# SPORTY'S®

***WHAT YOU SHOULD KNOW*® SERIES**

## ACS STUDY GUIDE

# Private Pilot Airman Certification Standards for Airplane Single-Engine Land Cross-Referenced to Sporty's Interactive Video Course

**Sporty's Academy, Inc.**
**Clermont County/Sporty's Airport**
**Batavia, OH 45103**


ISBN 978-0-9830729-8-0

**For additional copies, reorder #M116A**

**Call: 1 (USA) 800.SPORTYS**
**(776.7897)**

**Fax: 1 (USA) 800.359.7794**
**1 (USA) 513.735.9200**
**sportys.com**

08/17

Page Intentionally Left Blank

# Table of Contents

# Preface

Sporty's *What You Should Know*® Complete Learn to Fly Course has been designed to prepare you to become a Private Pilot.

The subject matter is presented in a logical sequence that parallels the flight instruction you will be receiving. This sequence is also the best way to prepare for the FAA computerized knowledge exam. This book is not a substitute for the videos, but a supplement to help you prepare more completely for your knowledge test, oral and practical exams, and to become a better pilot.

This study guide is arranged into two major sections.

The first section contains the Private Pilot Airman Certification Standards for Airplane Single-Engine with a video cross-reference. This section is intended to be used as a review prior to your oral and practical exams. It also may be used as a supplemental index to the videos. It relates the various elements of the ACS to the appropriate Sporty's video volumes and segments for further review. The test standards for both land and sea airplanes are included for completeness. The cross-reference to the video is only included for Single-Engine Land elements. Tasks and elements specific to Multiengine Land, Single-Engine Sea, and Multiengine Sea airplanes are labeled as AMEL Only, ASES Only, or AMES Only, as appropriate.

The second section contains supplemental material that you should study after watching each video volume. This information will support the subjects presented by the related videos and will provide reinforcing notes or may be used as a quick reference.

This study guide *is not* intended to stand alone. It is a part of the total training package supplied with Sporty's *What You Should Know* Complete Learn to Fly Course.

Best of luck with your studies and welcome to your new adventure.

Sporty's Academy, Staff
August, 2017
Batavia, Ohio

# Conventions Used in This Manual

The Private Pilot Airman Certification Standards (ACS) with Video Cross-Reference contains the text of the ACS with references to information that may be found in the Sporty's Complete Learn to Fly Course videos for each element. The cross-reference will appear in the following format:

- A number indicating the video volume will be followed by a period and number indicating the segment within the video. For example, 5.1 would indicate to refer to Segment 1 of Video Volume 5 from the course.
- **Please Note:** Private Pilot online and app based video volumes 4-6 are the same as DVD volumes 5-7. DVD volume numbers will appear in parentheses when different.

Appendices and pages within this study guide and the POH/AFM for your airplane are also referenced.

The ACS includes tasks and elements which are specific to both the Airplane Single-Engine Land (ASEL) and the Airplane Single-Engine Sea (ASES) ratings. The information for both is included for completeness, but the items specific to the ASES rating are not cross-referenced.

# FAA References Used in This Manual

Many of the references below were used by the FAA in preparing the ACS. Most of the references listed are books and may be purchased from Sporty's by calling 1.800.SPORTYS (776.7897) from the USA or by logging on to sportys.com.

14 CFR Part 39 Airworthiness Directives
14 CFR Part 43 Maintenance, Preventive Maintenance, Rebuilding, and Alteration
14 CFR Part 61 Certification: Pilots and Flight Instructors
14 CFR Part 91 General Operating and Flight Rules
14 CFR Part 93 Special Air Traffic Rules
NTSB Part 830 Notification and Reporting of Aircraft Accidents and Incidents
FAA-H-8083-1 Aircraft Weight and Balance Handbook
FAA-H-8083-2 Risk Management Handbook
FAA-H-8083-3 Airplane Flying Handbook
FAA-H-8083-6 Advanced Avionics Handbook
FAA-H-8083-15 Instrument Flying Handbook
FAA-H-8083-25 Pilot's Handbook of Aeronautical Knowledge
FAA-H-8083-30 Aviation Maintenance Technician Handbook—General
FAA-H-8083-31 Aviation Maintenance Technician Handbook—Airframe
FAA-H-8083-32 Aviation Maintenance Technician Handbook—Powerplant
AC 00-6 Aviation Weather
AC 00-45 Aviation Weather Services
AC 61-65 Certification: Pilots and Flight Instructors
AC 61-67 Stall Spin Awareness Training
AC 61-84 Role of Preflight Preparation
AC 67-2 Medical Handbook for Pilots
AC 90-48 Pilot's Role in Collision Avoidance
AC 90-66 Recommended Standard Traffic Patterns and Practices for Aeronautical Operations at Airports Without Operating Control Towers
AC 91-13 Cold Weather Operation of Aircraft
AC 91-55 Reduction of Electrical System Failures Following Aircraft Engine Starting
AC 91-73 Part 91 and 135 Single-Pilot Procedures During Taxi Operations
AC 120-51 Crew Resource Management Training
AC 120-74 Parts 91, 121, 125 and 135 Flightcrew Procedures During Taxi Operations
AC 150-5340-18 Standards for Airport Sign Systems AIM Aeronautical Information Manual
AIM Aeronautical Information Manual
Chart Supplements (formerly A/FD)
NOTAMs Notices to Airmen
POH/AFM - FAA-Pilot Operating Handbook/Approved Flight Manual (or Airplane Flight Manual)

# Section 1 - Private Pilot Airman Certification Standards for Airplane Single-Engine Land with Video Cross-Reference

## I. PREFLIGHT PREPARATION

| TASK | A. PILOT QUALIFICATIONS | |
|---|---|---|
| REFERENCES | 14 CFR parts 61, 68, 91; FAA-H-8083-2, FAA-H-8083-25 | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with airman and medical certificates including privileges, limitations, currency, and operating as pilot-in-command (PIC) as a private pilot. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.I.A.K1* | Certification requirements, currency, and record keeping. | 6.1 (7.1) |
| *PA.I.A.K2* | Privileges and limitations. | 6.1 (7.1) |
| *PA.I.A.K3* | Medical certificates: class, expiration, privileges, temporary disqualifications. | 3.22, 6.1 (7.1) |
| *PA.I.A.K4* | Documents required to exercise private pilot privileges. | 6.1 (7.1) |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.I.A.R1* | Failure to distinguish proficiency versus currency. | |
| *PA.I.A.R2* | Failure to set personal minimums. | |
| *PA.I.A.R3* | Failure to ensure fitness for flight. | |
| *PA.I.A.R4* | Flying unfamiliar aircraft, or operating with unfamiliar flight display systems, and avionics. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.I.A.S1* | Apply requirements to act as PIC under Visual Flight Rules (VFR) in a scenario given by the evaluator. | |

## I. PREFLIGHT PREPARATION

| TASK | B. AIRWORTHINESS REQUIREMENTS | |
|---|---|---|
| REFERENCES | 14 CFR parts 39, 43, 91; FAA-H-8083-2, FAA-H-8083-25 | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with airworthiness requirements, including aircraft certificates. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.I.B.K1* | General airworthiness requirements and compliance for airplanes, including: | |
| *PA.I.B.K1a* | a. Certificate location and expiration dates | 1.13, 6.1 (7.1) |
| *PA.I.B.K1b* | b. Required inspections and aircraft logbook documentation | 6.1 (7.1) |
| *PA.I.B.K1c* | c. Airworthiness Directives and Special Airworthiness Information Bulletins | 6.1 (7.1), Appendix A |
| *PA.I.B.K1d* | d. Purpose and procedure for obtaining a special flight permit | Appendix A |
| *PA.I.B.K2* | Pilot-performed preventive maintenance. | 6.1 (7.1) |
| *PA.I.B.K3* | Equipment requirements for day and night VFR flight, to include: | 1.13, 6.1 (7.1) |
| *PA.I.B.K3a* | a. Flying with inoperative equipment | Appendix A |
| *PA.I.B.K3b* | b. Using an approved Minimum Equipment List (MEL) | Appendix A |
| *PA.I.B.K3c* | c. Kinds of Operation Equipment List (KOEL) | |
| *PA.I.B.K3d* | d. Required discrepancy records or placards | Appendix A |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.I.B.R1* | Inoperative equipment discovered prior to flight. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.I.B.S1* | Locate and describe aircraft airworthiness and registration information. | |
| *PA.I.B.S2* | Determine the aircraft is airworthy in a scenario given by the evaluator. | |
| *PA.I.B.S3* | Apply the procedures for operating with inoperative equipment in a scenario given by the evaluator. | |

## I. PREFLIGHT PREPARATION

| TASK | C. WEATHER INFORMATION | |
|---|---|---|
| REFERENCES | 14 CFR part 91; FAA-H-8083-25; AC 00-6, AC 00-45; AIM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with weather information for a flight under VFR. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.I.C.K1* | Acceptable sources of weather data for flight planning purposes. | |
| *PA.I.C.K2* | Weather products required for preflight planning, current and forecast weather for departure, en route, and arrival phases of flight. | 5.1, 5.12 (6.1, 6.12) |
| *PA.I.C.K3* | Meteorology applicable to the airport, local area, departure, en route, alternate, and destination of a VFR flight in Visual Meteorological Conditions (VMC) to include expected climate and hazardous conditions such as: | 3.1, 3.9, 3.11, 3.12, 4.12, 4.13, 5.12 (5.12, 5.13, 6.12) |
| *PA.I.C.K3a* | a. Atmospheric composition and stability | |
| *PA.I.C.K3b* | b. Wind (e.g., crosswind, tailwind, wind shear, etc.) | |
| *PA.I.C.K3c* | c. Temperature | |
| *PA.I.C.K3d* | d. Moisture/precipitation | |
| *PA.I.C.K3e* | e. Weather system formation, including air masses and fronts | |
| *PA.I.C.K3f* | f. Clouds | |
| *PA.I.C.K3g* | g. Turbulence | |
| *PA.I.C.K3h* | h. Thunderstorms and microburst | |
| *PA.I.C.K3i* | i. Icing and freezing level information. | 4.13, 5.10, 5.11 (5.13, 6.10, 6.11) |
| *PA.I.C.K3j* | j. Fog | |
| *PA.I.C.K3k* | k. Frost | |
| *PA.I.C.K4* | Flight deck displays of digital weather and aeronautical information. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.I.C.R1* | Factors involved in making the go/no go and continue/divert decisions, to include: | |
| *PA.I.C.R1a* | a. Circumstances that would make diversion prudent | |
| *PA.I.C.R1b* | b. Personal weather minimums | |
| *PA.I.C.R2* | Limitations of: | |
| *PA.I.C.R2a* | a. Onboard weather equipment | |
| *PA.I.C.R2b* | b. Aviation weather reports and forecasts | |
| *PA.I.C.R2c* | c. Inflight weather resources | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.I.C.S1* | Use available aviation weather resources to obtain an adequate weather briefing. | |
| *PA.I.C.S2* | Discuss the implications of at least three of the conditions listed in K3a through K3k above, using actual weather or weather conditions in a scenario provided by the evaluator. | |
| *PA.I.C.S3* | Correlate weather information to make a go/no-go decision. | 1.2, 5.16 (6.16) |

# I. PREFLIGHT PREPARATION

| TASK | D. CROSS-COUNTRY FLIGHT PLANNING | |
|---|---|---|
| REFERENCES | 14 CFR part 91; FAA-H-8083-2, FAA-H-8083-25; Navigation Charts; Chart Supplements; AIM; NOTAMs | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with cross-country flights and VFR flight planning. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.I.D.K1* | Route planning, to include consideration of different classes and special use airspace and selection of appropriate navigation/communication systems and facilities. | |
| *PA.I.D.K2* | Altitude selection accounting for terrain and obstacles, glide distance of the aircraft, VFR cruising altitude, and the effect of wind. | 4.3 (5.3) |
| *PA.I.D.K3* | Calculating: | |
| *PA.I.D.K3a* | a. Time, climb and descent rates, course, distance, heading, true airspeed, and groundspeed | 4.5, 4.6, 4.16, 5.9 (5.5, 5.6, 5.16, 6.9) |
| *PA.I.D.K3b* | b. Estimated time of arrival to include conversion to universal coordinated time (UTC) | |
| *PA.I.D.K3c* | c. Fuel requirements, to include reserve | 4.5, 4.6, 4.16, 5.9 (5.5, 5.6, 5.16, 6.9) |
| *PA.I.D.K4* | Elements of a VFR flight plan. | |
| *PA.I.D.K5* | Procedures for activating and closing a VFR flight plan. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.I.D.R1* | Pilot. | |
| *PA.I.D.R2* | Aircraft. | |
| *PA.I.D.R3* | Environment (e.g., weather, airports, airspace, terrain, obstacles). | |
| *PA.I.D.R4* | External pressures. | |
| *PA.I.D.R5* | Limitations of air traffic control (ATC) services. | |
| *PA.I.D.R6* | Improper fuel planning. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.I.D.S1* | Prepare, present and explain a cross-country flight plan assigned by the evaluator including a risk analysis based on real-time weather, to the first fuel stop. | 5.All, 6.All |
| *PA.I.D.S2* | Apply pertinent information from appropriate and current aeronautical charts, chart supplements; NOTAMs relative to airport, runway and taxiway closures; and other flight publications. | 4.3 (5.3) |
| *PA.I.D.S3* | Create a navigation log and simulate filing a VFR flight plan. | 4.5, 4.15, 6.4, 6.8 (5.5, 5.15, 7.4, 7.8) |
| *PA.I.D.S4* | Recalculate fuel reserves based on a scenario provided by the evaluator. | |

## I. PREFLIGHT PREPARATION

| TASK | E. NATIONAL AIRSPACE SYSTEM | |
|---|---|---|
| REFERENCES | 14 CFR parts 71, 91, 93; FAA-H-8083-2; Navigation Charts; AIM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with the National Airspace System (NAS) operating under VFR as a private pilot. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.I.E.K1* | Types of airspace/airspace classes and associated requirements and limitations. | 4.17 (5.17), ACS Study Guide Page 2-11 |
| *PA.I.E.K2* | Charting symbology. | 4.17 (5.17), ACS Study Guide Page 2-11 |
| *PA.I.E.K3* | Special use airspace (SUA), special flight rules areas (SFRA), temporary flight restrictions (TFR), and other airspace areas. | 4.17 (5.17), ACS Study Guide Page 2-9 |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.I.E.R1* | Various classes of airspace. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.I.E.S1* | Explain the requirements for basic VFR weather minimums and flying in particular classes of airspace, to include SUA, SFRA, and TFR. | 4.17 (5.17), ACS Study Guide Pages 2-9 & 2-11 |
| *PA.I.E.S2* | Correctly identify airspace and operate in accordance with associated communication and equipment requirements. | 4.17 (5.17), ACS Study Guide Page 2-11 |

## I. PREFLIGHT PREPARATION

| TASK | F. PERFORMANCE AND LIMITATIONS | |
|---|---|---|
| REFERENCES | FAA-H-8083-1, FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-25; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with operating an aircraft safely within the parameters of its performance capabilities and limitations. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.I.F.K1* | Elements related to performance and limitations by explaining the use of charts, tables, and data to determine performance. | 3.18, 5.5, 6.6, 6.7 (6.5, 7.6, 7.7) |
| *PA.I.F.K2* | Factors affecting performance to include | |
| *PA.I.F.K2a* | a. atmospheric conditions | 2.3, 3.7, 3.8, 5.5 (6.5) |
| *PA.I.F.K2b* | b. pilot technique | 2.3, 3.7, 3.8, 5.5 (6.5) |
| *PA.I.F.K2c* | c. aircraft condition | 2.3, 3.7, 3.8, 5.5 (6.5) |
| *PA.I.F.K2d* | d. airport environment | 2.3, 3.7, 3.8, 5.5 (6.5) |
| *PA.I.F.K2e* | e. Loading | 5.5, 6.6 (6.5, 7.6) |
| *PA.I.F.K2f* | f. Weight and balance | 5.5, 6.6 (6.5, 7.6) |
| *PA.I.F.K3* | Aerodynamics. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.I.F.R1* | Inaccurate use of manufacturer's performance charts, tables and data. | |
| *PA.I.F.R2* | Exceeding aircraft limitations. | |
| *PA.I.F.R3* | Possible differences between actual aircraft performance data as it relates to expected performance and published aircraft performance data. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.I.F.S1* | Compute the weight and balance, correct out-of-center of gravity (CG) loading errors and determine if the weight and balance remains within limits during all phases of flight. | 3.18, 6.6, 6.7 (7.6, 7.7) |
| *PA.I.F.S2* | Demonstrate use of the appropriate aircraft manufacturer's approved performance charts, tables and data. | 5.5, 6.6 (6.5, 7.6) |

# I. PREFLIGHT PREPARATION

| TASK | G. OPERATION OF SYSTEMS | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23, FAA-H-8083-25; POH/AFM. | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with the safe operation of systems on the airplane provided for the flight test. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.I.G.K1* | Aircraft systems, to include: | |
| *PA.I.G.K1a* | a. Primary flight controls and trim | 1.4 |
| *PA.I.G.K1b* | b. Secondary flight controls | 1.4, 1.6 |
| *PA.I.G.K1c* | c. Powerplant and propeller | 1.1, 1.6, 1.7, 1.8, 2.3 |
| *PA.I.G.K1d* | d. Landing gear | POH/AFM |
| *PA.I.G.K1e* | e. Fuel, oil, and hydraulic | 1.1, 1.8 |
| *PA.I.G.K1f* | f. Electrical | 1.1 |
| *PA.I.G.K1g* | g. Avionics | 1.23, 4.7, 4.8, 4.9 (5.7, 5.8, 5.9) |
| *PA.I.G.K1h* | h. Pitot-static, vacuum/pressure, and associated flight instruments | 1.6, 2.6, 3.7, 3.13 |
| *PA.I.G.K1i* | i. Environmental | POH/AFM |
| *PA.I.G.K1j* | j. Deicing and anti-icing | 1.11 |
| *PA.I.G.K1k* | k. Water rudders (ASES, AMES) | ASES/AMES Only |
| *PA.I.G.K1l* | l. Oxygen system | |
| *PA.I.G.K2* | Indications of system abnormalities or failures. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.I.G.R1* | Failure to identify system malfunctions or failures. | |
| *PA.I.G.R2* | Improper handling a system failure. | |
| *PA.I.G.R3* | Failure to monitor and manage automated systems. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.I.G.S1* | Explain and operate at least three of the systems listed in K1a through K1l above. | |
| *PA.I.G.S2* | Properly use appropriate checklists. | |

## I. PREFLIGHT PREPARATION

| TASK | H. HUMAN FACTORS | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-25; AIM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with personal health, flight physiology, aeromedical and human factors, as it relates to safety of flight. ***Note: (See Appendix 6 – Safety of Flight.)*** | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.I.H.K1* | Symptoms, recognition, causes, effects, and corrective actions associated with aeromedical and physiological issues including: | |
| *PA.I.H.K1a* | a. Hypoxia | 3.22 |
| *PA.I.H.K1b* | b. Hyperventilation | 3.22 |
| *PA.I.H.K1c* | c. Middle ear and sinus problems | 3.23 |
| *PA.I.H.K1d* | d. Spatial disorientation | 3.22 |
| *PA.I.H.K1e* | e. Motion sickness | Appendix C |
| *PA.I.H.K1f* | f. Carbon monoxide poisoning | 3.22 |
| *PA.I.H.K1g* | g. Stress and fatigue | 3.23 |
| *PA.I.H.K1h* | h. Dehydration and nutrition | Appendix C |
| *PA.I.H.K1i* | i. Hypothermia | |
| *PA.I.H.K1j* | j. Optical illusions | |
| *PA.I.H.K1k* | k. Dissolved nitrogen in the bloodstream after scuba dives. | 6.8 (7.8) |
| *PA.I.H.K2* | Regulations regarding use of alcohol and drugs. | 3.23, 6.1 (7.1) |
| *PA.I.H.K3* | Effects of alcohol, drugs, and over-the-counter medications. | 3.23, 6.1 (7.1) |
| *PA.I.H.K4* | Aeronautical Decision-Making (ADM). | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks encompassing | |
| *PA.I.H.R1* | Aeromedical and physiological issues. | |
| *PA.I.H.R2* | Hazardous attitudes. | |
| *PA.I.H.R3* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.I.H.S1* | Describe symptoms, recognition, causes, effects, and corrective actions for at least three of the conditions listed in K1a through K1k above. | |
| *PA.I.H.S2* | Perform self-assessment, including fitness for flight and personal minimums, for actual flight or a scenario given by the evaluator. | |

# I. PREFLIGHT PREPARATION

| | | |
|---|---|---|
| **Task** | **I. Water and Seaplane Characteristics, Seaplane Bases, Maritime Rules, and Aids to Marine Navigation (ASES, AMES)** | |
| **References** | FAA-H-8083-2, FAA-H-8083-23; AIM; USCG Navigation Rules, International-Inland; POH/AFM; Chart Supplements | |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with water and seaplane characteristics, seaplane bases, maritime rules, and aids to marine navigation. | |
| **Knowledge** | The applicant demonstrates understanding of: | |
| *PA.I.I.K1* | The characteristics of a water surface as affected by features, such as: | ASES/AMES Only |
| *PA.I.I.K1a* | a. Size and location | ASES/AMES Only |
| *PA.I.I.K1b* | b. Protected and unprotected areas | ASES/AMES Only |
| *PA.I.I.K1c* | c. Surface wind | ASES/AMES Only |
| *PA.I.I.K1d* | d. Direction and strength of water current | ASES/AMES Only |
| *PA.I.I.K1e* | e. Floating and partially submerged debris | ASES/AMES Only |
| *PA.I.I.K1f* | f. Sandbars, islands, and shoals | ASES/AMES Only |
| *PA.I.I.K1g* | g. Vessel traffic and wakes | ASES/AMES Only |
| *PA.I.I.K1h* | h. Other features unique to the area | ASES/AMES Only |
| *PA.I.I.K2* | Float and hull construction, and their effect on seaplane performance. | ASES/AMES Only |
| *PA.I.I.K3* | Causes of porpoising and skipping, and the pilot action required to prevent or correct these occurrences. | ASES/AMES Only |
| *PA.I.I.K4* | How to locate and identify seaplane bases on charts or in directories. | ASES/AMES Only |
| *PA.I.I.K5* | Operating restrictions at various bases. | ASES/AMES Only |
| *PA.I.I.K6* | Right-of-way, steering, and sailing rules pertinent to seaplane operations. | ASES/AMES Only |
| *PA.I.I.K7* | Marine navigation aids, such as buoys, beacons, lights, and sound signals. | ASES/AMES Only |
| **Risk Management** | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.I.I.R1* | Local conditions. | ASES/AMES Only |
| *PA.I.I.R2* | Impact of marine traffic. | ASES/AMES Only |
| **Skills** | The applicant demonstrates the ability to: | |
| *PA.I.I.S1* | Assess the water surface characteristics for the proposed flight. | ASES/AMES Only |
| *PA.I.I.S2* | Identify restrictions at local bases. | ASES/AMES Only |
| *PA.I.I.S3* | Identify marine navigation aids. | ASES/AMES Only |
| *PA.I.I.S4* | Perform correct right-of-way, steering, and sailing operations. | ASES/AMES Only |

