emphasize the recovery from stalls entered from the three flight situations which have been found to be the most critical: takeoff and departure, approaches to landings, and during accelerated maneuvers.

Takeoff and departure stalls are simulated from straight flight, and from approximately 15° to 20° constant banked turns in takeoff configuration with recommended takeoff power. To prevent an abnormally high pitch attitude before the stall, it is important to initiate a climb at liftoff speed and increase the angle of attack progressively until a stall occurs. The airspeed should not increase above liftoff speed after the climb is initiated until recovery is effected. The altitude should be noted at the time of assumed liftoff, and compared with the altitude at which recovery is effected.

Approach to landing stalls are performed from straight glides and moderately banked gliding turns in landing configuration, with gear extended and full flaps, and trim set. The demonstration is entered at landing approach speed, and the angle of attack is increased smoothly until a stall occurs or full back elevator is held without producing further stall development. Turns should continue

at a constant angle of bank until the stall occurs. Recovery should be followed by a climbout in climb configuration to an altitude of at least 300 feet above the altitude at which full control effectiveness is regained.

Accelerated stalls are performed from a sustained bank of 45° or more by increasing the angle of attack at a constant altitude or moderate rate of climb until a stall occurs. Power may be reduced below cruising to assist in increasing the angle of attack, but any decrease in the rate of climb or loss of altitude will defeat the purpose of the maneuver by relieving the load factor. The term "accelerated" has nothing to do with the rapidity with which a stall is induced. It denotes a stall which occurs at a higher than normal airspeed because the angle of attack is increased by the additional load factor (or "acceleration") which results from a steep turn or an abrupt maneuver. An airplane with an unaccelerated stalling speed of 50 knots, for example, will stall at approximately 60 knots in a sustained 45° bank.

Accelerated stalls should not be performed in other than acrobatic airplanes at speeds more than 1.25 times the unaccelerated stalling speed, nor with flaps extended, because of the extremely high structural loads which may result. Abrupt pitch changes in all flight maneuvers should be avoided in airplanes with extensions between the engine and propeller, because of the high gyroscopic loads involved.

The applicant will be asked to recover from all types of stalls in high-performance airplanes as soon as evidence of a stall is recognized. Such evidence may be uncontrollable pitching, buffeting, rapid decay of control effectiveness, or the application of full back elevator without producing further stall development. In light, trainer-type airplanes,

the examiner may ask the applicant to delay the initiation of stall recoveries until the nose has pitched down through crusing flight attitude. The applicant should control the attitude of the airplane to the maximum extent possible throughout the stall and recovery with the normal use of the flight controls.

Recovery is complete when the airplane regains straight and laterally level flight. All appropriate flight and power controls should be used during stall recoveries. Recoveries without the use of power will be expected when specifically directed by the examiner. The angle of attack is relieved by relaxation of the back force on the elevator control, or the application of forward force if necessary, and full control effectiveness is regained with the least loss of altitude consistent with safety. Special attention will be directed to the altitude necessary to recover from a stabilized high rate of descent with full back elevator control, if this condition develops in some flight situations in the airplane used.

c. Acceptable performance.—Throughout his stall recovery demonstrations, the applicant will be expected to use prompt and correct control applications to achieve the desired attitudes and maintain the desired heading. Consideration will be given to the applicant's positive action and smoothness. Failure to initiate corrective action on partial stalls before the nose pitches uncontrollably, indications of a secondary stall during recoveries, or diving to higher than cruising airspeed during recoveries will be disqualifying, as will any loss of control which makes it necessary for the examiner to take over to avoid a spin or exceeding the airspeed limitations of the airplane.

PHASE IV. CROSS-COUNTRY FLIGHT

1. Cross-country flight planning

a. Objective.—To determine that the applicant can adequately prepare for a cross-country flight in a reasonable period of time.

b. Description.—Before takeoff for the flight test, the applicant will be requested to plan a cross-country flight to a point at least 3 hours' normal cruising range in the airplane to be used for the test. At least one intermediate stop should be included.

Planning will include the procurement of pertinent available weather information; plotting a course on a sectional aeronautical or WAC chart; establishing checkpoints and distances; and estimating flying time, headings, and fuel requirements. The *Airman's Information Manual,* if available, will be used as a reference for airport information and for NOTAM's. The use of a computer or wind vector diagrams for computing headings and groundspeeds is desirable, but not required.

The flight planning required is a practical demonstration of preparation for an actual flight, which shall be accomplished when directed by the examiner. A flight plan brought with the applicant when he appears for the flight test will not be accepted.

c. Acceptable performance.—It is expected that all flight planning operations will be meaningful, applicable to the trip proposed, and accurate. The use of more than 20 minutes to prepare a 3-hour trip is indicative of an inadequate performance, unless unavoidable delays are experienced in obtaining weather information.