## II. PREFLIGHT PROCEDURES

| TASK | A. PREFLIGHT ASSESSMENT | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM; AC 00-6 | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with preparing for safe flight. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.II.A.K1* | Pilot self assessment. | |
| *PA.II.A.K2* | Determining that the aircraft to be used is appropriate, airworthy, and in a condition for safe flight. | |
| *PA.II.A.K3* | Aircraft preflight inspection including: | 1.13, 6.10 (7.10) |
| *PA.II.A.K3a* | a. Which items must be inspected | |
| *PA.II.A.K3b* | b. The reasons for checking each item | |
| *PA.II.A.K3c* | c. How to detect possible defects | |
| *PA.II.A.K3d* | d. The associated regulations | |
| *PA.II.A.K4* | Environmental factors including weather, terrain, route selection, and obstructions. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.II.A.R1* | Pilot. | |
| *PA.II.A.R2* | Aircraft. | |
| *PA.II.A.R3* | Environment (e.g., weather, airports, airspace, terrain, obstacles). | |
| *PA.II.A.R4* | External pressures. | |
| *PA.II.A.R5* | Aviation security concerns. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.II.A.S1* | Inspect the airplane with reference to an appropriate checklist. | 1.13, POH/AFM |
| *PA.II.A.S2* | Verify the airplane is airworthy and in condition for safe flight. | 1.12, 1.13 |

## II. PREFLIGHT PROCEDURES

| TASK | B. FLIGHT DECK MANAGEMENT | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; AC 120-71; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with safe flight deck management practices. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.II.B.K1* | Passenger briefing requirements, to include operation and required use of safety restraint systems. | |
| *PA.II.B.K2* | Use of appropriate checklists. | |
| *PA.II.B.K3* | Requirements for current and appropriate navigation data. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.II.B.R1* | Improper use of systems or equipment, to include automation and portable electronic devices. | |
| *PA.II.B.R2* | Flying with unresolved discrepancies. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.II.B.S1* | Secure all items in the flight deck and cabin. | Appendix D |
| *PA.II.B.S2* | Conduct an appropriate pre-takeoff briefing, to include identifying the PIC, use of safety belts, shoulder harnesses, doors, sterile flight deck, and emergency procedures. | 1.14, 6.10 (7.10) |
| *PA.II.B.S3* | Properly program and manage aircraft automation. | |

## II. PREFLIGHT PROCEDURES

| TASK | C. ENGINE STARTING | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-25; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with recommended engine starting procedures. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.II.C.K1* | Starting under various atmospheric conditions. | 1.14, 6.10 (7.10) |
| *PA.II.C.K2* | Starting the engine(s) by use of external power. | |
| *PA.II.C.K3* | Engine limitations as they relate to starting. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.II.C.R1* | Propeller safety. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.II.C.S1* | Position the airplane properly considering structures, other aircraft, wind, and the safety of nearby persons and property. | 1.14 |
| *PA.II.C.S2* | Use the appropriate checklist for engine start procedure. | 1.14, POH/AFM |

## II. PREFLIGHT PROCEDURES

| TASK | D. TAXIING (ASEL, AMEL) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-25; POH/AFM; AC 91-73; Chart Supplements; AIM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with safe taxi operations, including runway incursion avoidance. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.II.D.K1* | Current airport aeronautical references and information resources including chart supplements, airport diagram, and appropriate references. | |
| *PA.II.D.K2* | Taxi instructions/clearances. | |
| *PA.II.D.K3* | Airport markings, signs, and lights. | |
| *PA.II.D.K4* | Visual indicators for wind. | |
| *PA.II.D.K5* | Aircraft lighting. | |
| *PA.II.D.K6* | Procedures for: | |
| *PA.II.D.K6a* | a. Appropriate flight deck activities during taxiing including taxi route planning, briefing the location of Hot Spots, communicating and coordinating with ATC | |
| *PA.II.D.K6b* | b. Safe taxi procedures at towered and non-towered airports: | 1.17, 6.10 (7.10) |
| *PA.II.D.K6c* | c. Entering or crossing runways | 3.15 |
| *PA.II.D.K6d* | d. Night taxi operations | |
| *PA.II.D.K6e* | e. Low visibility taxi operations | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.II.D.R1* | Inappropriate activities and distractions. | |
| *PA.II.D.R2* | Confirmation or expectation bias as related to taxi instructions. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.II.D.S1* | Complete the checklist, as appropriate to the aircraft. | |
| *PA.II.D.S2* | Perform a brake check immediately after the airplane begins moving. | 1.17 |
| *PA.II.D.S3* | Position the flight controls properly for the existing wind conditions. | 1.17, 1.18, 6.10 (7.10) |
| *PA.II.D.S4* | Control direction and speed without excessive use of brakes. | 1.17, 6.10 (7.10) |
| *PA.II.D.S5* | Maintain positive control of the airplane during ground operations. | 1.17, 3.15, 6.10 (7.10) |
| *PA.II.D.S6* | Properly position the aircraft relative to hold lines. | 1.20, 3.15 |
| *PA.II.D.S7* | Receive and correctly read back clearances/instructions. | 1.20, 3.15 |
| *PA.II.D.S8* | Exhibit situational awareness. | Appendix H |
| *PA.II.D.S9* | Use an airport diagram or taxi chart during taxi. | Appendix H |
| *PA.II.D.S10* | Comply with airport/taxiway markings, signals, ATC clearances and instructions. | 3.15 |

## II. PREFLIGHT PROCEDURES

| TASK | E. TAXIING AND SAILING (ASES, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-23, FAA-H-8083-25; POH/AFM; AC 91-73; Chart Supplements; AIM. | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with safe taxiing and sailing operations, including runway incursion avoidance. | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.II.E.K1* | Airport information resources including chart supplements, airport diagram, and appropriate references. | ASES/AMES Only |
| *PA.II.E.K2* | Taxi instructions/clearances, if applicable. | ASES/AMES Only |
| *PA.II.E.K3* | Airport markings, signs, and lights, if applicable. | ASES/AMES Only |
| *PA.II.E.K4* | Visual indicators for wind. | ASES/AMES Only |
| *PA.II.E.K5* | Aircraft lighting. | ASES/AMES Only |
| *PA.II.E.K6* | Procedures for: | ASES/AMES Only |
| *PA.II.E.K6a* | a. Appropriate flight deck activities during taxiing | ASES/AMES Only |
| *PA.II.E.K6b* | b. Safe taxi at towered and non-towered airports (land operation) | ASES/AMES Only |
| *PA.II.E.K6c* | c. Entering crossing runways (land operation) | ASES/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.II.E.R1* | Inappropriate activities and distractions. | ASES/AMES Only |
| *PA.II.E.R2* | Porpoising and skipping. | ASES/AMES Only |
| *PA.II.E.R3* | Low visibility taxi and sailing operations. | ASES/AMES Only |
| *PA.II.E.R4* | Other aircraft, vessels, and hazards. | ASES/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.II.E.S1* | Complete the appropriate checklist. | ASES/AMES Only |
| *PA.II.E.S2* | Perform a brake check when an amphibious plane begins to move on land. | ASES/AMES Only |
| *PA.II.E.S3* | Position the flight controls, flaps, doors, water rudder, and power correctly for the existing wind, water and sailing conditions and to prevent and correct for porpoising and skipping so as to follow the desired course while sailing. | ASES/AMES Only |
| *PA.II.E.S4* | Use the appropriate idle, plow, or step taxi technique. | ASES/AMES Only |
| *PA.II.E.S5* | Exhibit procedures for steering, maneuvering, maintaining proper position, and situational awareness. | ASES/AMES Only |
| *PA.II.E.S6* | Plan and follow the most favorable taxi or sailing course for current conditions. | ASES/AMES Only |
| *PA.II.E.S7* | Comply with seabase/airport/taxiway markings, signals, and signs. | ASES/AMES Only |

## II. PREFLIGHT PROCEDURES

| TASK | F. BEFORE TAKEOFF CHECK | |
|---|---|---|
| REFERENCES | FAAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with the before takeoff check. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.II.F.K1* | Purpose of pre-takeoff checklist items including: | |
| *PA.II.F.K1a* | a. Reasons for checking each item. | 1.17, 6.10 (7.10) |
| *PA.II.F.K1b* | b. Detecting malfunctions | |
| *PA.II.F.K1c* | c. Ensuring the airplane is in safe operating condition as recommended by the manufacturer | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.II.F.R1* | Division of attention while conducting pre-flight checks. | |
| *PA.II.F.R2* | Unexpected runway changes by ATC. | |
| *PA.II.F.R3* | Wake turbulence. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.II.F.S1* | Review takeoff performance. | 6.10 (7.10) |
| *PA.II.F.S2* | Complete the appropriate checklist. | 1.17 |
| *PA.II.F.S3* | Properly position the airplane considering other aircraft, vessels, and wind. | 1.17 |
| *PA.II.F.S4* | Divide attention between inside and outside the flight deck. | 6.10 (7.10) |
| *PA.II.F.S5* | Verify that engine temperature(s) and pressure(s) are suitable. | POH/AFM |

## III. AIRPORT AND SEAPLANE BASE OPERATIONS

| TASK | A. COMMUNICATIONS AND LIGHT SIGNALS | |
|---|---|---|
| REFERENCES | 14 CFR part 91; FAA-H-8083-2, FAA-H-8083-25; AIM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with normal and emergency radio communications and ATC light gun signals to conduct radio communications safely while operating the aircraft. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.III.A.K1* | How to obtain proper radio frequencies. | |
| *PA.III.A.K2* | Proper radio communication procedures and ATC phraseology. | 1.15, 3.20, 5.1 (6.1) |
| *PA.III.A.K3* | ATC light signal recognition. | 1.15, 3.20, 5.1 (6.1) |
| *PA.III.A.K4* | Appropriate use of transponders. | |
| *PA.III.A.K5* | Lost communication procedures. | |
| *PA.III.A.K6* | Equipment issues that could cause loss of communications. | |
| *PA.III.A.K7* | Radar assistance. | |
| *PA.III.A.K8* | National Transportation Safety Board (NTSB) accident/incident reporting. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.III.A.R1* | Poor communication. | |
| *PA.III.A.R2* | Failure to recognize and declare an emergency. | |
| *PA.III.A.R3* | Confirmation or expectation bias. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.III.A.S1* | Select appropriate frequencies. | 5.1, 6.14 (6.1, 7.14) |
| *PA.III.A.S2* | Transmit using phraseology and procedures as specified in the AIM. | 1.15, 1.16, 1.20, 3.19, 5.1, 6.10 (6.1, 7.10) |
| *PA.III.A.S3* | Acknowledge radio communications and comply with instructions. | 1.15, 1.20, 5.1 (6.1) |

## III. AIRPORT AND SEAPLANE BASE OPERATIONS

| TASK | B. TRAFFIC PATTERNS | |
|---|---|---|
| REFERENCES | 14 CFR part 91; FAA-H-8083-2, FAA-H-8083-25; AIM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with traffic patterns. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.III.B.K1* | Towered and non-towered airport operations. | |
| *PA.III.B.K2* | Runway selection for the current conditions. | |
| *PA.III.B.K3* | Right-of-way rules. | |
| *PA.III.B.K4* | Use of automated weather and airport information. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.III.B.R1* | Collision hazards to include aircraft, terrain, obstacles, and wires. | |
| *PA.III.B.R2* | Distractions, loss of situational awareness, and/or improper task management. | |
| *PA.III.B.R3* | Wake turbulence and/or wind shear. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.III.B.S1* | Properly identify and interpret airport/seaplane base runways, taxiways, markings, signs, and lighting. | 3.15 |
| *PA.III.B.S2* | Comply with recommended traffic pattern procedures. | 1.17, 2.11 |
| *PA.III.B.S3* | Correct for wind drift to maintain the proper ground track. | 2.1, 2.11, 2.13 |
| *PA.III.B.S4* | Maintain orientation with the runway/landing area in use. | 2.11 |
| *PA.III.B.S5* | Maintain traffic pattern altitude, ±100 feet, and the appropriate airspeed, ±10 knots. | 6.10 (7.10) |
| *PA.III.B.S6* | Maintain situational awareness and proper spacing from other aircraft in the traffic pattern. | 6.10 (7.10) |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | A. NORMAL TAKEOFF AND CLIMB | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a normal takeoff, climb operations, and rejected takeoff procedures.<br>***Note: If a crosswind condition does not exist, the applicant's knowledge of crosswind elements must be evaluated through oral testing.*** | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.A.K1* | Effects of atmospheric conditions, including wind, on takeoff and climb performance. | |
| *PA.IV.A.K2* | $V_X$ and $V_Y$ | |
| *PA.IV.A.K3* | Appropriate aircraft configuration. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.A.R1* | Selection of runway based on pilot capability, aircraft performance and limitations, available distance, and wind. | |
| *PA.IV.A.R2* | Effects of: | |
| *PA.IV.A.R2a* | a. Crosswind, to include exceeding maximum demonstrated crosswind component | |
| *PA.IV.A.R2b* | b. Wind shear | |
| *PA.IV.A.R2c* | c. Tailwind | |
| *PA.IV.A.R2d* | d. Wake turbulence | |
| *PA.IV.A.R2e* | e. Runway surface/condition/length | |
| *PA.IV.A.R3* | Abnormal operations, to include planning for: | |
| *PA.IV.A.R3a* | a. Rejected takeoff | |
| *PA.IV.A.R3b* | b. Engine failure in takeoff/climb phase of flight | |
| *PA.IV.A.R4* | Collision hazards to include aircraft, terrain, obstacles, and wires. | |
| *PA.IV.A.R5* | Low altitude maneuvering/stall/spin. | |
| *PA.IV.A.R6* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.A.S1* | Complete the appropriate checklist. | 6.10 (7.10), POH/AFM |
| *PA.IV.A.S2* | Make radio calls as appropriate. | |
| *PA.IV.A.S3* | Verify assigned/correct runway. | |
| *PA.IV.A.S4* | Ascertain wind direction with or without visible wind direction indicators. | 1.18, 2.1 |
| *PA.IV.A.S5* | Position the flight controls for the existing wind conditions. | 1.18, 2.13, 6.10 (7.10) |
| *PA.IV.A.S6* | Clear the area; taxi into the takeoff position and align the airplane on the runway centerline (ASEL, AMEL) or takeoff path (ASES, AMES). | 1.19, 1.21 |
| *PA.IV.A.S7* | Confirm takeoff power; and proper engine and flight instrument indications prior to rotation (ASEL, AMEL). | 1.19, 6.10 (7.10) |
| *PA.IV.A.S8* | Rotate and lift-off at the recommended airspeed and accelerate to $V_Y$. | 1.19, 6.10 (7.10) |
| *PA.IV.A.S9* | Retract the water rudders, as appropriate, establish and maintain the most efficient planing/liftoff attitude, and correct for porpoising and skipping (ASES, AMES). | ASES/AMES Only |
| *PA.IV.A.S10* | Establish pitch attitude to maintain the manufacturer's recommended speed, $V_Y$ +10/-5 knots. | 1.19, 1.21, 6.10 (7.10) |
| *PA.IV.A.S11* | Retract the landing gear and flaps in accordance with manufacturer's guidance. | 6.10 (7.10) |
| *PA.IV.A.S12* | Maintain $V_Y$ +10/-5 knots to a safe maneuvering altitude. | 1.19, 6.10 (7.10) |
| *PA.IV.A.S13* | Maintain directional control and proper wind drift correction throughout takeoff and climb. | 1.19, 1.21, 2.13, 6.10 (7.10) |
| *PA.IV.A.S14* | Comply with noise abatement procedures. | 6.12 (7.12), Appendix E |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | B. NORMAL APPROACH AND LANDING | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a normal approach and landing with emphasis on proper use and coordination of flight controls.<br>***Note: If a crosswind condition does not exist, the applicant's knowledge of crosswind elements must be evaluated through oral testing.*** | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.B.K1* | A stabilized approach, to include energy management concepts. | |
| *PA.IV.B.K2* | Effects of atmospheric conditions, including wind, on approach and landing performance. | |
| *PA.IV.B.K3* | Wind correction techniques on approach and landing. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.B.R1* | Selection of runway based on pilot capability, aircraft performance and limitations, available distance, and wind. | |
| *PA.IV.B.R2* | Effects of: | |
| *PA.IV.B.R2a* | a. Crosswind, to include exceeding maximum demonstrated crosswind component | |
| *PA.IV.B.R2b* | b. Wind shear | |
| *PA.IV.B.R2c* | c. Tailwind | |
| *PA.IV.B.R2d* | d. Wake turbulence | |
| *PA.IV.B.R2e* | e. Runway surface/condition | |
| *PA.IV.B.R3* | Abnormal operations, to include planning for: | |
| *PA.IV.B.R3a* | a. Rejected landing and go-around | |
| *PA.IV.B.R3b* | b. Land and hold short operations (LAHSO) | |
| *PA.IV.B.R4* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.IV.B.R5* | Low altitude maneuvering/stall/spin. | |
| *PA.IV.B.R6* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.B.S1* | Complete the appropriate checklist. | 2.11, POH/AFM |
| *PA.IV.B.S2* | Make radio calls as appropriate. | |
| *PA.IV.B.S3* | Ensure the aircraft is aligned with the correct/assigned runway (ASEL, AMEL). | |
| *PA.IV.B.S4* | Scan the landing runway and adjoining area for traffic and obstructions (ASEL, AMEL). | 1.18, 2.11 |
| *PA.IV.B.S5* | Consider the wind conditions, landing surface, obstructions, and select a suitable touchdown point (ASES, AMES). | |
| *PA.IV.B.S6* | Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach. | 2.11, 2.13 |
| *PA.IV.B.S7* | Maintain manufacturer's recommended airspeed, or in its absence, not more than 1.3 $V_{SO}$, +10/-5 knots, or as recommended for the aircraft type and gust velocity. | 2.11, 2.13, 6.10 (7.10) |
| *PA.IV.B.S8* | Maintain crosswind correction and directional control throughout the approach and landing. | 2.11, 2.13, 6.10 (7.10) |
| *PA.IV.B.S9* | Make smooth, timely, and correct control inputs during round out and touchdown. | 2.11, 2.13 |
| *PA.IV.B.S10* | Touch down at speed recommended by manufacturer (ASEL, AMEL), or during round out and touchdown to contact the water at the proper pitch attitude (ASES, AMES). | 2.11 |
| *PA.IV.B.S11* | Execute a timely go-around if the approach cannot be made within the tolerances specified above or for any other condition that may result in an unsafe approach or landing. | 2.13 |
| *PA.IV.B.S12* | Utilize runway incursion avoidance procedures. | Appendix H |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | C. SOFT-FIELD TAKEOFF AND CLIMB (ASEL) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a soft-field takeoff, climb operations, and rejected takeoff procedures. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.C.K1* | Effects of atmospheric conditions, including wind, on takeoff and climb performance. | |
| *PA.IV.C.K2* | $V_X$ and $V_Y$. | |
| *PA.IV.C.K3* | Appropriate aircraft configuration. | |
| *PA.IV.C.K4* | Ground effect. | |
| *PA.IV.C.K5* | Importance of weight transfer from wheels to wings. | |
| *PA.IV.C.K6* | Left turning tendencies. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.C.R1* | Selection of runway based on pilot capability, aircraft performance and limitations, available distance, and wind. | |
| *PA.IV.C.R2* | Effects of: | |
| *PA.IV.C.R2a* | a. Crosswind | |
| *PA.IV.C.R2b* | b. Wind shear | |
| *PA.IV.C.R2c* | c. Tailwind | |
| *PA.IV.C.R2d* | d. Wake turbulence | |
| *PA.IV.C.R2e* | e. Runway surface/condition | |
| *PA.IV.C.R3* | Abnormal operations, to include planning for: | |
| *PA.IV.C.R3a* | a. Rejected takeoff | |
| *PA.IV.C.R3b* | b. Engine failure in takeoff/climb phase of flight | |
| *PA.IV.C.R4* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.IV.C.R5* | Low altitude maneuvering/stall/spin. | |
| *PA.IV.C.R6* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.C.S1* | Complete the appropriate checklist. | 6.10 (7.10), POH/AFM |
| *PA.IV.C.S2* | Make radio calls as appropriate. | |
| *PA.IV.C.S3* | Verify assigned/correct runway. | |
| *PA.IV.C.S4* | Ascertain wind direction with or without visible wind direction indicators. | |
| *PA.IV.C.S5* | Position the flight controls for the existing wind conditions. | 1.18, 2.13, 5.7 (6.7) |
| *PA.IV.C.S6* | Clear the area, taxi into the takeoff position and align the airplane on the runway centerline without stopping, while advancing the throttle smoothly to takeoff power. | 5.7, 6.10 (6.7, 7.10) |
| *PA.IV.C.S7* | Confirm takeoff power and proper engine and flight instrument indications prior to rotation. | 5.7, 6.10 (6.7, 7.10) |
| *PA.IV.C.S8* | Establish and maintain a pitch attitude that will transfer the weight of the airplane from the wheels to the wings as rapidly as possible. | 5.7, 6.10 (6.7, 7.10) |
| *PA.IV.C.S9* | Lift off at the lowest possible airspeed and remain in ground effect while accelerating to $V_X$ or $V_Y$, as appropriate. | 5.7, 6.10 (6.7, 7.10) |
| *PA.IV.C.S10* | Establish a pitch attitude for $V_X$ or $V_Y$, as appropriate, and maintain selected airspeed +10/-5 knots during the climb. | 5.7 (6.7) |
| *PA.IV.C.S11* | Retract landing gear and flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer's guidance. | 5.7 (6.7) |
| *PA.IV.C.S12* | Maintain $V_X$ or $V_Y$ +10/-5 knots to a safe maneuvering altitude. | 1.19, 6.10 (7.10) |
| *PA.IV.C.S13* | Maintain directional control and proper wind-drift correction throughout takeoff and climb. | 1.19, 1.21, 2.13 |
| *PA.IV.C.S14* | Comply with noise abatement procedures. | |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | D. SOFT-FIELD APPROACH AND LANDING (ASEL) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a soft-field approach and landing with emphasis on proper use and coordination of flight controls. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.D.K1* | A stabilized approach, to include energy management concepts. | |
| *PA.IV.D.K2* | Effects of atmospheric conditions, including wind, on approach and landing performance. | |
| *PA.IV.D.K3* | Wind correction techniques on approach and landing. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.D.R1* | Selection of runway based on pilot capability, aircraft performance and limitations, available distance, and wind. | |
| *PA.IV.D.R2* | Effects of: | |
| *PA.IV.D.R2a* | a. Crosswind | |
| *PA.IV.D.R2b* | b. Wind shear | |
| *PA.IV.D.R2c* | c. Tailwind | |
| *PA.IV.D.R2d* | d. Wake turbulence | |
| *PA.IV.D.R2e* | e. Runway surface/condition | |
| *PA.IV.D.R3* | Abnormal operations, to include planning for rejected landing and go-around. | |
| *PA.IV.D.R4* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.IV.D.R5* | Low altitude maneuvering/stall/spin. | |
| *PA.IV.D.R6* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.D.S1* | Complete the appropriate checklist. | 2.11, POH/AFM |
| *PA.IV.D.S2* | Make radio calls as appropriate. | |
| *PA.IV.D.S3* | Ensure the aircraft is aligned with the correct/assigned runway. | |
| *PA.IV.D.S4* | Scan the landing runway and adjoining area for traffic and obstructions. | |
| *PA.IV.D.S5* | Consider the wind conditions, landing surface, obstructions, and select a suitable touchdown point. | 1.18, 2.11 |
| *PA.IV.D.S6* | Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach. | 5.7 (6.7) |
| *PA.IV.D.S7* | Maintain recommended airspeed, or in its absence, not more than 1.3 $V_{SO}$, +10 /-5 knots, with wind gust factor applied. | 5.7 (6.7) |
| *PA.IV.D.S8* | Maintain crosswind correction and directional control throughout the approach and landing. | 2.11, 2.13 |
| *PA.IV.D.S9* | Make smooth, timely, and correct control inputs during the round out and touchdown and, for tricycle gear airplanes, keep the nose wheel off the surface until loss of elevator effectiveness. | 5.7 (6.7) |
| *PA.IV.D.S10* | Touch down softly with minimum sink rate, no side drift, and with the airplane's longitudinal axis aligned with the center of the runway. | 5.7 (6.7) |
| *PA.IV.D.S11* | Maintain elevator as recommended by manufacturer during rollout and exit the "soft" area at a speed that would preclude sinking into the surface. | |
| *PA.IV.D.S12* | Execute a timely go-around if the approach cannot be made within the tolerances specified above or for any other condition that may result in an unsafe approach or landing. | |
| *PA.IV.D.S13* | Maintain proper position of the flight controls and sufficient speed to taxi on the soft surface. | 5.7 (6.7) |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | E. SHORT-FIELD TAKEOFF AND MAXIMUM PERFORMANCE CLIMB (ASEL, AMEL) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a short-field takeoff, maximum performance climb operations, and rejected takeoff procedures. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.E.K1* | Effects of atmospheric conditions, including wind, on takeoff and climb performance. | |
| *PA.IV.E.K2* | $V_X$ and $V_Y$. | |
| *PA.IV.E.K3* | Appropriate aircraft configuration. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.E.R1* | Selection of runway based on pilot capability, aircraft performance and limitations, available distance, and wind. | |
| *PA.IV.E.R2* | Effects of: | |
| *PA.IV.E.R2a* | a. Crosswind | |
| *PA.IV.E.R2b* | b. Wind shear | |
| *PA.IV.E.R2c* | c. Tailwind | |
| *PA.IV.E.R2d* | d. Wake turbulence | |
| *PA.IV.E.R2e* | e. Runway surface/condition | |
| *PA.IV.E.R3* | Abnormal operations, to include planning for: | |
| *PA.IV.E.R3a* | a. Rejected takeoff | |
| *PA.IV.E.R3b* | b. Engine failure in takeoff/climb phase of flight | |
| *PA.IV.E.R4* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | |
| *PA.IV.E.R5* | Low altitude maneuvering/stall/spin. | |
| *PA.IV.E.R6* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.E.S1* | Complete the appropriate checklist. | 6.10 (7.10), POH/AFM |
| *PA.IV.E.S2* | Make radio calls as appropriate. | |
| *PA.IV.E.S3* | Verify assigned/correct runway. | |
| *PA.IV.E.S4* | Ascertain wind direction with or without visible wind direction indicators. | |
| *PA.IV.E.S5* | Position the flight controls for the existing wind conditions. | 1.18, 2.13, 5.7 (6.7) |
| *PA.IV.E.S6* | Clear the area, taxi into the takeoff position and align the airplane on the runway centerline utilizing maximum available takeoff area. | 5.7 (6.7) |
| *PA.IV.E.S7* | Apply brakes while setting aircraft power to achieve maximum performance. | 5.7 (6.7) |
| *PA.IV.E.S8* | Confirm takeoff power prior to brake release and verify proper engine and flight instrument indications prior to rotation. | |
| *PA.IV.E.S9* | Rotate and lift off at the recommended airspeed, and accelerate to the recommended obstacle clearance airspeed or $V_X$ +10/-5 knots. | 5.7, 6.10 (6.7, 7.10) |
| *PA.IV.E.S10* | Establish a pitch attitude that will maintain the recommended obstacle clearance airspeed, or $V_X$, +10/-5 knots, until the obstacle is cleared, or until the airplane is 50 feet above the surface. | 5.7, 6.10 (6.7, 7.10) |
| *PA.IV.E.S11* | After clearing the obstacle, establish the pitch attitude for $V_Y$, accelerate to $V_Y$, and maintain $V_Y$, +10/-5 knots, during the climb. | 5.7, 6.10 (6.7, 7.10) |
| *PA.IV.E.S12* | Retract landing gear and flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer's guidance. | 5.7 (6.7) |
| *PA.IV.E.S13* | Maintain $V_Y$ +10/-5 knots to a safe maneuvering altitude. | 1.19, 6.10 (7.10) |
| *PA.IV.E.S14* | Maintain directional control and proper wind-drift correction throughout takeoff and climb. | 1.19, 1.21, 2.13 |
| *PA.IV.E.S15* | Comply with noise abatement procedures. | |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | F. SHORT-FIELD APPROACH AND LANDING (ASEL, AMEL) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a short-field approach and landing with emphasis on proper use and coordination of flight controls. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.F.K1* | A stabilized approach, to include energy management concepts. | |
| *PA.IV.F.K2* | Effects of atmospheric conditions, including wind, on approach and landing performance. | |
| *PA.IV.F.K3* | Wind correction techniques on approach and landing. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.F.R1* | Selection of runway based on pilot capability, aircraft performance and limitations, available distance, and wind. | |
| *PA.IV.F.R2* | Effects of: | |
| *PA.IV.F.R2a* | a. Crosswind | |
| *PA.IV.F.R2b* | b. Wind shear | |
| *PA.IV.F.R2c* | c. Tailwind | |
| *PA.IV.F.R2d* | d. Wake turbulence | |
| *PA.IV.F.R2e* | e. Runway surface/condition | |
| *PA.IV.F.R3* | Abnormal operations, to include planning for: | |
| *PA.IV.F.R3a* | a. Rejected landing and go-around | |
| *PA.IV.F.R3b* | b. Land and hold short operations (LAHSO) | |
| *PA.IV.F.R4* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.IV.F.R5* | Low altitude maneuvering/stall/spin. | |
| *PA.IV.F.R6* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.F.S1* | Complete the appropriate checklist. | 2.11, POH/AFM |
| *PA.IV.F.S2* | Make radio calls as appropriate. | |
| *PA.IV.F.S3* | Ensure the aircraft is aligned with the correct/assigned runway. | |
| *PA.IV.F.S4* | Scan the landing runway and adjoining area for traffic and obstructions. | |
| *PA.IV.F.S5* | Consider the wind conditions, landing surface, and select a suitable touchdown point. | 1.18, 2.11 |
| *PA.IV.F.S6* | Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach. | 5.7 (6.7) |
| *PA.IV.F.S7* | Maintain manufacturer's published airspeed, or in its absence, not more than 1.3 $V_{SO}$, +10 /-5 knots, with wind gust factor applied. | 5.7 (6.7) |
| *PA.IV.F.S8* | Maintain crosswind correction and directional control throughout the approach and landing sequence. | 2.11, 2.13 |
| *PA.IV.F.S9* | Make smooth, timely, and correct control inputs during the round out and touchdown. | 5.7 (6.7) |
| *PA.IV.F.S10* | Touch down at the recommended airspeed. | 5.7 (6.7) |
| *PA.IV.F.S11* | Touch down within 200 feet beyond the specified point, threshold markings or runway numbers, with no side drift, minimum float, and with the airplane's longitudinal axis aligned with and over runway centerline. | 6.10 (7.10) |
| *PA.IV.F.S12* | Use manufacturer's recommended procedures for aircraft configuration and braking. | 5.7 (6.7) |
| *PA.IV.F.S13* | Execute a safe and timely go-around if the approach cannot be made within the tolerances specified above or for any other condition that may result in an unsafe approach or landing. | |
| *PA.IV.F.S14* | Utilize runway incursion avoidance procedures. | Appendix H |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | G. CONFINED AREA TAKEOFF AND MAXIMUM PERFORMANCE CLIMB (ASES, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a confined area takeoff, and maximum performance climb operations. | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.G.K1* | Effects of atmospheric conditions, including wind, on takeoff and climb performance. | ASES/AMES Only |
| *PA.IV.G.K2* | $V_X$ and $V_Y$. | ASES/AMES Only |
| *PA.IV.G.K3* | Appropriate aircraft configuration. | ASES/AMES Only |
| *PA.IV.G.K4* | Effects of water surface. | ASES/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.G.R1* | Selection of takeoff path based on pilot capability, aircraft performance and limitations, available distance, and wind. | ASES/AMES Only |
| *PA.IV.G.R2* | Effects of: | ASES/AMES Only |
| *PA.IV.G.R2a* | a. Crosswind | ASES/AMES Only |
| *PA.IV.G.R2b* | b. Wind shear | ASES/AMES Only |
| *PA.IV.G.R2c* | c. Tailwind | ASES/AMES Only |
| *PA.IV.G.R2d* | d. Wake turbulence | ASES/AMES Only |
| *PA.IV.G.R2e* | e. Water surface/condition | ASES/AMES Only |
| *PA.IV.G.R3* | Abnormal operations, to include planning for: | ASES/AMES Only |
| *PA.IV.G.R3a* | a. Rejected takeoff | ASES/AMES Only |
| *PA.IV.G.R3b* | b. Engine failure in takeoff/climb phase of flight | ASES/AMES Only |
| *PA.IV.G.R4* | Collision hazards, to include aircraft, terrain, obstacles, wires, and vessels. | ASES/AMES Only |
| *PA.IV.G.R5* | Low altitude maneuvering/stall/spin. | ASES/AMES Only |
| *PA.IV.G.R6* | Distractions, loss of situational awareness, and/or improper task management. | ASES/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.G.S1* | Complete the appropriate checklist. | ASES/AMES Only |
| *PA.IV.G.S2* | Make radio calls as appropriate. | ASES/AMES Only |
| *PA.IV.G.S3* | Verify assigned/correct takeoff path. | ASES/AMES Only |
| *PA.IV.G.S4* | Ascertain wind direction with or without visible wind direction indicators. | ASES/AMES Only |
| *PA.IV.G.S5* | Position the flight controls for the existing wind conditions. | ASES/AMES Only |
| *PA.IV.G.S6* | Clear the area, taxi into takeoff position utilizing maximum available takeoff area and align the airplane on the takeoff path. | ASES/AMES Only |
| *PA.IV.G.S7* | Confirm takeoff power and proper engine and flight instrument indications prior to rotation. | ASES/AMES Only |
| *PA.IV.G.S8* | Establish a pitch attitude that maintains the most efficient planing/liftoff attitude and corrects for porpoising and skipping. | ASES/AMES Only |
| *PA.IV.G.S9* | Rotate and liftoff at the recommended airspeed, and accelerate to the recommended obstacle clearance airspeed or $V_X$. | ASES/AMES Only |
| *PA.IV.G.S10* | Establish a pitch attitude that will maintain the recommended obstacle clearance airspeed, or $V_X$ +10/-5 knots until the obstacle is cleared, or until the airplane is 50 feet above the surface. | ASES/AMES Only |
| *PA.IV.G.S11* | After clearing the obstacle, establish pitch attitude for $V_Y$, accelerate to $V_Y$, and maintain $V_Y$, +10/-5 knots, during the climb. | ASES/AMES Only |
| *PA.IV.G.S12* | Retract flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer's guidance. | ASES/AMES Only |
| *PA.IV.G.S13* | Maintain $V_Y$ +10/-5 knots to a safe maneuvering altitude. | ASES/AMES Only |
| *PA.IV.G.S14* | Maintain directional control and proper wind-drift correction throughout takeoff and climb. | ASES/AMES Only |
| *PA.IV.G.S15* | Comply with noise abatement procedures. | ASES/AMES Only |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | H. CONFINED AREA APPROACH AND LANDING (ASES, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a confined area approach and landing. | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.H.K1* | A stabilized approach, to include energy management concepts. | ASES/AMES Only |
| *PA.IV.H.K2* | Effects of atmospheric conditions, including wind, on approach and landing performance. | ASES/AMES Only |
| *PA.IV.H.K3* | Wind correction techniques on approach and landing. | ASES/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.H.R1* | Selection of approach path and touchdown area based on pilot capability, aircraft performance and limitations, available distance, and wind. | ASES/AMES Only |
| *PA.IV.H.R2* | Effects of: | ASES/AMES Only |
| *PA.IV.H.R2a* | a. Crosswind | ASES/AMES Only |
| *PA.IV.H.R2b* | b. Wind shear | ASES/AMES Only |
| *PA.IV.H.R2c* | c. Tailwind | ASES/AMES Only |
| *PA.IV.H.R2d* | d. Wake turbulence | ASES/AMES Only |
| *PA.IV.H.R2e* | e. Water surface/condition | ASES/AMES Only |
| *PA.IV.H.R3* | Abnormal operations, to include planning for rejected landing and go-around. | ASES/AMES Only |
| *PA.IV.H.R4* | Collision hazards, to include aircraft, terrain, obstacles, wires, and vessels. | ASES/AMES Only |
| *PA.IV.H.R5* | Low altitude maneuvering/stall/spin. | ASES/AMES Only |
| *PA.IV.H.R6* | Distractions, loss of situational awareness, and/or improper task management. | ASES/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.H.S1* | Complete the appropriate checklist. | ASES/AMES Only |
| *PA.IV.H.S2* | Make radio calls as appropriate. | ASES/AMES Only |
| *PA.IV.H.S3* | Ensure the aircraft is aligned with the correct/assigned waterway. | ASES/AMES Only |
| *PA.IV.H.S4* | Scan the landing area for traffic and obstructions. | ASES/AMES Only |
| *PA.IV.H.S5* | Consider wind conditions, landing surface, obstructions, and select the proper landing path. | ASES/AMES Only |
| *PA.IV.H.S6* | Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach. | ASES/AMES Only |
| *PA.IV.H.S7* | Maintain manufacturer's published airspeed, or in its absence, not more than 1.3 $V_{SO}$, +10/-5 knots, with wind gust factor applied. | ASES/AMES Only |
| *PA.IV.H.S8* | Maintain crosswind correction and directional control throughout the approach and landing, as required. | ASES/AMES Only |
| *PA.IV.H.S9* | Make smooth, timely, and correct control application during the round out and touchdown. | ASES/AMES Only |
| *PA.IV.H.S10* | Contact the water at the minimum safe airspeed with the proper pitch attitude for the surface conditions. | ASES/AMES Only |
| *PA.IV.H.S11* | Touch down within 200 feet beyond the specified point, with no side drift, minimum float, and with the airplane's longitudinal axis aligned with the projected landing path. | ASES/AMES Only |
| *PA.IV.H.S12* | Execute a timely go-around if the approach cannot be made within the tolerances specified above or for any other condition that that may result in an unsafe approach or landing. | ASES/AMES Only |
| *PA.IV.H.S13* | Apply elevator control as necessary to stop in the shortest distance consistent with safety. | ASES/AMES Only |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | I. GLASSY WATER TAKEOFF AND CLIMB (ASES, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-23; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a glassy water takeoff and climb.<br>***Note: If a glassy water condition does not exist, the applicant must be evaluated by simulating the Task.*** | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.I.K1* | Effects of atmospheric conditions, including wind, on takeoff and climb performance. | ASES/AMES Only |
| *PA.IV.I.K2* | $V_X$ and $V_Y$. | ASES/AMES Only |
| *PA.IV.I.K3* | Appropriate aircraft configuration. | ASES/AMES Only |
| *PA.IV.I.K4* | Appropriate use of glassy water takeoff and climb technique. | ASES/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.I.R1* | Selection of takeoff path based on pilot capability, aircraft performance and limitations, available distance, and wind. | ASES/AMES Only |
| *PA.IV.I.R2* | Water surface/condition. | ASES/AMES Only |
| *PA.IV.I.R3* | Abnormal operations, to include planning for: | ASES/AMES Only |
| *PA.IV.I.R3a* | a. Rejected takeoff criteria | ASES/AMES Only |
| *PA.IV.I.R3b* | b. Engine failure in takeoff/climb phase of flight | ASES/AMES Only |
| *PA.IV.I.R4* | Collision hazards, to include aircraft, terrain, obstacles, wires, and vessels. | ASES/AMES Only |
| *PA.IV.I.R5* | Low altitude maneuvering/stall/spin. | ASES/AMES Only |
| *PA.IV.I.R6* | Distractions, loss of situational awareness, and/or improper task management. | ASES/AMES Only |
| *PA.IV.I.R7* | Failure to confirm gear position in an amphibious aircraft. | ASES/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.I.S1* | Complete the appropriate checklist. | ASES/AMES Only |
| *PA.IV.I.S2* | Make radio calls as appropriate. | ASES/AMES Only |
| *PA.IV.I.S3* | Position flight controls and flaps for the existing conditions. | ASES/AMES Only |
| *PA.IV.I.S4* | Clear the area; select appropriate takeoff path considering surface hazards and/or vessels and surface conditions. | ASES/AMES Only |
| *PA.IV.I.S5* | Retract the water rudders as appropriate; advance the throttle smoothly to takeoff power. | ASES/AMES Only |
| *PA.IV.I.S6* | Establish and maintain an appropriate planing attitude, directional control, and correct for porpoising, skipping, and increase in water drag. | ASES/AMES Only |
| *PA.IV.I.S7* | Utilize appropriate techniques to lift seaplane from the water considering surface conditions. | ASES/AMES Only |
| *PA.IV.I.S8* | Establish proper attitude/airspeed, and accelerate to $V_Y$ +10/-5 knots during the climb. | ASES/AMES Only |
| *PA.IV.I.S9* | Retract flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer's guidance. | ASES/AMES Only |
| *PA.IV.I.S10* | Maintain $V_Y$ +10/-5 knots to a safe maneuvering altitude. | ASES/AMES Only |
| *PA.IV.I.S11* | Maintain directional control and proper wind-drift correction throughout takeoff and climb. | ASES/AMES Only |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| | | |
|---|---|---|
| **Task** | **J. Glassy Water Approach and Landing (ASES, AMES)** | |
| **References** | FAA-H-8083-2, FAA-H-8083-23; POH/AFM | |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a glassy water approach and landing.<br>***Note: If a glassy water condition does not exist, the applicant must be evaluated by simulating the Task.*** | |
| **Knowledge** | The applicant demonstrates understanding of: | |
| *PA.IV.J.K1* | A stabilized approach, to include energy management concepts. | ASES/AMES Only |
| *PA.IV.J.K2* | Effects of atmospheric conditions, including wind, on approach and landing performance. | ASES/AMES Only |
| *PA.IV.J.K3* | When and why glassy water techniques are used. | ASES/AMES Only |
| *PA.IV.J.K4* | How a glassy water approach and landing is executed. | ASES/AMES Only |
| **Risk Management** | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.J.R1* | Selection of approach path and touchdown area based on pilot capability, aircraft performance and limitations, available distance, and wind. | ASES/AMES Only |
| *PA.IV.J.R2* | Water surface/condition. | ASES/AMES Only |
| *PA.IV.J.R3* | Abnormal operations, to include planning for rejected landing and go-around. | ASES/AMES Only |
| *PA.IV.J.R4* | Collision hazards, to include aircraft, terrain, obstacle, wires, and vessels. | ASES/AMES Only |
| *PA.IV.J.R5* | Low altitude maneuvering/stall/spin. | ASES/AMES Only |
| *PA.IV.J.R6* | Distractions, loss of situational awareness, and/or improper task management. | ASES/AMES Only |
| *PA.IV.J.R7* | Failure to confirm gear position in an amphibious aircraft. | ASES/AMES Only |
| **Skills** | The applicant demonstrates the ability to: | |
| *PA.IV.J.S1* | Complete the appropriate checklist. | ASES/AMES Only |
| *PA.IV.J.S2* | Make radio calls as appropriate. | ASES/AMES Only |
| *PA.IV.J.S3* | Scan the landing area for traffic and obstructions. | ASES/AMES Only |
| *PA.IV.J.S4* | Consider landing surface, obstructions, and select the proper landing path. | ASES/AMES Only |
| *PA.IV.J.S5* | Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach. | ASES/AMES Only |
| *PA.IV.J.S6* | Maintain manufacturer's published airspeed, or in its absence, not more than 1.3 $V_{SO}$, +10/-5 knots. | ASES/AMES Only |
| *PA.IV.J.S7* | Make smooth, timely, and correct power and control adjustments to maintain proper pitch attitude and rate of descent to touchdown. | ASES/AMES Only |
| *PA.IV.J.S8* | Contact the water in the proper pitch attitude, and slow to idle taxi speed. | ASES/AMES Only |
| *PA.IV.J.S9* | Maintain crosswind correction and directional control throughout the approach and landing. | ASES/AMES Only |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| | | |
|---|---|---|
| **Task** | **K. Rough Water Takeoff and Climb (ASES, AMES)** | |
| **References** | FAA-H-8083-2, FAA-H-8083-23; POH/AFM | |
| **Objective** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a rough water takeoff and climb.<br>***Note: If a rough water condition does not exist, the applicant must be evaluated by simulating the Task.*** | |
| **Knowledge** | The applicant demonstrates understanding of: | |
| *PA.IV.K.K1* | Effects of atmospheric conditions, including wind, on takeoff and climb performance. | ASES/AMES Only |
| *PA.IV.K.K2* | $V_X$ and $V_Y$. | ASES/AMES Only |
| *PA.IV.K.K3* | Appropriate aircraft configuration. | ASES/AMES Only |
| *PA.IV.K.K4* | Appropriate use of rough water takeoff and climb technique. | ASES/AMES Only |
| **Risk Management** | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.K.R1* | Selection of takeoff path based on pilot capability, aircraft performance and limitations, available distance, and wind. | ASES/AMES Only |
| *PA.IV.K.R2* | Effects of: | ASES/AMES Only |
| *PA.IV.K.R2a* | a. Crosswind | ASES/AMES Only |
| *PA.IV.K.R2b* | b. Wind shear | ASES/AMES Only |
| *PA.IV.K.R2c* | c. Tailwind | ASES/AMES Only |
| *PA.IV.K.R2d* | d. Wake turbulence | ASES/AMES Only |
| *PA.IV.K.R2e* | e. Water surface/condition | ASES/AMES Only |
| *PA.IV.K.R3* | Abnormal operations, to include planning for: | ASES/AMES Only |
| *PA.IV.K.R3a* | a. Rejected takeoff criteria | ASES/AMES Only |
| *PA.IV.K.R3b* | b. Engine failure in takeoff/climb phase of flight | ASES/AMES Only |
| *PA.IV.K.R4* | Collision hazards, to include aircraft, terrain, obstacles, wires, and vessels. | ASES/AMES Only |
| *PA.IV.K.R5* | Low altitude maneuvering/stall/spin. | ASES/AMES Only |
| *PA.IV.K.R6* | Distractions, loss of situational awareness, and/or improper task management. | ASES/AMES Only |
| *PA.IV.K.R7* | Failure to confirm gear position in an amphibious aircraft. | ASES/AMES Only |
| **Skills** | The applicant demonstrates the ability to: | |
| *PA.IV.K.S1* | Complete the appropriate checklist. | ASES/AMES Only |
| *PA.IV.K.S2* | Make radio calls as appropriate. | ASES/AMES Only |
| *PA.IV.K.S3* | Verify assigned/correct takeoff path. | ASES/AMES Only |
| *PA.IV.K.S4* | Ascertain wind direction with or without visible wind direction indicators. | ASES/AMES Only |
| *PA.IV.K.S5* | Position flight controls and flaps for the existing conditions. | ASES/AMES Only |
| *PA.IV.K.S6* | Clear the area, select an appropriate takeoff path considering wind, swells, surface hazards and/or vessels. | ASES/AMES Only |
| *PA.IV.K.S7* | Retract the water rudders as appropriate; advance the throttle smoothly to takeoff power. | ASES/AMES Only |
| *PA.IV.K.S8* | Establish and maintain an appropriate planing attitude, directional control, and correct for porpoising, skipping, and increase in water drag. | ASES/AMES Only |
| *PA.IV.K.S9* | Lift off at minimum airspeed and accelerate to $V_Y$, +10/- 5 knots before leaving ground effect. | ASES/AMES Only |
| *PA.IV.K.S10* | Retract flaps after a positive rate of climb has been verified or in accordance with aircraft manufacturer's guidance. | ASES/AMES Only |
| *PA.IV.K.S11* | Maintain $V_Y$ +10/ 5 knots to a safe maneuvering altitude. | ASES/AMES Only |
| *PA.IV.K.S12* | Maintain directional control and proper wind-drift correction throughout takeoff and climb. | ASES/AMES Only |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | L. ROUGH WATER APPROACH AND LANDING (ASES, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-23; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a rough water approach and landing.<br>***Note: If a rough water condition does not exist, the applicant must be evaluated by simulating the Task.*** | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.L.K1* | A stabilized approach, to include energy management concepts. | ASES/AMES Only |
| *PA.IV.L.K2* | Effects of atmospheric conditions, including wind, on approach and landing performance. | ASES/AMES Only |
| *PA.IV.L.K3* | Wind correction techniques on approach and landing. | ASES/AMES Only |
| *PA.IV.L.K4* | When and why rough water techniques are used. | ASES/AMES Only |
| *PA.IV.L.K5* | How a rough water approach and landing is executed. | ASES/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.L.R1* | Selection of approach path and touchdown area based on pilot capability, aircraft performance and limitations, available distance, and wind. | ASES/AMES Only |
| *PA.IV.L.R2* | Effects of: | ASES/AMES Only |
| *PA.IV.L.R2a* | a. Crosswind | ASES/AMES Only |
| *PA.IV.L.R2b* | b. Wind shear | ASES/AMES Only |
| *PA.IV.L.R2c* | c. Tailwind | ASES/AMES Only |
| *PA.IV.L.R2d* | d. Wake turbulence | ASES/AMES Only |
| *PA.IV.L.R2e* | e. Water surface/condition | ASES/AMES Only |
| *PA.IV.L.R3* | Abnormal operations, to include planning for rejected landing and go-around. | ASES/AMES Only |
| *PA.IV.L.R4* | Collision hazards, to include aircraft, terrain, obstacles, wires, and vessels. | ASES/AMES Only |
| *PA.IV.L.R5* | Low altitude maneuvering/stall/spin. | ASES/AMES Only |
| *PA.IV.L.R6* | Distractions, loss of situational awareness, and/or improper task management. | ASES/AMES Only |
| *PA.IV.L.R7* | Failure to confirm gear position in an amphibious aircraft. | ASES/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.L.S1* | Complete the appropriate checklist. | ASES/AMES Only |
| *PA.IV.L.S2* | Make radio calls as appropriate. | ASES/AMES Only |
| *PA.IV.L.S3* | Ensure the aircraft is aligned with the correct/assigned waterway. | ASES/AMES Only |
| *PA.IV.L.S4* | Scan the landing area for traffic and obstructions. | ASES/AMES Only |
| *PA.IV.L.S5* | Consider wind conditions, landing surface, obstructions, and select the proper landing path. | ASES/AMES Only |
| *PA.IV.L.S6* | Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach. | ASES/AMES Only |
| *PA.IV.L.S7* | Maintain manufacturer's published approach airspeed, or in its absence not more than 1.3 $V_{SO}$ +10/-5 knots with wind gust factor applied. | ASES/AMES Only |
| *PA.IV.L.S8* | Maintain crosswind correction and directional control throughout the approach and landing sequence. | ASES/AMES Only |
| *PA.IV.L.S9* | Make smooth, timely, and correct power and control adjustments to maintain proper pitch attitude and rate of descent to touchdown. | ASES/AMES Only |
| *PA.IV.L.S10* | Contact the water in the proper pitch attitude, considering the type of rough water. | ASES/AMES Only |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | M. FORWARD SLIP TO A LANDING (ASEL, ASES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a forward slip to a landing. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.M.K1* | Concepts of energy management during a forward slip approach. | |
| *PA.IV.M.K2* | Effects of atmospheric conditions, including wind, on approach and landing performance. | |
| *PA.IV.M.K3* | Wind correction techniques during forward slip approaches. | |
| *PA.IV.M.K4* | When and why a forward slip approach is used. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.M.R1* | Selection of runway or approach path and touchdown area based on pilot capability, aircraft performance and limitations, available distance, and wind. | |
| *PA.IV.M.R2* | Effects of: | |
| *PA.IV.M.R2a* | a. Crosswind | |
| *PA.IV.M.R2b* | b. Wind shear | |
| *PA.IV.M.R2c* | c. Tailwind | |
| *PA.IV.M.R2d* | d. Wake turbulence | |
| *PA.IV.M.R2e* | e. Runway surface/condition | |
| *PA.IV.M.R3* | Abnormal operations, to include planning for rejected landing and go-around. | |
| *PA.IV.M.R4* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.IV.M.R5* | Low altitude maneuvering/stall/spin. | |
| *PA.IV.M.R6* | Distractions, loss of situational awareness, and/or improper task management. | |
| *PA.IV.M.R7* | Forward slip operations, including fuel flowage, tail stalls with flaps, and lack of airspeed control. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.M.S1* | Complete the appropriate checklist. | 2.11, POH/AFM |
| *PA.IV.M.S2* | Make radio calls as appropriate. | |
| *PA.IV.M.S3* | Plan and follow a flightpath to the selected landing area considering altitude, wind, terrain, and obstructions. | |
| *PA.IV.M.S4* | Select the most suitable touchdown point based on wind, landing surface, obstructions, and aircraft limitations. | 1.18, 2.11 |
| *PA.IV.M.S5* | Position airplane on downwind leg, parallel to landing runway. | |
| *PA.IV.M.S6* | Correctly configure the airplane. | 2.13 |
| *PA.IV.M.S7* | As necessary, correlate crosswind with direction of forward slip and transition to side slip for landing. | 2.13 |
| *PA.IV.M.S8* | Touch down within -0/+400 feet from the specified touchdown point with minimum side drift. | 2.13 |

## IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

| TASK | N. GO-AROUND/REJECTED LANDING | |
|---|---|---|
| REFERENCES | FAA-H-8083-3, FAA-H-8083-23; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a go-around/rejected landing with emphasis on factors that contribute to landing conditions that may require a go-around. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IV.N.K1* | A stabilized approach, to include energy management concepts. | |
| *PA.IV.N.K2* | Effects of atmospheric conditions, including wind and density altitude on a go-around or rejected landing. | |
| *PA.IV.N.K3* | Wind correction techniques on takeoff/departure, and approach/landing. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.N.R1* | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IV.N.R2* | Delayed recognition of the need for rejected landing/go-around. | |
| *PA.IV.N.R3* | Delayed performance of go-around at low altitude. | |
| *PA.IV.N.R4* | Improper application of power. | |
| *PA.IV.N.R5* | Improper aircraft configuration. | |
| *PA.IV.N.R6* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.IV.N.R7* | Low altitude maneuvering/stall/spin. | |
| *PA.IV.N.R8* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IV.N.S1* | Complete the appropriate checklist. | 2.11, POH/AFM |
| *PA.IV.N.S2* | Make radio calls as appropriate. | |
| *PA.IV.N.S3* | Make a timely decision to discontinue the approach to landing. | 2.13 |
| *PA.IV.N.S4* | Apply takeoff power immediately and transition to climb pitch attitude for $V_X$ or $V_Y$ as appropriate +10/-5 knots. | 2.13 |
| *PA.IV.N.S5* | Retract the flaps, as appropriate. | 2.13 |
| *PA.IV.N.S6* | Retract the landing gear after establishing a positive rate of climb. | |
| *PA.IV.N.S7* | Maneuver to the side of the runway/landing area when necessary to clear and avoid conflicting traffic. | |
| *PA.IV.N.S8* | Maintain $V_Y$ +10/-5 knots to a safe maneuvering altitude. | 1.19, 6.10 (7.10) |
| *PA.IV.N.S9* | Maintain directional control and proper wind-drift correction throughout the climb. | 1.19, 1.21, 2.13 |

## V. PERFORMANCE AND GROUND REFERENCE MANEUVERS

| TASK | A. STEEP TURNS | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with steep turns.<br>***Note: See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations.*** | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.V.A.K1* | Purpose of steep turns. | |
| *PA.V.A.K2* | Aerodynamics associated with steep turns, to include: | |
| *PA.V.A.K2a* | a. Coordinated and uncoordinated flight | |
| *PA.V.A.K2b* | b. Overbanking tendencies | |
| *PA.V.A.K2c* | c. Maneuvering speed, including impact of weight changes | |
| *PA.V.A.K2d* | d. Accelerated stalls | |
| *PA.V.A.K2e* | e. Rate and radius of turn | |
| *PA.V.A.K2f* | f. Effect of bank angle on stalls | |
| *PA.V.A.K3* | Altitude control at various airspeeds. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.V.A.R1* | Failure to divide attention between airplane control and orientation. | 3.3 |
| *PA.V.A.R2* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.V.A.R3* | Low altitude maneuvering/stall/spin. | |
| *PA.V.A.R4* | Distractions, loss of situational awareness, and/or improper task management. | |
| *PA.V.A.R5* | Failure to maintain coordinated flight. | |
| SKILLS | The applicant demonstrates the ability to: | |
| | Clear the area. | |
| *PA.V.A.S1* | Establish the manufacturer's recommended airspeed or, if not stated, a safe airspeed not to exceed $V_A$. | 3.3, 6.10 (7.10) |
| *PA.V.A.S2* | Roll into a coordinated 360° steep turn with approximately a 45° bank. | 3.3, 6.10 (7.10) |
| *PA.V.A.S3* | Perform the Task in the opposite direction, as specified by evaluator. | |
| *PA.V.A.S4* | Maintain the entry altitude ±100 feet, airspeed ±10 knots, bank ±5°, and roll out on the entry heading ±10°. | 3.3, 6.10 (7.10) |

## V. PERFORMANCE AND GROUND REFERENCE MANEUVERS

| TASK | B. GROUND REFERENCE MANEUVERS | |
|---|---|---|
| REFERENCES | 14 CFR part 61; FAA-H-8083-2, FAA-H-8083-3 | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with ground reference maneuvering which may include a rectangular course, S-turns, and turns around a point.<br>***Note: See Appendix 7 – Operational Requirements and Limitations.*** | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.V.B.K1* | Purpose of ground reference maneuvers. | |
| *PA.V.B.K2* | Effects of wind on ground track and relation to a ground reference point. | |
| *PA.V.B.K3* | Effects of bank angle and groundspeed on rate and radius of turn. | |
| *PA.V.B.K4* | Relationship of rectangular course to airport traffic pattern. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.V.B.R1* | Failure to divide attention between airplane control and orientation. | |
| *PA.V.B.R2* | Collision hazards to include other aircraft, terrain, obstacles, and wire. | |
| *PA.V.B.R3* | Low altitude maneuvering/stall/spin. | |
| *PA.V.B.R4* | Distractions, loss of situational awareness, and/or improper task management. | |
| *PA.V.B.R5* | Failure to maintain coordinated flight. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.V.B.S1* | Clear the area. | |
| *PA.V.B.S2* | Select a suitable ground reference area, line, or point as appropriate. | 2.1 |
| *PA.V.B.S3* | Plan the maneuver:<br>***Note: The evaluator must select at least one maneuver for the applicant to demonstrate.*** | |
| *PA.V.B.S3a* | a. Rectangular course: enter a left or right pattern, 600 to 1,000 feet above ground level (AGL) at an appropriate distance from the selected reference area, 45° to the downwind leg | 2.1 |
| *PA.V.B.S3b* | b. S-turns: enter perpendicular to the selected reference line, 600 to 1,000 feet AGL at an appropriate distance from the selected reference area | 2.1, 3.1 |
| *PA.V.B.S3c* | c. Turns around a point: enter at an appropriate distance from the reference point, 600 to 1,000 feet AGL at an appropriate distance from the selected reference area | 2.1, 3.1 |
| *PA.V.B.S4* | Apply adequate wind drift correction during straight and turning flight to maintain a constant ground track if around a rectangular reference area, or to maintain a constant radius turn on each side of a selected reference line or point. | 2.1, 3.1 |
| *PA.V.B.S5* | If performing S-Turns, reverse the turn directly over the selected reference line; if performing turns around a point, complete turns in either direction, as specified by the evaluator. | 3.1 |
| *PA.V.B.S6* | Divide attention between airplane control, traffic avoidance and the ground track while maintaining coordinated flight. | 2.1, 6.10 (7.10) |
| *PA.V.B.S7* | Maintain altitude ±100 feet; maintain airspeed ±10 knots. | 3.1 |

## VI. NAVIGATION

| TASK | A. PILOTAGE AND DEAD RECKONING | |
|---|---|---|
| REFERENCES | 14 CFR part 61; FAA-H-8083-2, FAA-H-8083-25; Navigation Charts | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with pilotage and dead reckoning. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VI.A.K1* | Pilotage and dead reckoning. | |
| *PA.VI.A.K2* | Magnetic compass errors. | |
| *PA.VI.A.K3* | Topography. | |
| *PA.VI.A.K4* | Selection of appropriate: | |
| *PA.VI.A.K4a* | a. Route | |
| *PA.VI.A.K4b* | b. Altitude(s) | |
| *PA.VI.A.K4c* | c. Checkpoints | |
| *PA.VI.A.K5* | Plotting a course, to include: | |
| *PA.VI.A.K5a* | a. Determining heading, speed, and course | |
| *PA.VI.A.K5b* | b. Wind correction angle | |
| *PA.VI.A.K5c* | c. Estimating time, speed, and distance | |
| *PA.VI.A.K5d* | d. True airspeed and density altitude | |
| *PA.VI.A.K6* | Power setting selection. | |
| *PA.VI.A.K7* | Planned versus actual flight plan calculations and required corrections. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VI.A.R1* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.VI.A.R2* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VI.A.S1* | Prepare and use a flight log. | |
| *PA.VI.A.S2* | Navigate by pilotage. | 4.3, 4.15, 6.10 (5.3, 5.15, 7.10) |
| *PA.VI.A.S3* | Navigate by means of pre-computed headings, groundspeeds, and elapsed time. | 4.15, 6.10 (5.15, 7.10) |
| *PA.VI.A.S4* | Demonstrate use of the magnetic direction indicator in navigation, to include turns to headings. | 5.3 (6.3) |
| *PA.VI.A.S5* | Verify position within three nautical miles of the flight-planned route. | 4.15, 6.10 (5.15, 7.10) |
| *PA.VI.A.S6* | Arrive at the en route checkpoints within five minutes of the initial or revised estimated time of arrival and provide a destination estimate. | 6.10 (7.10) |
| *PA.VI.A.S7* | Maintain the selected altitude, ±200 feet and headings, ±15°. | 6.10 (7.10) |

## VI. NAVIGATION

| TASK | B. NAVIGATION SYSTEMS AND RADAR SERVICES | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-6, FAA-H-8083-25; AIM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with navigation systems and radar services.<br>***Note: The evaluator should reference the manufacturer's equipment supplement(s) as necessary.*** | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VI.B.K1* | Ground-based navigation (orientation, course determination, equipment, tests and regulations). | |
| *PA.VI.B.K2* | Satellite-based navigation (e.g., equipment, regulations, authorized use of databases, and Receiver Autonomous Integrity Monitoring (RAIM)). | |
| *PA.VI.B.K3* | Radar assistance to VFR aircraft (e.g., operations, equipment, available services, traffic advisories). | |
| *PA.VI.B.K4* | Transponder (Mode(s) A, C, and S). | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VI.B.R1* | Failure to manage automated navigation and auto flight systems. | |
| *PA.VI.B.R2* | Distractions, loss of situational awareness, and/or improper task management. | |
| *PA.VI.B.R3* | Limitations of the navigation system in use. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VI.B.S1* | Use an airborne electronic navigation system. | 4.7, 4.8, 4.9, 4.15 (5.7, 5.8, 5.9, 5.15) |
| *PA.VI.B.S2* | Determine the airplane's position using the navigation system. | 4.7, 4.8, 4.15, 6.10 (5.7, 5.8, 5.15, 7.10) |
| *PA.VI.B.S3* | Intercept and track a given course, radial, or bearing, as appropriate. | 4.7, 4.8, 4.9, 4.15, 6.10 (5.7, 5.8, 5.9, 5.15, 7.10) |
| *PA.VI.B.S4* | Recognize and describe the indication of station or waypoint passage, if appropriate. | 4.7, 6.10 (5.7, 7.10) |
| *PA.VI.B.S5* | Recognize signal loss and take appropriate action. | 4.7, 6.10 (5.7, 7.10) |
| *PA.VI.B.S6* | Use proper communication procedures when utilizing radar services. | 5.1, 5.18 (6.1, 6.18) |
| *PA.VI.B.S7* | Maintain the appropriate altitude, ±200 feet and heading ±15°. | |

## VI. NAVIGATION

| TASK | C. DIVERSION | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-25; AIM; Navigation Charts | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with diversion. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VI.C.K1* | Selecting an alternate destination. | |
| *PA.VI.C.K2* | Situations that require deviations from flight plan and/or ATC instructions. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VI.C.R1* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.VI.C.R2* | Distractions, loss of situational awareness, and/or improper task management. | |
| *PA.VI.C.R3* | Failure to make a timely decision to divert. | |
| *PA.VI.C.R4* | Failure to select an appropriate airport. | |
| *PA.VI.C.R5* | Failure to utilize all available resources (e.g., automation, ATC, and flight deck planning aids). | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VI.C.S1* | Select a suitable airport and route for diversion. | 4.6, 6.10 (5.6, 7.10) |
| *PA.VI.C.S2* | Make a reasonable estimate of heading, groundspeed, arrival time, and fuel consumption to the divert airport. | 6.10 (7.10) |
| *PA.VI.C.S3* | Maintain the appropriate altitude, ±200 feet and heading, ±15°. | |
| *PA.VI.C.S4* | Update/interpret weather in flight. | |
| *PA.VI.C.S5* | Explain and use flight deck displays of digital weather and aeronautical information, as applicable. | |