2. Cross-country flying

a. Objective.—To determine that the applicant can conduct safe, expeditious VFR cross-country flights, using normally available aids and facilities.

b. Description.—When requested by the examiner, the applicant will set out on the cross-country flight which he has planned before takeoff. The planned course will be followed at least until the applicant establishes the compass heading necessary to stay on course, and can give a reasonable estimate of his groundspeed and time of arrival at his first point of intended landing. At this time, he may be requested to divert to an alternate airport of the examiner's choice, or the examiner may ask the applicant to select a suitable alternate.

The cross-country demonstration will be of sufficient duration to allow the examiner to evaluate the applicant's ability to navigate by pilotage, and may also include the use of radio aids to VFR navigation required under item 4, of this phase. The cross-country demonstration will include an approach and landing at an unfamiliar airport, when practicable.

c. Acceptable performance.—The cross-country flight will be evaluated on the basis of the applicant's ability to follow the intended course, correctly identify checkpoints, maintain heading and altitude, and provide reasonable estimates to times over checkpoints, and plan alternate courses during flight.

He will be expected to establish the compass heading necessary to hold his planned course within 10 minutes, and thereafter hold

this track within 1 mile, and his altitude within 200 feet of the planned crusing altitude. Using his observed time over checkpoints, he is expected to compute an estimated time of arrival at the first point of intended landing with an apparent error of not more than 5 minutes for each hour of cruising flight involved.

When requested to divert to an alternate, he will be expected to turn to his new course promptly, and establish the appropriate heading within 10 minutes. His approach to an unfamiliar airport will be evaluated on the basis of his compliance with the known traffic pattern, traffic directional markers, or control tower instructions, as available.

3. Cross-country flying emergencies

a. Objective.—To determine that the applicant can recognize and cope promptly and correctly with emergencies which occur during cross-country flights.

b. Description.—During the cross-country flight demonstration, the examiner will simulate, or ask the applicant to assume typical emergencies involving aircraft or equipment malfunctions and encounters with critical flight situations.

Simulated malfunctions may include such emergencies as partial or imminent power failures, failure of electrical or hydraulic systems, and fires in flight or loss of pressurization. Critical flight situations may include being lost, encountering unanticipated adverse weather, icing, or loss of visual references.

The applicant will be expected to proceed as he would in the event he encounters the emergency simulated, including the evaluation of the emergency, attempting to make in-flight corrections for malfunctions, and the

execution of appropriate emergency actions.

c. Acceptable performance.—Performance will be evaluated on the basis of the applicant's prompt analysis of the situation and possible choices of action, his resourcefulness and planning, and the appropriateness of the actions taken. Emphasis will be directed to the consideration and application of normal remedies before drastic emergency action is initiated. Any action which invokes additional unnecessary hazards will be disqualifying.

4. Use of radio aids to VFR navigation

a. Objective.—To determine that the applicant can use effectively the common aeronautical radio facilities for assistance in VFR navigation.

b. Description.—During his flight test, preferably on the cross-country portion, the applicant will be required to demonstrate the use of radio navigation facilities for VFR navigation. He may elect to use a VOR or low frequency range, or ADF equipment in the airplane.

He will be expected to intercept and track toward the station on assigned VOR radial, range leg, or ADF bearing. No prescribed orientation procedure will be required.

c. Acceptable performance.—Performance will be evaluated on the basis of the applicant's ability to tune in and identify the desired radio facility, to intercept a desired range leg or radial or ADF bearing, and to track it toward or away from the station. Consideration will also be given to his practical knowledge of the procedures for obtaining radar guidance, DF steers, and emergency approach assistance by radio.

5. Instrument flight

a. Objective.—To determine that the applicant is able to control and maneuver an airplane solely by reference to flight instruments.

b. Description.—The applicant will be requested to demonstrate his ability to control and maneuver an airplane solely by reference to flight instruments. The following maneuvers and operations are specifically required by FAR 61.117(c):

(1) Recovery from a well-developed power-on moderate turn spiral in a medium banked attitude;
(2) Recovery from a high-angle climb in a turn;
(3) Standard rate turns of 180° and 360° duration to within 10° and 20°, respectively, of proper heading and 150 feet of altitude;
(4) Maximum safe performance climbing turns of 180° duration, followed by continued straight climb to predetermined altitude, requiring not less than 1 minute of straight climb performed within 10 knots of the proper airspeed and 10° of proper heading;
(5) Two consecutive descending 90° turns, using normal approach power for reducing altitude, performed within 10° of the proper heading, and at the completion of the first 90° turn continued straight descent for 1 minute, and then a second 90° descending turn and continued straight descent for 1½ minutes (simulating a landing approach); and
(6) Straight and level flight performed within 10° of the proper heading, 100 feet of the assigned altitude, and 10 knots of the specified airspeed.

c. Acceptable performance.—Performance will be evaluated on the basis of coordination, smoothness, and accuracy. Any loss of control which makes it necessary for the examiner to take over to avoid a stall or exceeding the operating limitations of the airplane used will be disqualifying.

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