## VI. NAVIGATION

| TASK | D. LOST PROCEDURES | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-25; AIM; Navigation Charts | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with lost procedures and taking appropriate steps to achieve a satisfactory outcome if lost. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VI.D.K1* | Methods to determine position. | |
| *PA.VI.D.K2* | Assistance available if lost (e.g. radar services, communication procedures). | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VI.D.R1* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.VI.D.R2* | Distractions, loss of situational awareness, and/or improper task management. | |
| *PA.VI.D.R3* | Failure to record times over waypoints. | |
| *PA.VI.D.R4* | Failure to seek assistance or declare an emergency in a deteriorating situation. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VI.D.S1* | Use an appropriate method to determine position. | 5.18 (6.18) |
| *PA.VI.D.S2* | Maintain an appropriate heading and climb as necessary. | 5.18 (6.18) |
| *PA.VI.D.S3* | Identify prominent landmarks. | 5.18, 6.10 (6.18, 7.10) |
| *PA.VI.D.S4* | Use navigation systems/facilities and/or contact an ATC facility for assistance. | 5.18, 6.10 (6.18, 7.10) |

## VII. SLOW FLIGHT AND STALLS

| TASK | A. MANEUVERING DURING SLOW FLIGHT | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with maneuvering during slow flight.<br>***Note: See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations.*** | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VII.A.K1* | Aerodynamics associated with slow flight in various aircraft configurations, to include the relationship between angle of attack, airspeed, load factor, power setting, aircraft weight and center of gravity, aircraft attitude, and yaw effects. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VII.A.R1* | Inadvertent slow flight and flight with a stall warning, which could lead to loss of control. | |
| *PA.VII.A.R2* | Range and limitations of stall warning indicators (e.g., aircraft buffet, stall horn, etc.). | |
| *PA.VII.A.R3* | Failure to maintain coordinated flight. | |
| *PA.VII.A.R4* | Effect of environmental elements on aircraft performance. (e.g., turbulence, microbursts, and high density altitude). | |
| *PA.VII.A.R5* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | |
| *PA.VII.A.R6* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VII.A.S1* | Clear the area. | |
| *PA.VII.A.S2* | Select an entry altitude that will allow the Task to be completed no lower than 1,500 feet AGL (ASEL, ASES) or 3,000 feet AGL (AMEL, AMES). | 5.13 (6.13) |
| *PA.VII.A.S3* | Establish and maintain an airspeed at which any further increase in angle of attack, increase in load factor, or reduction in power, would result in a stall warning (e.g., aircraft buffet, stall horn, etc.). | |
| *PA.VII.A.S4* | Accomplish coordinated straight-and-level flight, turns, climbs, and descents with landing gear and flap configurations specified by the evaluator without a stall warning (e.g., aircraft buffet, stall horn, etc.). | 1.24 |
| *PA.VII.A.S5* | Maintain the specified altitude, ±100 feet; specified heading, ±10°; airspeed +10/-0 knots; and specified angle of bank, ±10°. | |

## VII. SLOW FLIGHT AND STALLS

| TASK | B. POWER-OFF STALLS | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; AC 61-67; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with power-off stalls.<br>***Note: See Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations.*** | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VII.B.K1* | Aerodynamics associated with stalls in various aircraft configurations, to include the relationship between angle of attack, airspeed, load factor, power setting, aircraft weight and center of gravity, aircraft attitude, and yaw effects. | |
| *PA.VII.B.K2* | Stall characteristics (i.e., airplane design) and impending stall and full stall indications (i.e., how to recognize by sight, sound, or feel). | |
| *PA.VII.B.K3* | Factors and situations that can lead to a power-off stall and actions that can be taken to prevent it. | |
| *PA.VII.B.K4* | Fundamentals of stall recovery. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VII.B.R1* | Factors and situations that could lead to inadvertent power-off stall, spin, and loss of control. | |
| *PA.VII.B.R2* | Range and limitations of stall warning indicators (e.g., aircraft buffet, stall horn, etc.). | |
| *PA.VII.B.R3* | Failure to recognize and recover at the stall warning during normal operations. | |
| *PA.VII.B.R4* | Improper stall recovery procedure. | |
| *PA.VII.B.R5* | Secondary stalls, accelerated stalls, and cross-control stalls. | |
| *PA.VII.B.R6* | Effect of environmental elements on aircraft performance related to power-off stalls (e.g., turbulence, microbursts, and high density altitude). | |
| *PA.VII.B.R7* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | |
| *PA.VII.B.R8* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VII.B.S1* | Clear the area. | |
| *PA.VII.B.S2* | Select an entry altitude that will allow the Task to be completed no lower than 1,500 feet AGL (ASEL, ASES) or 3,000 feet AGL (AMEL, AMES). | 2.9, 6.10 (7.10) |
| *PA.VII.B.S3* | Configure the airplane in the approach or landing configuration, as specified by the evaluator, and maintain coordinated flight throughout the maneuver. | 1.24, 2.9 |
| *PA.VII.B.S4* | Establish a stabilized descent. | 1.24, 2.9 |
| *PA.VII.B.S5* | Transition smoothly from the approach or landing attitude to a pitch attitude that will induce a stall. | 1.24, 2.9 |
| *PA.VII.B.S6* | Maintain a specified heading, ±10 if in straight flight, maintain a specified angle of bank not to exceed 20°, ±10° if in turning flight, while inducing the stall. | 1.24 |
| *PA.VII.B.S7* | Acknowledge cues of the impending stall and then recover promptly after a full stall has occurred. | 1.24, 2.9, 6.10 (7.10) |
| *PA.VII.B.S8* | Execute a stall recovery in accordance with procedures set forth in the POH/AFM. | |
| *PA.VII.B.S9* | Retract the flaps to the recommended setting; retract the landing gear, if retractable, after a positive rate of climb is established. | 2.9 |
| *PA.VII.B.S10* | Accelerate to $V_X$ or $V_Y$ speed before the final flap retraction; return to the altitude, heading, and airspeed specified by the evaluator. | 2.9 |

## VII. SLOW FLIGHT AND STALLS

| TASK | C. POWER-ON STALLS | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; AC 61-67; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with power-on stalls.<br>***Note: See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations.*** | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VII.C.K1* | Aerodynamics associated with stalls in various aircraft configurations, to include the relationship between angle of attack, airspeed, load factor, power setting, aircraft weight and center of gravity, aircraft attitude, and yaw effects. | |
| *PA.VII.C.K2* | Stall characteristics (i.e., airplane design) and impending stall and full stall indications (i.e., how to recognize by sight, sound, or feel). | |
| *PA.VII.C.K3* | Factors and situations that can lead to a power-on stall and actions that can be taken to prevent it. | |
| *PA.VII.C.K4* | Fundamentals of stall recovery. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VII.C.R1* | Factors and situations that could lead to inadvertent power-on stall, spin, and loss of control. | |
| *PA.VII.C.R2* | Range and limitations of stall warning indicators (e.g., aircraft buffet, stall horn, etc.). | |
| *PA.VII.C.R3* | Failure to recognize the stall warning during normal operations. | |
| *PA.VII.C.R4* | Improper stall recovery procedure. | |
| *PA.VII.C.R5* | Secondary stalls, accelerated stalls, elevator trim stalls, and cross-control stalls. | |
| *PA.VII.C.R6* | Effect of environmental elements on aircraft performance related to power-on stalls (e.g., turbulence, microbursts, and high density altitude). | |
| *PA.VII.C.R7* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | |
| *PA.VII.C.R8* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VII.C.S1* | Clear the area. | |
| *PA.VII.C.S2* | Select an entry altitude that will allow the Task to be completed no lower than 1,500 feet AGL (ASEL, ASES) or 3,000 feet AGL (AMEL, AMES). | 2.9, 6.10 (7.10) |
| *PA.VII.C.S3* | Establish the takeoff, departure, or cruise configuration as specified by the evaluator, and maintain coordinated flight throughout the maneuver. | 2.9 |
| *PA.VII.C.S4* | Set power (as assigned by the evaluator) to no less than 65 percent available power. | 2.9 |
| *PA.VII.C.S5* | Transition smoothly from the takeoff or departure attitude to the pitch attitude that will induce a stall. | 2.9 |
| *PA.VII.C.S6* | Maintain a specified heading, ±10 if in straight flight; maintain a specified angle of bank not to exceed 20°, ±10° if in turning flight, while inducing the stall. | 2.9, 6.10 (7.10) |
| *PA.VII.C.S7* | Acknowledge the cues of the impending stall and then recover promptly after a full stall occurs. | 2.9, 6.10 (7.10) |
| *PA.VII.C.S8* | Execute a stall recovery in accordance with procedures set forth in the POH/AFM. | |
| *PA.VII.C.S9* | Retract the flaps to the recommended setting; retract the landing gear if retractable, after a positive rate of climb is established. | 2.9 |
| *PA.VII.C.S10* | Accelerate to $V_X$ or $V_Y$ speed before the final flap retraction; return to the altitude, heading, and airspeed specified by the evaluator. | 2.9 |

## VII. SLOW FLIGHT AND STALLS

| TASK | D. SPIN AWARENESS | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; AC 61-67; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with spins, flight situations where unintentional spins may occur and procedures for recovery from unintentional spins. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VII.D.K1* | Aerodynamics associated with spins in various aircraft configurations, to include the relationship between angle of attack, airspeed, load factor, power setting, aircraft weight and center of gravity, aircraft attitude, and yaw effects. | 2.10 |
| *PA.VII.D.K2* | What causes a spin and how to identify the entry, incipient, and developed phases of a spin. | 2.10 |
| *PA.VII.D.K3* | Spin recovery procedure. | 2.10 |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VII.D.R1* | Factors and situations that could lead to inadvertent spin and loss of control. | |
| *PA.VII.D.R2* | Range and limitations of stall warning indicators (e.g., aircraft buffet, stall horn, etc.). | |
| *PA.VII.D.R3* | Improper spin recovery procedure. | |
| *PA.VII.D.R4* | Effect of environmental elements on aircraft performance related to spins (e.g., turbulence, microbursts, and high density altitude). | |
| *PA.VII.D.R5* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | |
| *PA.VII.D.R6* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | [Intentionally left blank.] | |

## VIII. BASIC INSTRUMENT MANEUVERS

| TASK | A. STRAIGHT-AND-LEVEL FLIGHT | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-15 | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with attitude instrument flying during straight-and-level flight. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VIII.A.K1* | Flight instruments as related to: | |
| *PA.VIII.A.K1a* | a. Sensitivity, limitations, and potential errors in unusual attitudes | |
| *PA.VIII.A.K1b* | b. Correlation (pitch instruments/bank instruments) | |
| *PA.VIII.A.K1c* | c. Function and operation | |
| *PA.VIII.A.K1d* | d. Proper instrument cross-check techniques | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VIII.A.R1* | Instrument flying hazards to include failure to maintain VFR, spatial disorientation, loss of control, fatigue, stress, and emergency off airport landings. | |
| *PA.VIII.A.R2* | Failure to seek assistance or declare an emergency in a deteriorating situation. | |
| *PA.VIII.A.R3* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | |
| *PA.VIII.A.R4* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VIII.A.S1* | Maintain straight-and-level flight solely by reference to instruments using proper instrument cross-check and interpretation, and coordinated control application. | 5.14 (6.14) |
| *PA.VIII.A.S2* | Maintain altitude ±200 feet, heading ±20°, and airspeed ±10 knots. | 6.10 (7.10) |

## VIII. BASIC INSTRUMENT MANEUVERS

| TASK | B. CONSTANT AIRSPEED CLIMBS | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-15 | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with attitude instrument flying during constant airspeed climbs. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VIII.B.K1* | Flight instruments as related to: | |
| *PA.VIII.B.K1a* | a. Sensitivity, limitations, and potential errors in unusual attitudes | |
| *PA.VIII.B.K1b* | b. Correlation (pitch instruments/bank instruments) | |
| *PA.VIII.B.K1c* | c. Function and operation | |
| *PA.VIII.B.K1d* | d. Proper instrument cross-check techniques | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VIII.B.R1* | Instrument flying hazards to include failure to maintain VFR, spatial disorientation, loss of control, fatigue, stress, and emergency off airport landings. | |
| *PA.VIII.B.R2* | Failure to seek assistance or declare an emergency in a deteriorating situation. | |
| *PA.VIII.B.R3* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.VIII.B.R4* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VIII.B.S1* | Transition to the climb pitch attitude and power setting on an assigned heading using proper instrument cross-check and interpretation, and coordinated flight control application. | 5.14 (6.14) |
| *PA.VIII.B.S2* | Demonstrate climbs solely by reference to instruments at a constant airspeed to specific altitudes in straight flight and turns. | 5.14 (6.14) |
| *PA.VIII.B.S3* | Level off at the assigned altitude and maintain altitude ±200 feet, heading ±20° and airspeed ±10 knots. | 6.10 (7.10) |

## VIII. BASIC INSTRUMENT MANEUVERS

| TASK | C. CONSTANT AIRSPEED DESCENTS | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-15 | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with attitude instrument flying during constant airspeed descents. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VIII.C.K1* | Flight instruments as related to: | |
| *PA.VIII.C.K1a* | a. Sensitivity, limitations, and potential errors in unusual attitudes | |
| *PA.VIII.C.K1b* | b. Correlation (pitch instruments/bank instruments) | |
| *PA.VIII.C.K1c* | c. Function and operation | |
| *PA.VIII.C.K1d* | d. Proper instrument cross-check techniques | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VIII.C.R1* | Instrument flying hazards to include failure to maintain VFR, spatial disorientation, loss of control, fatigue, stress, and emergency off airport landings. | |
| *PA.VIII.C.R2* | Failure to seek assistance or declare an emergency in a deteriorating situation. | |
| *PA.VIII.C.R3* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | |
| *PA.VIII.C.R4* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VIII.C.S1* | Transition to the descent pitch attitude and power setting on an assigned heading using proper instrument cross-check and interpretation, and coordinated flight control application. | 5.14 (6.14) |
| *PA.VIII.C.S2* | Demonstrate descents solely by reference to instruments at a constant airspeed to specific altitudes in straight flight and turns. | 5.14 (6.14) |
| *PA.VIII.C.S3* | Level off at the assigned altitude and maintain altitude ±200 feet, heading ±20° and airspeed ±10 knots. | 6.10 (7.10) |

## VIII. BASIC INSTRUMENT MANEUVERS

| TASK | D. TURNS TO HEADINGS | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-15 | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with attitude instrument flying during turns to headings. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VIII.D.K1* | Flight instruments as related to: | |
| *PA.VIII.D.K1a* | a. Sensitivity, limitations, and potential errors in unusual attitudes | |
| *PA.VIII.D.K1b* | b. Correlation (pitch instruments/bank instruments) | |
| *PA.VIII.D.K1c* | c. Function and operation | |
| *PA.VIII.D.K1d* | d. Proper instrument cross-check techniques | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VIII.D.R1* | Instrument flying hazards to include failure to maintain VFR, spatial disorientation, loss of control, fatigue, stress, and emergency off airport landings. | |
| *PA.VIII.D.R2* | Failure to seek assistance or declare an emergency in a deteriorating situation. | |
| *PA.VIII.D.R3* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | |
| *PA.VIII.D.R4* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VIII.D.S5* | Demonstrate turns to headings solely by reference to instruments, maintain altitude ±200 feet and maintain a standard rate turn and rolls out on the assigned heading ±10°; maintain airspeed ±10 knots. | |

## VIII. BASIC INSTRUMENT MANEUVERS

| TASK | E. RECOVERY FROM UNUSUAL FLIGHT ATTITUDES | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-15 | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with attitude instrument flying while recovering from unusual attitudes. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VIII.E.K1* | Flight instruments as related to: | |
| *PA.VIII.E.K1a* | a. Sensitivity, limitations, and potential errors in unusual attitudes | |
| *PA.VIII.E.K1b* | b. Correlation (pitch instruments/bank instruments) | |
| *PA.VIII.E.K1c* | c. Function and operation | |
| *PA.VIII.E.K1d* | d. Proper instrument cross-check techniques | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VIII.E.R1* | Instrument flying hazards to include failure to maintain VFR, spatial disorientation, loss of control, fatigue, stress, and emergency off airport landings. | |
| *PA.VIII.E.R2* | Failure to seek assistance or declare an emergency in a deteriorating situation. | |
| *PA.VIII.E.R3* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | |
| *PA.VIII.E.R4* | Distractions, loss of situational awareness, and/or improper task management. | |
| *PA.VIII.E.R5* | Failure to interpret flight instruments. | |
| *PA.VIII.E.R6* | Failure to unload the wings in recovering from high G situations. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VIII.E.S1* | Recognize unusual flight attitudes solely by reference to instruments; perform the correct, coordinated, and smooth flight control application to resolve unusual pitch and bank attitudes while staying within the airplane's limitations and flight parameters. | 5.14, 6.10 (6.14, 7.10) |

## VIII. BASIC INSTRUMENT MANEUVERS

| TASK | F. RADIO COMMUNICATIONS, NAVIGATION SYSTEMS/FACILITIES, AND RADAR SERVICES | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-15, FAA-H-8083-25 | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with radio communications, navigation systems/facilities, and radar services available for use during flight solely by reference to instruments. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.VIII.F.K1* | Operating communications equipment to include identifying and selecting radio frequencies, requesting and following ATC instructions. | |
| *PA.VIII.F.K2* | Operating navigation equipment to include functions and displays, and following bearings, radials, or courses. | |
| *PA.VIII.F.K3* | Air traffic control facilities and services. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.VIII.F.R1* | Failure to seek assistance or declare an emergency in a deteriorating situation. | |
| *PA.VIII.F.R2* | Failure to utilize all available resources (e.g., automation, ATC, and flight deck planning aids). | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.VIII.F.S1* | Maintain aircraft control while selecting proper communications frequencies, identifying the appropriate facility, and managing navigation equipment. | 4.7 (5.7) |
| *PA.VIII.F.S2* | Comply with ATC instructions. | 4.7, 4.8, 4.9, 6.10 (5.7, 5.8, 5.9, 7.10) |
| *PA.VIII.F.S3* | Maintain altitude ±200 feet, heading ±20° and airspeed ±10 knots. | |

## IX. EMERGENCY OPERATIONS

| TASK | A. EMERGENCY DESCENT | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with an emergency descent.<br>***Note: See Appendix 6 Safety of Flight.*** | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IX.A.K1* | Situations that require an emergency descent (e.g., depressurization, smoke, and/or engine fire). | Appendix I |
| *PA.IX.A.K2* | Immediate action items and emergency procedures. | Appendix I |
| *PA.IX.A.K3* | Airspeed, to include airspeed limitations. | Appendix I |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IX.A.R1* | Failure to consider altitude, wind, terrain, obstructions, and available glide distance. | |
| *PA.IX.A.R2* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | |
| *PA.IX.A.R3* | Improper aircraft configuration. | |
| *PA.IX.A.R4* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IX.A.S1* | Clear the area. | Appendix I |
| *PA.IX.A.S2* | Establish and maintain the appropriate airspeed and configuration appropriate to the scenario specified by the evaluator and as covered in POH/AFM for the emergency descent. | Appendix I |
| *PA.IX.A.S3* | Demonstrate orientation, division of attention and proper planning. | Appendix I |
| *PA.IX.A.S4* | Use bank angle between 30° and 45° to maintain positive load factors during the descent. | Appendix I |
| *PA.IX.A.S5* | Complete the appropriate checklist. | Appendix I |

## IX. EMERGENCY OPERATIONS

| TASK | B. EMERGENCY APPROACH AND LANDING (SIMULATED) (ASEL, ASES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with emergency approach and landing procedures.<br>***Note: See Appendix 6: Safety of Flight.*** | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IX.B.K1* | Immediate action items and emergency procedures. | |
| *PA.IX.B.K1a* | a. Airspeed, to include importance of best glide speed and its relationship to distance | |
| *PA.IX.B.K1b* | b. Difference between best glide speed and minimum sink speed | |
| *PA.IX.B.K2* | Effects of atmospheric conditions, including wind, on emergency approach and landing. | |
| *PA.IX.B.K3* | A stabilized approach, to include concepts of energy management. | |
| *PA.IX.B.K4* | ELTs and/or other emergency locating devices. | |
| *PA.IX.B.K5* | ATC services to aircraft in distress. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IX.B.R1* | Failure to consider altitude, wind, terrain, obstructions, and available landing distance. | |
| *PA.IX.B.R2* | Failure to plan and follow a flightpath to the selected landing area. | |
| *PA.IX.B.R3* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | |
| *PA.IX.B.R4* | Improper aircraft configuration. | |
| *PA.IX.B.R5* | Low altitude maneuvering/stall/spin. | |
| *PA.IX.B.R6* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IX.B.S1* | Establish and maintain the recommended best glide airspeed, ±10 knots. | 3.5, 6.10 (7.10) |
| *PA.IX.B.S2* | Configure the airplane in accordance with POH/AFM and existing circumstances. | 3.5, 6.10 (7.10), POH/AFM |
| *PA.IX.B.S3* | Select a suitable landing area considering altitude, wind, terrain, obstructions, and available glide distance. | 3.5, 6.10 (7.10) |
| *PA.IX.B.S4* | Plan and follow a flightpath to the selected landing area. | 3.5, 6.10 (7.10) |
| *PA.IX.B.S5* | Prepare for landing as specified by the evaluator. | 3.5, 6.10 (7.10) |
| *PA.IX.B.S6* | Complete the appropriate checklist. | 3.5, 6.10 (7.10), POH/AFM |

## IX. EMERGENCY OPERATIONS

| TASK | C. SYSTEMS AND EQUIPMENT MALFUNCTION | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with system and equipment malfunctions appropriate to the airplane provided for the practical test and analyzing the situation and take appropriate action for simulated emergencies. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IX.C.K1* | Partial or complete power loss related to the specific powerplant, including: | 3.5, 6.10 (7.10) |
| *PA.IX.C.K1a* | a. Engine roughness or overheat | 6.10 (7.10) |
| *PA.IX.C.K1b* | b. Carburetor or induction icing | 1.11, 6.10 (7.10) |
| *PA.IX.C.K1c* | c. Loss of oil pressure | 6.10 (7.10) |
| *PA.IX.C.K1d* | d. Fuel starvation | 6.10 (7.10) |
| *PA.IX.C.K2* | System and equipment malfunctions specific to the airplane, including: | |
| *PA.IX.C.K2a* | a. Electrical malfunction | POH/AFM |
| *PA.IX.C.K2b* | b. Vacuum/pressure, and associated flight instruments malfunction | POH/AFM |
| *PA.IX.C.K2c* | c. Pitot/static system malfunction | 3.5 |
| *PA.IX.C.K2d* | d. Electronic flight deck display malfunction | POH/AFM |
| *PA.IX.C.K2e* | e. Landing gear or flap malfunction | POH/AFM |
| *PA.IX.C.K2f* | f. Inoperative trim | POH/AFM |
| *PA.IX.C.K3* | m. Smoke/fire/engine compartment fire | POH/AFM |
| *PA.IX.C.K4* | n. Any other emergency appropriate to the airplane | POH/AFM |
| *PA.IX.C.K5* | k. Inadvertent door or window opening | POH/AFM |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IX.C.R1* | Failure to use the proper checklist for a system or equipment malfunction. | |
| *PA.IX.C.R2* | Distractions, loss of situational awareness, and/or improper task management. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IX.C.S1* | Describe appropriate action for simulated emergencies specified by the evaluator from at least three of the elements or sub-elements listed in the K1 through K5 above. | 6.10 (7.10) |
| *PA.IX.C.S2* | Complete the appropriate checklist. | POH/AFM |

## IX. EMERGENCY OPERATIONS

| TASK | D. EMERGENCY EQUIPMENT AND SURVIVAL GEAR | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with emergency equipment, and survival gear appropriate to the airplane and environment encountered during flight and identifying appropriate equipment that should be onboard the airplane. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IX.D.K1* | ELT operations, limitations, and testing requirements. | |
| *PA.IX.D.K2* | Fire extinguisher operations and limitations. | |
| *PA.IX.D.K3* | Emergency equipment and survival gear needed for: | |
| *PA.IX.D.K3a* | a. Climate extremes (hot/cold) | POH/AFM, Appendix G |
| *PA.IX.D.K3b* | b. Mountainous terrain | POH/AFM, Appendix G |
| *PA.IX.D.K3c* | c. Overwater operations | POH/AFM, Appendix G |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IX.D.R1* | Failure to plan for basic needs (water, clothing, shelter) for 48 to 72 hours. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IX.D.S1* | Identify appropriate equipment and personal gear. | POH/AFM, Appendix G |
| *PA.IX.D.S2* | Brief passengers on proper use of on-board emergency equipment and survival gear. | |

## IX. EMERGENCY OPERATIONS

| TASK | E. ENGINE FAILURE DURING TAKEOFF BEFORE $V_{MC}$ (SIMULATED) (AMEL, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; FAA-P-8740-66; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with an engine failure during takeoff before $V_{MC}$.<br>***Note: See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations.*** | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IX.E.K1* | Factors affecting $V_{MC}$. | AMEL/AMES Only |
| *PA.IX.E.K2* | $V_{MC}$ (red line) and $V_{YSE}$ (blue line). | AMEL/AMES Only |
| *PA.IX.E.K3* | Accelerate/stop distance. | AMEL/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IX.E.R1* | Failure to plan for engine failure during takeoff. | AMEL/AMES Only |
| *PA.IX.E.R2* | Improper aircraft configuration. | AMEL/AMES Only |
| *PA.IX.E.R3* | Distractions, loss of situational awareness, and/or improper task management. | AMEL/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IX.E.S1* | Close the throttles smoothly and promptly when a simulated engine failure occurs. | AMEL/AMES Only |
| *PA.IX.E.S2* | Maintain directional control and apply brakes (AMEL), or flight controls (AMES), as necessary. | AMEL/AMES Only |

## IX. EMERGENCY OPERATIONS

| TASK | F. ENGINE FAILURE AFTER LIFT-OFF (SIMULATED) (AMEL, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; FAA-P-8740-19; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with an engine failure after lift-off.<br>***Note: (See Appendix 6 – Safety of Flight.)*** | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IX.F.K1* | Factors affecting $V_{MC}$. | AMEL/AMES Only |
| *PA.IX.F.K2* | $V_{MC}$ (red line), $V_{YSE}$ (blue line), and $V_{SSE}$ (safe single-engine speed). | AMEL/AMES Only |
| *PA.IX.F.K3* | Accelerate/stop and accelerate/go distances. | AMEL/AMES Only |
| *PA.IX.F.K4* | How to identify and correctly secure the inoperative engine. | AMEL/AMES Only |
| *PA.IX.F.K5* | Importance of drag reduction, to include propeller feathering, gear and flap retraction, proper bank angle into operating engine and inclinometer ball coordination. | AMEL/AMES Only |
| *PA.IX.F.K6* | Zero-thrust procedures. | AMEL/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IX.F.R1* | Failure to plan for engine failure after liftoff. | AMEL/AMES Only |
| *PA.IX.F.R2* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | AMEL/AMES Only |
| *PA.IX.F.R3* | Improper aircraft configuration. | AMEL/AMES Only |
| *PA.IX.F.R4* | Low altitude maneuvering/stall/spin. | AMEL/AMES Only |
| *PA.IX.F.R5* | Distractions, loss of situational awareness, and/or improper task management. | AMEL/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IX.F.S1* | Recognize a simulated engine failure promptly, maintain control and utilize appropriate emergency procedures. | AMEL/AMES Only |
| *PA.IX.F.S2* | Establish $V_{YSE}$; if obstructions are present, establish $V_{XSE}$ or $V_{MC}$ +5 knots, whichever is greater, until obstructions are cleared, then transition to $V_{YSE}$. | AMEL/AMES Only |
| *PA.IX.F.S3* | Reduce drag by retracting landing gear and flaps as appropriate. | AMEL/AMES Only |
| *PA.IX.F.S4* | Simulate feathering the propeller on the inoperative engine. (Evaluator should then establish a zero-thrust on the inoperative engine). | AMEL/AMES Only |
| *PA.IX.F.S5* | Bank toward the operating engine as required for best performance. | AMEL/AMES Only |
| *PA.IX.F.S6* | Monitor operating engine and make adjustments as necessary. | AMEL/AMES Only |
| *PA.IX.F.S7* | Recognize the airplane's performance capabilities. If a climb is not possible at $V_{YSE}$, maintain $V_{YSE}$ and return to the departure airport for landing, or initiate an approach to the most suitable landing area available. | AMEL/AMES Only |
| *PA.IX.F.S8* | Simulate securing the inoperative engine. | AMEL/AMES Only |
| *PA.IX.F.S9* | Maintain heading ±10°, and airspeed ±5 knots. | AMEL/AMES Only |
| *PA.IX.F.S10* | Complete the appropriate emergency checklist. | AMEL/AMES Only |

## IX. EMERGENCY OPERATIONS

| TASK | G. APPROACH AND LANDING WITH AN INOPERATIVE ENGINE (SIMULATED) (AMEL, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; FAA-P-8740-19; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with an approach and landing with an engine inoperative, including engine failure on final approach. | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.IX.G.K1* | Factors affecting $V_{MC}$. | AMEL/AMES Only |
| *PA.IX.G.K2* | $V_{MC}$ (red line) and $V_{YSE}$ (blue line). | AMEL/AMES Only |
| *PA.IX.G.K3* | How to identify and secure the inoperative engine. | AMEL/AMES Only |
| *PA.IX.G.K4* | Importance of drag reduction, to include propeller feathering, gear and flap retraction, proper bank angle into operating engine and inclinometer ball coordination. | AMEL/AMES Only |
| *PA.IX.G.K5* | Feathering and zero-thrust procedures. | AMEL/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.IX.G.R1* | Failure to plan for engine failure inflight or during an approach. | AMEL/AMES Only |
| *PA.IX.G.R2* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | AMEL/AMES Only |
| *PA.IX.G.R3* | Improper aircraft configuration. | AMEL/AMES Only |
| *PA.IX.G.R4* | Low altitude maneuvering/stall/spin. | AMEL/AMES Only |
| *PA.IX.G.R5* | Distractions, loss of situational awareness, and/or improper task management. | AMEL/AMES Only |
| *PA.IX.G.R6* | Possible single-engine go-around. | AMEL/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.IX.G.S1* | Recognize an engine failure and take appropriate action, maintain control, and utilize the manufacturer's recommended emergency procedures. | AMEL/AMES Only |
| *PA.IX.G.S2* | Bank toward the operating engine, as required, for best performance. | AMEL/AMES Only |
| *PA.IX.G.S3* | Monitor the operating engine and make adjustments as necessary. | AMEL/AMES Only |
| *PA.IX.G.S4* | Maintain the manufacturer's recommended approach airspeed +10/-5 knots, in the landing configuration with a stabilized approach, until landing is assured. | AMEL/AMES Only |
| *PA.IX.G.S5* | Make smooth, timely, and correct control applications, during round out and touchdown. | AMEL/AMES Only |
| *PA.IX.G.S6* | Touch down on the first one-third of available runway, with no drift and the airplane's longitudinal axis aligned with and over the runway center path. | AMEL/AMES Only |
| *PA.IX.G.S7* | Maintain crosswind correction and directional control throughout the centerline approach and landing sequence. | AMEL/AMES Only |
| *PA.IX.G.S8* | Complete the appropriate checklist. | AMEL/AMES Only |

## X. MULTIENGINE OPERATIONS

| TASK | A. MANEUVERING WITH ONE ENGINE INOPERATIVE (AMEL, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-P-8740-66; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with maneuvering with one engine inoperative.<br>***Note: See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations.*** | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.X.A.K1* | Factors affecting $V_{MC}$. | AMEL/AMES Only |
| *PA.X.A.K2* | $V_{MC}$ (red line) and $V_{YSE}$ (blue line). | AMEL/AMES Only |
| *PA.X.A.K3* | How to identify and secure the inoperative engine. | AMEL/AMES Only |
| *PA.X.A.K4* | Importance of drag reduction, to include propeller feathering, gear and flap retraction, proper bank angle into operating engine and inclinometer ball coordination. | AMEL/AMES Only |
| *PA.X.A.K5* | Feathering and zero-thrust procedures. | AMEL/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.X.A.R1* | Failure to plan for engine failure during flight. | AMEL/AMES Only |
| *PA.X.A.R2* | Collision hazards, to include aircraft, terrain, obstacles, and wires. | AMEL/AMES Only |
| *PA.X.A.R3* | Improper aircraft configuration. | AMEL/AMES Only |
| *PA.X.A.R4* | Low altitude maneuvering/stall/spin. | AMEL/AMES Only |
| *PA.X.A.R5* | Distractions, loss of situational awareness, and/or improper task management. | AMEL/AMES Only |
| *PA.X.A.R6* | Factors associated with uncoordinated flight. | AMEL/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.X.A.S1* | Recognize a simulated engine failure, maintain control, manufacturer's memory item procedures and utilize appropriate emergency procedures. | AMEL/AMES Only |
| *PA.X.A.S2* | Set the engine controls, identify and verify the inoperative engine, and feather the appropriate propeller. | AMEL/AMES Only |
| *PA.X.A.S3* | Reduce drag by establishing and maintaining a bank toward the operating engine and proper inclinometer ball displacement toward the operating engine as required for best performance in straight-and-level flight. | AMEL/AMES Only |
| *PA.X.A.S4* | Monitor the operating engine and make the necessary adjustments. | AMEL/AMES Only |
| *PA.X.A.S5* | Demonstrate coordinated flight with one engine inoperative (propeller feathered). | AMEL/AMES Only |
| *PA.X.A.S6* | Restart the inoperative engine using the appropriate manufacturer's restart procedures. | AMEL/AMES Only |
| *PA.X.A.S7* | Maintain altitude ±100 feet or a minimum sink rate as appropriate and a heading ±10°. | AMEL/AMES Only |
| *PA.X.A.S8* | Complete the appropriate checklist. | AMEL/AMES Only |

## X. MULTIENGINE OPERATIONS

| TASK | B. $V_{MC}$ DEMONSTRATION (AMEL, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-P-8740-66; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a $V_{MC}$ demonstration.<br>***Note: See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations.*** | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.X.B.K1* | Factors affecting $V_{MC}$ and how $V_{MC}$ differs from stall speed ($V_S$). | AMEL/AMES Only |
| *PA.X.B.K2* | $V_{MC}$ (red line), $V_{YSE}$ (blue line) and $V_{SSE}$ (safe single-engine speed). | AMEL/AMES Only |
| *PA.X.B.K3* | Cause of loss of directional control at airspeeds below $V_{MC}$. | AMEL/AMES Only |
| *PA.X.B.K4* | Proper procedures for maneuver entry and safe recovery. | AMEL/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.X.B.R1* | Improper aircraft configuration. | AMEL/AMES Only |
| *PA.X.B.R2* | Maneuvering with one engine inoperative. | AMEL/AMES Only |
| *PA.X.B.R3* | Distractions, loss of situational awareness, and/or improper task management. | AMEL/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.X.B.S1* | Configure the airplane in accordance with the manufacturer's recommendations, in the absence of the manufacturer's recommendations, then at $V_{SSE}$/$V_{YSE}$, as appropriate: | AMEL/AMES Only |
| *PA.X.B.S1a* | a. Landing gear retracted | AMEL/AMES Only |
| *PA.X.B.S1b* | b. Flaps set for takeoff | AMEL/AMES Only |
| *PA.X.B.S1c* | c. Cowl flaps set for takeoff | AMEL/AMES Only |
| *PA.X.B.S1d* | d. Trim set for takeoff | AMEL/AMES Only |
| *PA.X.B.S1e* | e. Propellers set for high RPM | AMEL/AMES Only |
| *PA.X.B.S1f* | f. Power on critical engine reduce to idle and wind milling | AMEL/AMES Only |
| *PA.X.B.S1g* | g. Power on operating engine set to takeoff or maximum available power | AMEL/AMES Only |
| *PA.X.B.S1h* | h. Up to 5° of bank into the operating engine | AMEL/AMES Only |
| *PA.X.B.S2* | Establish a single-engine climb attitude with the airspeed at approximately 10 knots above $V_{SSE}$. | AMEL/AMES Only |
| *PA.X.B.S3* | Establish a bank angle not to exceed 5° toward the operating engine, as required for best performance and controllability. | AMEL/AMES Only |
| *PA.X.B.S4* | Increase the pitch attitude slowly to reduce the airspeed at approximately 1 knot per second while applying rudder pressure to maintain directional control until full rudder is applied. | AMEL/AMES Only |
| *PA.X.B.S5* | Recognize indications of loss of directional control, stall warning, or buffet. | AMEL/AMES Only |
| *PA.X.B.S6* | Recover promptly by simultaneously reducing power sufficiently on the operating engine while decreasing the angle of attack as necessary to regain airspeed and directional control. Recovery **should not** be attempted by increasing the power on the simulated failed engine. | AMEL/AMES Only |
| *PA.X.B.S7* | Recover within 20° of the entry heading. | AMEL/AMES Only |
| *PA.X.B.S8* | Advance power smoothly on the operating engine and accelerate to $V_{SSE}$/$V_{YSE}$, as appropriate, +10/-5 knots, during the recovery. | AMEL/AMES Only |

## X. MULTIENGINE OPERATIONS

| TASK | C. ENGINE FAILURE DURING FLIGHT (BY REFERENCE TO INSTRUMENTS) (AMEL, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-P-8740-66; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with instrument flight with one engine inoperative.<br>***Note: See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations.*** | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.X.C.K1* | Instrument procedures used with one engine inoperative. | AMEL/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.X.C.R1* | Failure to plan for engine failure during flight. | AMEL/AMES Only |
| *PA.X.C.R2* | Distractions, loss of situational awareness, and/or improper task management. | AMEL/AMES Only |
| *PA.X.C.R3* | Single-engine performance. | AMEL/AMES Only |
| *PA.X.C.R4* | Fuel management during single-engine operation. | AMEL/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.X.C.S1* | Recognize an engine failure, set the engine controls, reduce drag, identify and verify the inoperative engine, and feather the appropriate engine propeller. | AMEL/AMES Only |
| *PA.X.C.S2* | Establish and maintain a bank angle toward the operating engine as required for best performance in straight-and-level flight. | AMEL/AMES Only |
| *PA.X.C.S3* | Follow the manufacturer's checklists to verify procedures for securing the inoperative engine. | AMEL/AMES Only |
| *PA.X.C.S4* | Monitor the operating engine and make the necessary adjustments. | AMEL/AMES Only |
| *PA.X.C.S5* | Demonstrate coordinated flight with one engine inoperative. | AMEL/AMES Only |
| *PA.X.C.S6* | Maintain the specified altitude within ±100 feet, or a minimum sink rate, as appropriate, airspeed ±10 knots, and the specified heading ±10°. | AMEL/AMES Only |

## X. MULTIENGINE OPERATIONS

| | | |
|---|---|---|
| **TASK** | **D. INSTRUMENT APPROACH AND LANDING WITH AN INOPERATIVE ENGINE (SIMULATED) (BY REFERENCE TO INSTRUMENTS) (AMEL, AMES)** | |
| **REFERENCES** | FAA-H-8083-2, FAA-H-8083-3, FAA-P-8740-66; POH/AFM | |
| **OBJECTIVE** | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with executing a published instrument approach with one engine inoperative.<br>***Note: See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations.*** | |
| **KNOWLEDGE** | The applicant demonstrates understanding of: | |
| *PA.X.D.K1* | Instrument approach procedures used with one engine inoperative. | AMEL/AMES Only |
| **RISK MANAGEMENT** | The applicant demonstrates the ability to identify, assess, and mitigate risks, encompassing: | |
| *PA.X.D.R1* | Failure to plan for engine failure during approach and landing. | AMEL/AMES Only |
| *PA.X.D.R2* | Distractions, loss of situational awareness, and/or improper task management. | AMEL/AMES Only |
| *PA.X.D.R3* | Single-engine performance. | AMEL/AMES Only |
| **SKILLS** | The applicant demonstrates the ability to: | |
| *PA.X.D.S1* | Recognize engine failure, set the engine controls, reduce drag, identify and verify the inoperative engine, and feather inoperative engine propeller. | AMEL/AMES Only |
| *PA.X.D.S2* | Reduce drag by establishing and maintaining a bank angle and inclinometer ball displacement toward the operating engine and configuring the aircraft, as required for best performance in straight-and-level flight and during the approach phase. | AMEL/AMES Only |
| *PA.X.D.S3* | Follow the manufacturer's prescribed checklists for securing the inoperative engine. | AMEL/AMES Only |
| *PA.X.D.S4* | Monitor the operating engine and make the necessary adjustments. | AMEL/AMES Only |
| *PA.X.D.S5* | Request and follow an actual or a simulated ATC clearance for an instrument approach. | AMEL/AMES Only |
| *PA.X.D.S6* | Maintain altitude within 100 feet, airspeed within ±10 knots if within the aircraft's capability, and heading ±10°. | AMEL/AMES Only |
| *PA.X.D.S7* | Establish a rate of descent that will ensure arrival at the MDA or DH/DA, with the airplane in a position from which a descent to a landing on the intended runway can be made, either straight in or circling as appropriate. | AMEL/AMES Only |
| *PA.X.D.S8* | On final approach segment, maintain vertical and lateral guidance within ¾-scale deflection. | AMEL/AMES Only |
| *PA.X.D.S9* | Avoid loss of aircraft control, or to attempt flight contrary to the operating limitations of the aircraft (i.e., the engine-inoperative limits). | AMEL/AMES Only |
| *PA.X.D.S10* | Comply with the published criteria for the aircraft approach category when circling. | AMEL/AMES Only |
| *PA.X.D.S11* | Complete the landing and the appropriate manufacturer's checklist. | AMEL/AMES Only |

## XI. NIGHT OPERATIONS

| TASK | A. NIGHT PREPARATION | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-25; AIM; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with night operations. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.XI.A.K1* | Physiological aspects of night flying as it relates to vision. | 4.1, 6.10 (5.1, 7.10) |
| *PA.XI.A.K2* | Lighting systems identifying airports, runways, taxiways and obstructions, as well as pilot controlled lighting. | 4.1, 6.10 (5.1, 7.10) |
| *PA.XI.A.K3* | Airplane equipment and lighting requirements for night operations. | 4.1, 6.10 (5.1, 7.10) |
| *PA.XI.A.K4* | Personal equipment essential for night flight. | 4.1, 6.10 (5.1, 7.10) |
| *PA.XI.A.K5* | Night orientation, navigation, and chart reading techniques. | 4.2 (5.2) |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.XI.A.R1* | Collision hazards, to include aircraft, terrain, obstacles and wires. | |
| *PA.XI.A.R2* | Distractions, loss of situational awareness, and/or improper task management. | |
| *PA.XI.A.R3* | Hazards specific to night flying. | 6.10 (7.10) |
| SKILLS | ***N/A***<br>***Note: Not generally evaluated in flight. If the practical test is conducted at night, all ACS Tasks are evaluated in that environment, thus there is no need for explicit Task elements to exist here.*** | |

## XII. POSTFLIGHT PROCEDURES

| TASK | A. AFTER LANDING, PARKING AND SECURING (ASEL, AMEL) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-3; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with after landing, parking, and securing procedures. | **Video Volume.Segment** |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.XII.A.K1* | Aircraft shutdown, securing, and postflight inspection. | |
| *PA.XII.A.K2* | Documenting in-flight/postflight discrepancies, if any. | |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.XII.A.R1* | Inappropriate activities and distractions. | |
| *PA.XII.A.R2* | Confirmation or expectation bias as related to taxi instructions. | |
| *PA.XII.A.R3* | Airport specific security procedures. | |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.XII.A.S1* | Demonstrate runway incursion avoidance procedures. | 3.15 |
| *PA.XII.A.S2* | Park in an appropriate area, considering the safety of nearby persons and property. | 6.10 (7.10) |
| *PA.XII.A.S3* | Complete the appropriate checklist. | 2.11, 6.10 (7.10), POH/AFM |
| *PA.XII.A.S4* | Disembark passengers safely and monitor passenger movement while on the ramp. | |
| *PA.XII.A.S5* | Conduct a postflight inspection and document discrepancies and servicing requirements, if any. | |
| *PA.XII.A.S6* | Secure the aircraft. | |

## XII. POSTFLIGHT PROCEDURES

| TASK | B. SEAPLANE POST-LANDING PROCEDURES (ASES, AMES) | |
|---|---|---|
| REFERENCES | FAA-H-8083-2, FAA-H-8083-23; POH/AFM | |
| OBJECTIVE | To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with anchoring, docking, mooring, and ramping/beaching.<br>***Note: The evaluator must select at least one after-landing procedure (anchoring, docking and mooring, or ramping/beaching).*** | |
| KNOWLEDGE | The applicant demonstrates understanding of: | |
| *PA.XII.B.K1* | Mooring. | ASES/AMES Only |
| *PA.XII.B.K2* | Docking. | ASES/AMES Only |
| *PA.XII.B.K3* | Anchoring. | ASES/AMES Only |
| *PA.XII.B.K4* | Ramping/beaching. | ASES/AMES Only |
| *PA.XII.B.K5* | Postflight inspection, recording of in-flight/postflight discrepancies. | ASES/AMES Only |
| RISK MANAGEMENT | The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing: | |
| *PA.XII.B.R1* | Inappropriate activities and distractions. | ASES/AMES Only |
| *PA.XII.B.R2* | Confirmation or expectation bias as related to taxi instructions. | ASES/AMES Only |
| SKILLS | The applicant demonstrates the ability to: | |
| *PA.XII.B.S1* | Select a suitable area for anchoring, considering seaplane movement, water depth, tide, wind, and weather changes. | ASES/AMES Only |
| *PA.XII.B.S2* | Approach the dock/mooring buoy or ramp/beach in the proper direction and at a safe speed, considering water depth, tide, current, and wind. | ASES/AMES Only |
| *PA.XII.B.S3* | If anchoring, use an adequate number of anchors and lines of sufficient strength and length to ensure the seaplane's security. | ASES/AMES Only |
| *PA.XII.B.S4* | Secure the seaplane in a manner that will protect it from the harmful effect of wind, waves, and changes in water level. | ASES/AMES Only |

# Supplemental ACS Information

The following information is from the Private Pilot Airman Certification Standards and may be useful in your preparation.

## (ACS) Foreword

The Federal Aviation Administration (FAA) has published the Private Pilot – Airplane Airman Certification Standards (ACS) document to communicate the aeronautical knowledge, risk management, and flight proficiency standards for the private pilot (PP) certification in the airplane category, single-engine land and sea; and multiengine land and sea classes. This ACS incorporates and supersedes FAA-S-ACS-6, Private Pilot-Airplane Airman Certification Standards, Change 1.

The FAA views the ACS as the foundation of its transition to a more integrated and systematic approach to airman certification. The ACS is part of the safety management system (SMS) framework that the FAA uses to mitigate risks associated with airman certification training and testing. Specifically, the ACS, associated guidance, and test question components of the airman certification system are constructed around the four functional components of an SMS:

- Safety Policy that defines and describes aeronautical knowledge, flight proficiency, and risk management as integrated components of the airman certification system;
- Safety Risk Management processes through which both internal and external stakeholders identify changes in regulations, safety recommendations, or other factors. These changes are then evaluated to determine whether they require modification of airman testing and training materials;
- Safety Assurance processes to ensure the prompt and appropriate incorporation of changes arising from new regulations and safety recommendations; and
- Safety Promotion in the form of ongoing engagement with both external stakeholders (e.g., the aviation training industry) and FAA policy divisions.

The FAA has developed this ACS and its associated guidance in collaboration with a diverse group of aviation training experts. The goal is to drive a systematic approach to all components of the airman certification system, including knowledge test question development and conduct of the practical test. The FAA acknowledges and appreciates the many hours that these aviation experts have contributed toward this goal. This level of collaboration, a hallmark of a robust safety culture, strengthens and enhances aviation safety at every level of the airman certification system.

/s/ May 17, 2017

John S. Duncan
Director, Flight Standards Service

## Airman Certification Standards Concept

The goal of the airman certification process is to ensure the applicant possesses the knowledge, ability to manage risks, and skill consistent with the privileges of the certificate or rating being exercised, in order to act as Pilot-in-command (PIC).

In fulfilling its responsibilities for the airman certification process, the Federal Aviation Administration (FAA) Flight Standards Service (AFS) plans, develops, and maintains materials related to airman certification training and testing. These materials have included several components. The FAA knowledge test measures mastery of the aeronautical knowledge areas listed in Title 14 of the Code of Federal Regulations (14 CFR) part 61. Other materials, such as handbooks in the FAA-H-8083 series, provide guidance to applicants on aeronautical knowledge, risk management, and flight proficiency.

Safe operations in today's National Airspace System (NAS) require a more systematic integration of aeronautical knowledge, risk management, and flight proficiency standards. To accomplish these goals, the FAA drew upon the expertise of organizations and individuals across the aviation and training community to develop the Airman Certification Standards (ACS). The ACS integrates the elements of knowledge, risk management, and skill listed in 14 CFR part 61 for each airman certificate or rating. It thus forms a more comprehensive standard for what an applicant must know, consider, and do for the safe conduct and successful completion of each Task to be tested on both the qualifying FAA knowledge test and the oral and flight portions of the practical test.

Through the ground and flight portion of the practical test, the FAA expects evaluators to assess the applicant's mastery of the topic in accordance with the level of learning most appropriate for the specified Task. The oral questioning will

continue throughout the entire practical test. For some topics, the evaluator will ask the applicant to describe or explain. For other items, the evaluator will assess the applicant's understanding by providing a scenario that requires the applicant to appropriately apply and/or correlate knowledge, experience, and information to the circumstances of the given scenario. The flight portion of the practical test requires the applicant to demonstrate knowledge, risk management, flight proficiency, and operational skill in accordance with the ACS.

***Note:*** *As used in the ACS, an* evaluator *is any person authorized to conduct airman testing (e.g., an FAA Aviation Safety Inspector (ASI), Designated Pilot Examiner (DPE), or other individual authorized to conduct test for a certificate or rating).*

## Using the ACS

The ACS consists of ***Areas of Operation*** arranged in a logical sequence, beginning with Preflight Preparation and ending with Postflight Procedures. Each Area of Operation includes ***Tasks*** appropriate to that Area of Operation. Each Task begins with an ***Objective*** stating what the applicant should know, consider, and/or do. The ACS then lists the aeronautical knowledge, risk management, and skill elements relevant to the specific Task, along with the conditions and standards for acceptable performance. The ACS uses ***Notes*** to emphasize special considerations. The ACS uses the terms "will" and "must" to convey directive (mandatory) information. The term "may" denotes items that are recommended but not required. The ***References*** for each Task indicate the source material for Task elements. For example, in Tasks such as "Weather products required for preflight planning, current and forecast weather for departure, en route, and arrival phases of flight." (PA.I.C.K2), the applicant should be prepared for questions on any weather product presented in the references for that Task.

The abbreviation(s) within parentheses immediately following a Task refer to the category and/or class aircraft appropriate to that Task. The meaning of each abbreviation is as follows:

**ASEL:** Airplane – Single-Engine Land

**ASES:** Airplane – Single-Engine Sea

**AMEL:** Airplane – Multiengine Land

**AMES:** Airplane – Multiengine Sea

***Note:*** *When administering a test, the Tasks appropriate to the class airplane (ASEL, ASES, AMEL, or AMES) used for the test must be included in the plan of action. The absence of a class indicates the Task is for all classes.*

Each Task in the ACS is coded according to a scheme that includes four elements. For example:

PA.XI.A.K1:
- PA = Applicable ACS (Private Pilot – Airplane)
- XI = Area of Operation (Night Operations)
- A = Task (Night Preparation)
- K1 = Task element Knowledge 1 (Physiological aspects of night flying as it relates to vision.)

Knowledge test questions are linked to the ACS codes, which will soon replace the system of Learning Statement Codes (LSC). After this transition occurs, the Airman Knowledge Test Report (AKTR) will list an ACS code that correlates to a specific Task element for a given Area of Operation and Task. Remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria. Similarly, a Notice of Disapproval for the practical test will use the ACS codes to identify the deficient Task elements.

The current knowledge test management system does not have the capability to print ACS codes. Until a new test management system is in place, the LSC (e.g., "PLT058") code will continue to be displayed on the AKTR. The LSC codes are linked to references leading to broad subject areas. By contrast, each ACS code is tied to a unique Task element in the ACS itself. Because of this fundamental difference, there is no one-to-one correlation between LSC codes and ACS codes.

Because all active knowledge test questions for the Private Pilot Airplane (PAR) Knowledge Test have been aligned with the corresponding ACS, evaluators can continue to use LSC codes in conjunction with the ACS for the time being. The evaluator should look up the LSC code(s) on the applicant's AKTR in the Learning Statement Reference Guide. After noting the subject area(s), the evaluator can use the corresponding Area(s) of Operation/Task(s) in the ACS to narrow the scope of material for retesting, and to evaluate the applicant's understanding of that material in the context of the appropriate ACS Area(s) of Operation and Task(s).

Applicants for a combined Private Pilot Certificate with Instrument Rating, in accordance with 14 CFR part 61, section 61.65 (a) and (g), must pass all areas designated in the Private Pilot – Airplane ACS and the Instrument Rating – Airplane ACS. Evaluators need not duplicate Tasks. For example, only one preflight demonstration would be required; however, the Preflight Task from the Instrument Rating – Airplane ACS would be more extensive than the Preflight Task from the Private Pilot – Airplane ACS to ensure readiness for Instrument Flight Rules (IFR) flight.

A combined checkride should be treated as one practical test, requiring only one application and resulting in only one temporary certificate, disapproval notice, or letter of discontinuance, as applicable. Failure of any Task will result in a failure of the entire test and application. Therefore, even if the deficient maneuver was instrument related and the performance of all visual flight rules (VFR) Tasks was determined to be satisfactory, the applicant will receive a notice of disapproval.

The applicant must pass the Private Pilot Airplane (PAR) Knowledge Test before taking the private pilot practical test. The practical test is conducted in accordance with the ACS and FAA regulations that are current as of the date of the test. Further, the applicant must pass the ground portion of the practical test before beginning the flight portion.

The ground portion of the practical test allows the evaluator to determine whether the applicant is sufficiently prepared to advance to the flight portion of the practical test. The oral questioning will continue throughout the entire practical test.

The FAA encourages applicants and instructors to use the ACS when preparing for knowledge tests and practical tests. The FAA will revise the ACS as circumstances require.

# Appendix 1: The Knowledge Test Eligibility, Prerequisites, and Testing Centers

## Knowledge Test Description

The knowledge test is an important part of the airman certification process. Applicants must pass the knowledge test before taking the practical test.

The knowledge test consists of objective, multiple-choice questions. There is a single correct response for each test question. Each test question is independent of other questions. A correct response to one question does not depend upon, or influence, the correct response to another.

## Knowledge Test Table

| Test Code | Test Name | Number of Questions | Age | Allotted Time | Passing Score |
|---|---|---|---|---|---|
| PAR | Private Pilot Airplane | 60 | 15 | 2.5 | 70 |
| PAT | Private Pilot Airplane/Recreational Pilot - Transition | 30 | 15 | 1.5 | 70 |
| PBG | Private Pilot Balloon - Gas | 60 | 14 | 2.5 | 70 |
| PBH | Private Pilot Balloon - Hot Air | 60 | 14 | 2.5 | 70 |
| PCH | Private Pilot Helicopter **Canadian Conversion** | 40 | 16 | 2.0 | 70 |
| PCP | Private Pilot – Airplane **Canadian Conversion** | 40 | 16 | 2.0 | 70 |
| PGL | Private Pilot Glider | 60 | 14 | 2.5 | 70 |
| PGT | Private Pilot Gyroplane/Recreational Pilot - Transition | 30 | 15 | 1.5 | 70 |
| PHT | Private Pilot Helicopter/Recreational Pilot - Transition | 30 | 15 | 1.5 | 70 |
| PLA | Private Pilot Airship | 60 | 15 | 2.5 | 70 |
| PPP | Private Pilot Powered Parachute | 60 | 15 | 2.5 | 70 |
| PRG | Private Pilot Gyroplane | 60 | 15 | 2.5 | 70 |
| PRH | Private Pilot Helicopter | 60 | 15 | 2.5 | 70 |
| PWS | Private Pilot Weight-Shift-Control | 60 | 15 | 2.5 | 70 |

## Knowledge Test Blueprint

| PAR Knowledge Areas Required by 14 CFR section 61.65 to be on the Knowledge Test | Percent of Questions Per Test |
|---|---|
| Regulations | 5 – 15% |
| Accident Reporting | 5 – 10% |
| Performance Charts | 5 – 10% |
| Radio Communications | 5 – 10% |
| Weather | 5 – 10% |
| Safe and Efficient Operations | 5 – 15% |
| Density Altitude Performance | 5 – 10% |
| Weight and Balance | 5 – 10% |
| Aerodynamics., Powerplants and Aircraft Systems | 5 – 10% |
| Stalls and Spins | 5 – 10% |
| Aeronautical Decision-Making (ADM) | 5 – 10% |
| Preflight actions | 5 – 10% |
| **Total Number of Questions** | **60** |

## English Language Standard

In accordance with the requirements of 14 CFR part 61 and the FAA Aviation English Language Proficiency standard, throughout the application and testing process the applicant must demonstrate the ability to read, write, speak, and understand the English language. English language proficiency is required to communicate effectively with Air Traffic Control (ATC), to comply with ATC instructions, and to ensure clear and effective crew communication and coordination. Normal restatement of questions as would be done for a native English speaker is permitted, and does not constitute grounds for disqualification.

## Knowledge Test Requirements

In order to take the Private Pilot Knowledge Test, you must provide proper identification. To verify your eligibility to take the test, you must also provide one of the following in accordance with the requirements of 14 CFR part 61:

- 14 CFR part 61, section 61.35 lists the prerequisites for taking the knowledge test, to include the minimum age an applicant must be to sit for the test.
  - — Received an endorsement, if required by this part, from an authorized instructor certifying that the applicant accomplished the appropriate ground-training or a home-study course required by this part for the certificate or rating sought and is prepared for the knowledge test;
  - — Proper identification at the time of application that contains the applicant's—
    - o (i) Photograph;
    - o (ii) Signature;
    - o (iii) Date of birth;
    - o (iv) If the permanent mailing address is a post office box number, then the applicant must provide a government-issued residential address
- 14 CFR part 61, section 61.49 acceptable forms of retest authorization for **all** Private Pilot tests:
  - — An applicant retesting **after failure** is required to submit the applicable test report indicating failure, along with an endorsement from an authorized instructor who gave the applicant the required additional training. The endorsement must certify that the applicant is competent to pass the test. The test proctor must retain the original failed test report presented as authorization and attach it to the applicable sign-in/out log.

***Note:*** *If the applicant no longer possesses the original test report, he or she may request a duplicate replacement issued by the Airman Certification Branch (AFS-760).*

- Acceptable forms of authorization for Private Pilot Canadian Conversion (PCP) only:
  - Confirmation of Verification Letter issued by the AFS-760 (Knowledge Testing Authorization Requirements Matrix).
  - Requires **no** instructor endorsement or other form of written authorization.

### Knowledge Test Centers

The FAA authorizes hundreds of knowledge testing center locations that offer a full range of airman knowledge tests. For information on authorized testing centers and to register for the knowledge test, contact one of the providers listed at www.faa.gov.

### Knowledge Test Registration

When you contact a knowledge testing center to register for a test, please be prepared to select a test date, choose a testing center, and make financial arrangements for test payment when you call. You may **register** for test(s) several weeks in advance, and you may cancel in accordance with the testing center's cancellation policy.

## Appendix 2: Knowledge Test Procedures and Tips

Before starting the actual test, the testing center will provide an opportunity to practice navigating through the test. This practice or tutorial session may include sample questions to familiarize the applicant with the look and feel of the software. (e.g., selecting an answer, marking a question for later review, monitoring time remaining for the test, and other features of the testing software.)

### Acceptable Materials

The applicant may use the following aids, reference materials, and test materials, as long as the material does not include actual test questions or answers:

| Acceptable Materials | Unacceptable Materials | Notes |
|---|---|---|
| Supplement book provided by proctor | Written materials that are handwritten, printed, or electronic | Testing centers may provide calculators and/or deny the use of personal calculators |
| All models of aviation-oriented calculators or small electronic calculators that perform only arithmetic functions | Electronic calculators incorporating permanent or continuous type memory circuits without erasure capability | Unit Member (proctor) may prohibit the use of your calculator if he or she is unable to determine the calculator's erasure capability |
| Calculators with simple programmable memories, which allow addition to, subtraction from, or retrieval of one number from the memory; or simple functions, such as square root and percentages | Magnetic Cards, magnetic tapes, modules, computer chips, or any other device upon which pre- written programs or information related to the test can be stored and retrieved | Printouts of data must be surrendered at the completion of the test if the calculator incorporates this design feature |
| Scales, straightedges, protractors, plotters, navigation computers, blank log sheets, holding pattern entry aids, and electronic or mechanical calculators that are directly related to the test | Dictionaries | Before, and upon completion of the test, while in the presence of the Unit Member, actuate the ON/OFF switch or RESET button, and perform any other function that ensures erasure of any data stored in memory circuits |
| Manufacturer's permanently inscribed instructions on the front and back of such aids, e.g., formulas, conversions, regulations, signals, weather data, holding pattern diagrams, frequencies, weight and balance formulas, and air traffic control procedures | Any booklet or manual containing instructions related to use of test aids | Unit Member makes the final determination regarding aids, reference materials, and test materials |

### Test Tips

When taking a knowledge test, please keep the following points in mind:

- Carefully read the instructions provided with the test.
- Answer each question in accordance with the latest regulations and guidance publications.
- Read each question carefully before looking at the answer options. You should clearly understand the problem before trying to solve it.

- After formulating a response, determine which answer option corresponds with your answer. The answer you choose should completely solve the problem.
- Remember that only one answer is complete and correct. The other possible answers are either incomplete or erroneous.
- If a certain question is difficult for you, mark it for review and return to it after you have answered the less difficult questions. This procedure will enable you to use the available time to maximum advantage.
- When solving a calculation problem, be sure to read all the associated notes.
- For questions involving use of a graph, you may request a printed copy that you can mark in computing your answer. This copy and all other notes and paperwork must be given to the testing center upon completion of the test.

### Cheating or Other Unauthorized Conduct

To avoid test compromise, computer testing centers must follow strict security procedures established by the FAA and described in FAA Order 8080.6 (as amended), Conduct of Airman Knowledge Tests. The FAA has directed testing centers to terminate a test at any time a test unit member suspects that a cheating incident has occurred.

The FAA will investigate and, if the agency determines that cheating or unauthorized conduct has occurred, any airman certificate or rating you hold may be revoked. You will also be prohibited from applying for or taking any test for a certificate or rating under 14 CFR part 61 for a period of 1 year.

### Testing Procedures for Applicants Requesting Special Accommodations

An applicant with learning or reading disability may request approval from the Airman Testing Standards Branch (AFS-630) through the local Flight Standards District Office (FSDO) or International Field Office/International Field Unit (IFO/IFU) to take airman knowledge test using one of the three options listed below, in preferential order:

**Option 1:** Use current testing facilities and procedures whenever possible.

**Option 2:** Use a self-contained, electronic device which pronounces and displays typed-in words (e.g., the Franklin Speaking Wordmaster®) to facilitate the testing process.

***Note:*** *The device should consist of an electronic thesaurus that audibly pronounces typed-in words and presents them on a display screen. The device should also have a built-in headphone jack in order to avoid disturbing others during testing.*

**Option 3:** Request the proctor's assistance in reading specific words or terms from the test questions and/or supplement book. To prevent compromising the testing process, the proctor must be an individual with no aviation background or expertise. The proctor may provide reading assistance only (i.e., no explanation of words or terms). When an applicant requests this option, the FSDO or IFO/IFU inspector must contact AFS-630 for assistance in selecting the test site and assisting the proctor. Before approving any option, the FSDO or IFO/IFU inspector must advise the applicant of the regulatory certification requirement to be able to read, write, speak, and understand the English language.

## Appendix 3: Airman Knowledge Test Report

Immediately upon completion of the knowledge test, the applicant receives a printed Airman Knowledge Test Report (AKTR) documenting the score with the testing center's raised, embossed seal. The applicant must retain the original AKTR. The instructor must provide instruction in each area of deficiency and provide a logbook endorsement certifying that the applicant has demonstrated satisfactory knowledge in each area. When taking the practical test, the applicant must present the original AKTR to the evaluator, who is required to assess the noted areas of deficiency during the ground portion of the practical test.

An AKTR expires 24 calendar months after the month the applicant completes the knowledge test. If the AKTR expires before completion of the practical test, the applicant must retake the knowledge test.

To obtain a duplicate AKTR due to loss or destruction of the original, the applicant can send a signed request accompanied by a check or money order for $12.00 (U.S. funds), payable to the FAA to:

Federal Aviation Administration
Airmen Certification Branch, AFS-760
P.O. Box 25082
Oklahoma City, OK 73125

To obtain a copy of the application form or a list of the information required, please see the Airman Certification Branch (AFS-760) web page.

### FAA Knowledge Test Question Coding

Each Task in the ACS includes an ACS code. This ACS code will soon be displayed on the AKTR to indicate what Task element was proven deficient on the knowledge test. Instructors can then provide remedial training in the deficient areas, and evaluators can re-test this element during the practical test.

The ACS coding consists of four elements. For example, this code is interpreted as follows:

PA.XI.A.K1:
- PA = Applicable ACS (Private Pilot – Airplane)
- XI = Area of Operation (Night Operations)
- A = Task (Night Preparation)
- K1 = Task element Knowledge 1 (Physiological aspects of night flying as it relates to vision.)

Knowledge test questions are linked to the ACS codes, which will soon replace the system of Learning Statement Codes (LSC). After this transition occurs, the Airman Knowledge Test Report (AKTR) will list an ACS code that correlates to a specific Task element for a given Area of Operation and Task. Remedial instruction and re-testing will be specific, targeted, and based on specified learning criteria. Similarly, a Notice of Disapproval for the practical test will use the ACS codes to identify the deficient Task elements.

The current knowledge test management system does not have the capability to print ACS codes. Until a new test management system is in place, the LSC (e.g., "PLT058") code will continue to be displayed on the AKTR. The LSC codes are linked to references leading to broad subject areas. By contrast, each ACS code is tied to a unique Task element in the ACS itself. Because of this fundamental difference, there is no one-to-one correlation between LSC codes and ACS codes.

Because all active knowledge test questions for the Private Pilot Airplane Knowledge Test (PAR) have been aligned with the corresponding ACS, evaluators can continue to use LSC codes in conjunction with the ACS for the time being. The evaluator should look up the LSC code(s) on the applicant's AKTR in the Learning Statement Reference Guide. After noting the subject area(s), the evaluator can use the corresponding Area(s) of Operation/Task(s) in the ACS to narrow the scope of material for retesting, and to evaluate the applicant's understanding of that material in the context of the appropriate ACS Area(s) of Operation and Task(s).

## Appendix 4: The Practical Test – Eligibility and Prerequisites

The prerequisite requirements and general eligibility for a practical test and the specific requirements for the original issuance of a Private Pilot Certificate in the airplane category can be found in 14 CFR part 61, sections 61.39(a)(1) through (7) and 61.103, respectively.

## Appendix 5: Practical Test Roles, Responsibilities, and Outcomes

### Applicant Responsibilities

The applicant is responsible for mastering the established standards for knowledge, skill, and risk management elements in all Tasks appropriate to the certificate and rating sought. The applicant should use this ACS, its references, and the Practical Test Checklist in this Appendix in preparation to take the practical test.

## Instructor Responsibilities

The instructor is responsible for training the applicant to meet the established standards for knowledge, skill, and risk management elements in all Tasks appropriate to the certificate and rating sought. The instructor should use this ACS and its references as part of preparing the applicant to take the practical test and, if necessary, in retraining the applicant to proficiency in all subject(s) missed on the knowledge test.

## Evaluator Responsibilities

An evaluator is:

- Aviation Safety Inspector (ASI)
- Pilot examiner (other than administrative pilot examiners);
- Training center evaluator (TCE);
- Chief instructor, assistant chief instructor or check instructor of pilot school holding examining authority; or
- Instrument Flight Instructor (CFII) conducting instrument proficiency check (IPC).

The evaluator who conducts the practical test is responsible for determining that the applicant meets the established standards of aeronautical knowledge, skills (flight proficiency), and risk management for each Task in the appropriate ACS. This responsibility also includes verifying the experience requirements specified for a certificate or rating.

Prior to beginning the practical test, the evaluator must also determine that the applicant meets FAA Aviation English Language Proficiency Standard by verifying that he or she can understand ATC instructions and communicate in English at a level that is understandable to ATC and other pilots. The evaluator should use the procedures outlined in the AC 60-28, English Language Skill Standards required by 14 CFR parts 61, 63, and 65 (current version) when evaluating the applicant's ability to meet the standard.

The evaluator must develop a Plan of Action (POA), written in English, to conduct the practical test, and it must include all of the required Areas of Operation and Tasks. The POA must include a scenario that evaluates as many of the required Areas of Operation and Tasks as possible. As the scenario unfolds during the test, the evaluator will introduce problems and emergencies that the applicant must manage. The evaluator has the discretion to modify the POA in order to accommodate unexpected situations as they arise. For example, the evaluator may elect to suspend and later resume a scenario in order to assess certain Tasks.

In the integrated ACS framework, the Areas of Operation contain Tasks that include "knowledge" elements (such as K1), "risk management" elements (such as R1), and "skill" elements (such as S1). Knowledge and risk management elements are primarily evaluated during the knowledge testing phase of the airman certification process. The evaluator must assess the applicant on all skill elements for each Task included in each Area of Operation of the ACS, unless otherwise noted. The evaluator administering the practical test has the discretion to combine Tasks/elements as appropriate to testing scenarios.

The required minimum elements to include in the POA, unless otherwise noted, from each applicable Task are as follows:

- at least one knowledge element;
- at least one risk management element;
- all skill elements; and
- any Task elements in which the applicant was shown to be deficient on the knowledge test.

***Note:*** *Task elements added to the POA on the basis of being listed on the AKTR may satisfy the other minimum Task element requirements. The missed items on the AKTR are not required to be added in addition to the minimum Task element requirements.*

There is no expectation for testing every knowledge and risk management element in a Task, but the evaluator has discretion to sample as needed to ensure the applicant's mastery of that Task.

Unless otherwise noted in the Task, the evaluator must test each item in the skills section by asking the applicant to perform each one. As safety of flight conditions permit, the evaluator should use questions during flight to test knowledge and risk management elements not evident in the demonstrated skills. To the greatest extent practicable,

evaluators should test the applicant's ability to apply and correlate information, and use rote questions only when they are appropriate for the material being tested. If the Task includes an element with subelements, the evaluator may choose the primary element and select at least one sub-element to satisfy the requirement that at least one knowledge element be selected. For example, if the evaluator chooses PA.I.H.K1, he or she must select a sub-element like PA.I.H.K1e to satisfy the requirement to select one knowledge element.

## Possible Outcomes of the Test

There are three possible outcomes of the practical test: (1) Temporary Airman Certificate (satisfactory), (2) Notice of Disapproval (unsatisfactory), or (3) Letter of Discontinuance.

If the evaluator determines that a Task is incomplete, or the outcome is uncertain, the evaluator must require the applicant to repeat that Task, or portions of that Task. This provision does not mean that instruction, practice, or the repetition of an unsatisfactory Task is permitted during the practical test.

If the evaluator determines the applicant's skill and abilities are in doubt, the outcome is unsatisfactory and the evaluator must issue a Notice of Disapproval.

***Satisfactory Performance***

Satisfactory performance requires that the applicant:

- demonstrate the tasks specified in the areas of operation for the certificate or rating sought within the established standards;
- demonstrate mastery of the aircraft by performing each task successfully;
- demonstrate proficiency and competency in accordance with the approved standards;
- demonstrate sound judgment and exercise aeronautical decision-making/risk management; and
- demonstrate competence in crew resource management in aircraft certificated for more than one required pilot crew member, or, single-pilot competence in an airplane that is certificated for single-pilot operations.

Satisfactory performance will result in the issuance of a temporary certificate.

***Unsatisfactory Performance***

If, in the judgment of the evaluator, the applicant does not meet the standards for any Task, the applicant fails the Task and associated Area of Operation. The test is unsatisfactory, and the evaluator issues a Notice of Disapproval.

When the evaluator issues a Notice of Disapproval, he or she must list the Area of Operation in which the applicant did not meet the standard. The Notice of Disapproval must also list the Area(s) of Operation not tested, and the number of practical test failures. If the applicant's inability to meet English language requirements contributed to the failure of a Task, the evaluator should note "English Proficiency" on the Notice of Disapproval.

The evaluator or the applicant must end the test if the applicant fails a Task. The evaluator may continue the test only with the consent of the applicant, and the applicant is entitled to credit only for those Areas of Operation and the associated Tasks satisfactorily performed. Though not required, the evaluator has discretion to reevaluate any Task, including those previously passed, during the retest.

Typical areas of unsatisfactory performance and grounds for disqualification include:

- Any action or lack of action by the applicant that requires corrective intervention by the evaluator to maintain safe flight.
- Failure to use proper and effective visual scanning techniques to clear the area before and while performing maneuvers.
- Consistently exceeding tolerances stated in the skill elements of the Task.
- Failure to take prompt corrective action when tolerances are exceeded.
- Failure to exercise risk management.

***Discontinuance***

When it is necessary to discontinue a practical test for reasons other than unsatisfactory performance (e.g., equipment failure, weather, illness), the evaluator must return all test paperwork to the applicant. The evaluator must prepare, sign, and issue a Letter of Discontinuance that lists those Areas of Operation the applicant successfully completed and the time period remaining to complete the test. The evaluator should advise the applicant to present the Letter of Discontinuance to the evaluator when the practical test resumes in order to receive credit for the items successfully completed. The Letter of Discontinuance becomes part of the applicant's certification file.

## Practical Test Checklist (Applicant)

**Appointment with Evaluator**

**Evaluator's Name:** _____

**Location:** _____

**Date/Time:** _____

**ACCEPTABLE AIRCRAFT**

- ❑ Aircraft Documents:
  - ❑ Airworthiness Certificate
  - ❑ Registration Certificate
  - ❑ Operating Limitations
- ❑ Aircraft Maintenance Records:
  - ❑ Logbook Record of Airworthiness Inspections and AD Compliance
- ❑ Pilot's Operating Handbook, FAA-Approved Airplane Flight Manual

**PERSONAL EQUIPMENT**

- ❑ View-Limiting Device
- ❑ Current Aeronautical Charts (Printed or Electronic)
- ❑ Computer and Plotter
- ❑ Flight Plan Form and Flight Logs (printed or electronic)
- ❑ Chart Supplements, Airport Diagrams and appropriate Publications
- ❑ Current AIM

**PERSONAL RECORDS**

- ❑ Identification—Photo/Signature ID
- ❑ Pilot Certificate
- ❑ Current Medical Certificate
- ❑ Completed FAA Form 8710-1, Airman Certificate and/or Rating Application with Instructor's Signature or completed IACRA form
- ❑ Original Knowledge Test Report
- ❑ Pilot Logbook with appropriate Instructor Endorsements
- ❑ FAA Form 8060-5, Notice of Disapproval (if applicable)
- ❑ Letter of Discontinuance (if applicable)
- ❑ Approved School Graduation Certificate (if applicable)
- ❑ Examiner's Fee (if applicable)

## Additional Rating Task Table

For an applicant who holds at least a Private Pilot Certificate and seeks an additional airplane category and/or class rating at the private pilot level, the evaluator must evaluate that applicant in the Areas of Operation and Tasks listed in the Additional Rating Task Table. Please note, however, that the evaluator has the discretion to evaluate the applicant's competence in the remaining Areas of Operation and Tasks.

If the applicant holds two or more category or class ratings at least at the private level, and the ratings table indicates differing required Tasks, the "least restrictive" entry applies. For example, if "All" and "None" are indicated for one Area of Operation, the "None" entry applies. If "B" and "B, C" are indicated, the "B" entry applies.

***Addition of an Airplane Single-Engine Land Rating to an existing Private Pilot Certificate***

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

**Private Pilot Rating(s) Held**

| Areas of Operation | ASES | AMEL | AMES | RH | RG | Glider | Balloon | Airship |
|---|---|---|---|---|---|---|---|---|
| I | F,G | F,G | F,G | F,G | F,G | F,G | F,G | F,G |
| II | D | D | D | A,C,D, F | A,D,F | A,B,C, D,F | A,B,C, D,F | A,B,C, D,F |
| III | None | None | None | B | None | B | B | B |
| IV | A,B,C, D,E,F | A,B,C, D,E,F | A,B,C, D,E,F | A,B,C, D,E,F, M,N | A,B,C, D,E,F, M,N | A,B,C, D,E,F, M,N | A,B,C, D,E,F, M,N | A,B,C, D,E,F, M,N |
| V | None | None | None | A,B | A | A,B | A,B | A,B |
| VI | None | None | None | None | None | A,B,C,D | A,B,C,D | None |
| VII | None | None | None | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D |
| VIII | None | None | None | A,B,C, D,E,F | A,B,C, D,E,F | A,B,C, D,E,F | A,B,C, D,E,F | A,B,C, D,E,F |
| IX | A,B,C | A,B,C | A,B,C | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D |
| X | None | None | None | None | None | None | None | None |
| XI | None | None | None | None | None | A | A | A |
| XII | A | None | A | A | A | A | A | A |

***Addition of an Airplane Single-Engine Sea Rating to an existing Private Pilot Certificate***

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

**Private Pilot Rating(s) Held**

| Areas of Operation | ASEL | AMEL | AMES | RH | RG | Glider | Balloon | Airship |
|---|---|---|---|---|---|---|---|---|
| I | F,G,I | F,G | F,G,I | F,G,I | F,G,I | F,G,I | F,G,I | F,G,I |
| II | E | E | E | All | A,B,E,F | All | All | All |
| III | None | None | None | B | None | B | B | B |
| IV | A,B,G,H I,J,K,L | A,B,G,H I,J,K,L | A,B,G,H I,J,K,L | A,B,G,H,I, J,K,L,M,N | A,B,G,H,I, J,K,L,M,N | A,B,G,H,I, J,K,L,M,N | A,B,G,H,I, J,K,L,M,N | A,B,G,H,I, J,K,L,M,N |
| V | None | None | None | All | A | All | All | All |
| VI | None | None | None | None | None | All | All | None |
| VII | None | None | None | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D |
| VIII | None | None | None | A,B,C,D,E,F | A,B,C,D,E,F | A,B,C,D,E,F | A,B,C,D,E,F | A,B,C,D,E,F |
| IX | A,B | A,B | A,B | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D |
| X | None | None | None | None | None | None | None | None |
| XI | None | None | None | None | None | All | All | All |
| XII | B | None | B | B | B | B | B | B |

***Addition of an Airplane Multiengine Land Rating to an existing Private Pilot Certificate***

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

**Private Pilot Rating(s) Held**

| Areas of Operation | ASEL | ASES | AMES | RH | RG | Glider | Balloon | Airship |
|---|---|---|---|---|---|---|---|---|
| I | F,G | F,G | F,G | F,G | F,G | F,G | F,G | F,G |
| II | A,B,C,D,F | A,B,C,D,F | D | A,B,C,D,F | A,B,C,D,F | A,B,C,D,F | A,B,C,D,F | A,B,C,D,F |
| III | None | None | None | B | None | B | B | B |
| IV | A,B,E,F | A,B,E,F | A,B,E,F | A,B,E,F,N | A,B,E,F,N | A,B,E,F,N | A,B,E,F,N | A,B,E,F,N |
| V | A | A | None | A,B | A | A,B | A,B | A,B |
| VI | None | None | None | None | None | A,B,C,D | A,B,C,D | None |
| VII | A,B,C,D | A,B,C,D | None | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D |
| VIII | None | None | None | A,B,C,D,E,F | A,B,C,D,E,F | A,B,C,D,E,F | A,B,C,D,E,F | A,B,C,D,E,F |
| IX | A,C,D,E,F,G | A,C,D,E,F,G | C,E,G | A,C,D,E,F,G | A,C,D,E,F,G | A,C,D,E,F,G | A,C,D,E,F,G | A,C,D,E,F,G |
| X* | A,B,C,D | A,B,C,D | None | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D |
| XI | None | None | None | None | None | A | A | A |
| XII | None | A | A | A | A | A | A | A |

* Tasks C and D are not required for applicants who are instrument-rated and who have previously demonstrated instrument proficiency in a multiengine airplane or for applicants who do not hold an instrument rating.

***Addition of an Airplane Multiengine Sea Rating to an existing Private Pilot Certificate***

Required Tasks are indicated by either the Task letter(s) that apply(s) or an indication that all or none of the Tasks must be tested based on the notes in each Area of Operation.

**Private Pilot Rating(s) Held**

| Areas of Operation | AMEL | ASEL | ASES | RH | RG | Glider | Balloon | Airship |
|---|---|---|---|---|---|---|---|---|
| I | F,G,I | F,G,I | F,G | F,G,I | F,G,I | F,G,I | F,G,I | F,G,I |
| II | E | A,B,C,E,F | A,B,C,E,F | A,B,C,E,F | A,B,C,E,F | A,B,C,E,F | A,B,C,E,F | A,B,C,E,F |
| III | None | None | None | B | None | B | B | B |
| IV | A,B,G,H, I,J,K,L | A,B,G,H, I,J,K,L | A,B,G,H, I,J,K,L | A,B,G,H,I, J,K,L,N | A,B,G,H,I, J,K,L,N | A,B,G,H,I, J,K,L,N | A,B,G,H,I, J,K,L,N | A,B,G,H,I, J,K,L,N |
| V | None | A | A | A,B | A | A,B | A,B | A,B |
| VI | None | None | None | None | None | A,B,C,D | A,B,C,D | None |
| VII | None | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D |
| VIII | None | None | None | A,B,C,D,E,F | A,B,C,D,E,F | A,B,C,D,E,F | A,B,C,D,E,F | A,B,C,D,E,F |
| IX | A,C,D,E,F,G | A,C,D,E,F,G | A,C,D,E,F,G | A,C,D,E,F,G | A,C,D,E,F,G | A,C,D,E,F,G | A,C,D,E,F,G | A,C,D,E,F,G |
| X* | None | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D | A,B,C,D |
| XI | None | None | None | None | None | A | A | A |
| XII | B | B | None | B | B | B | B | B |

* Tasks C and D are not required for applicants who are instrument-rated and who have previously demonstrated instrument proficiency in a multiengine airplane or for applicants who do not hold an instrument rating.

### Removal of the "Airplane Multiengine VFR Only" Limitation

The removal of the "Airplane Multiengine VFR Only" limitation, at the private pilot certificate level, requires an applicant to satisfactorily perform the following Area of Operation and Tasks from the Private Pilot – Airplane ACS in a multiengine airplane that has a manufacturer's published $V_{MC}$ speed.

| X. | Multiengine Operations | |
|---|---|---|
| | Task C: | Engine Failure During Flight (by Reference to Instruments) (AMEL, AMES) |
| | Task D: | Instrument Approach and Landing with an Inoperative Engine (Simulated) (by Reference to Instruments) (AMEL, AMES) |

### Removal of the "Limited to Center Thrust" Limitation

The "Limited to Center Thrust" limitation for the AMEL rating is issued to applicants who complete the practical test for the AMEL rating in an aircraft that does not have a manufacturer's published $V_{MC}$. It can also be issued to a military pilot seeking a commercial certificate under 14 CFR section 61.73 who can only show qualification in a multiengine airplane that is limited to center thrust. When conducting a practical test for the purpose of removing the "Limited to Center Thrust" limitation from the AMEL rating, the applicant must be tested on the multiengine Tasks identified in the table below in a multiengine airplane that has a manufacturer's published $V_{MC}$ speed. This speed would be found on the type certificate data sheet (TCDS) or in the AFM. If the limitation will be removed under parts 121, 135, or 142, it must be done in accordance with an approved curriculum or training program.

| IX. | Emergency Operations | |
|---|---|---|
| | Task E: | Engine Failure During Takeoff Before $V_{MC}$ (Simulated) (AMEL and AMES) |
| | Task F: | Engine Failure After Liftoff (Simulated) (AMEL, AMES) |
| | Task G: | Approach and Landing with an Inoperative Engine (Simulated) (AMEL, AMES) |
| X. | Multiengine Operations | |
| | Task A: | Maneuvering with One Engine Inoperative (AMEL, AMES) |
| | Task B: | $V_{MC}$ Demonstration (AMEL and AMES) |

## Appendix 6: Safety of Flight

### General

Safety of flight must be the prime consideration at all times. The evaluator, applicant, and crew must be constantly alert for other traffic. If performing aspects of a given maneuver, such as emergency procedures, would jeopardize safety, the evaluator will ask the applicant to simulate that portion of the maneuver. The evaluator will assess the applicant's use of visual scanning and collision avoidance procedures throughout the entire test.

### Stall and Spin Awareness

During flight training and testing, the applicant and the instructor or evaluator must always recognize and avoid operations that could lead to an inadvertent stall or spin and inadvertent loss of control.

### Use of Checklists

Throughout the practical test, the applicant is evaluated on the use of an appropriate checklist.

Assessing proper checklist use depends upon the specific Task. In all cases, the evaluator should determine whether the applicant appropriately divides attention and uses proper visual scanning. In some situations, reading the actual checklist may be impractical or unsafe. In such cases, the evaluator should assess the applicant's performance of published or recommended immediate action "memory" items along with his or her review of the appropriate checklist once conditions permit.

In a single-pilot airplane, the applicant should demonstrate the crew resource management (CRM) principles described as single-pilot resource management (SRM). Proper use is dependent on the specific Task being evaluated. The situation may be such that the use of the checklist while accomplishing elements of an Objective would be either unsafe or impractical in a single-pilot operation. In this case, a review of the checklist after the elements have been accomplished is appropriate.

## Use of Distractions

Numerous studies indicate that many accidents have occurred when the pilot has been distracted during critical phases of flight. The evaluator should incorporate realistic distractions during the flight portion of the practical test to evaluate the pilot's situational awareness and ability to utilize proper control technique while dividing attention both inside and outside the cockpit.

## Positive Exchange of Flight Controls

There must always be a clear understanding of who has control of the aircraft. Prior to flight, the pilots involved should conduct a briefing that includes reviewing the procedures for exchanging flight controls.

The FAA recommends a positive three-step process for exchanging flight controls between pilots:

- When one pilot seeks to have the other pilot take control of the aircraft, he or she will say, "You have the flight controls."
- The second pilot acknowledges immediately by saying, "I have the flight controls."
- The first pilot again says, "You have the flight controls," and visually confirms the exchange.

## Aeronautical Decision-Making, Risk Management, Crew Resource Management and Single-Pilot Resource Management

Throughout the practical test, the evaluator must assess the applicant's ability to use sound aeronautical decision-making procedures in order to identify hazards and mitigate risk. The evaluator must accomplish this requirement by reference to the risk management elements of the given Task(s), and by developing scenarios that incorporate and combine Tasks appropriate to assessing the applicant's risk management in making safe aeronautical decisions. For example, the evaluator may develop a scenario that incorporates weather decisions and performance planning.

In assessing the applicant's performance, the evaluator should take note of the applicant's use of CRM and, if appropriate, SRM. CRM/SRM is the set of competencies that includes situational awareness, communication skills, teamwork, task allocation, and decision-making within a comprehensive framework of standard operating procedures (SOP). SRM specifically refers to the management of all resources onboard the aircraft as well as outside resources available to the single pilot.

Deficiencies in CRM/SRM almost always contribute to the unsatisfactory performance of a Task. While evaluation of CRM/SRM may appear to be somewhat subjective, the evaluator should use the risk management elements of the given Task(s) to determine whether the applicant's performance of the Task(s) demonstrates both understanding and application of the associated risk management elements.

## Multiengine Considerations

On multiengine practical tests, where the failure of the most critical engine after liftoff is required, the evaluator must consider local atmospheric conditions, terrain, and type of aircraft used. The evaluator must not simulate failure of an engine until attaining at least $V_{SSE}/V_{XSE}/V_{YSE}$ and an altitude not lower than 400 feet AGL.

The applicant must supply an airplane that does not prohibit the demonstration of feathering the propeller in flight unless the conditions below for a type rating are met. For multiengine practical tests conducted in the airplane, the evaluator will set zero thrust after the applicant has simulated feathering the propeller following a simulated engine failure. The applicant must demonstrate feathering one propeller in flight unless the manufacturer prohibits this action. Practical tests conducted in a flight simulation training device (FSTD) can only be accomplished as part of an approved curriculum or training program. Any limitations or powerplant failure will be noted in that program.

*VIII. Emergency Operations - Powerplant Failure—Multiengine Airplane*

In a multiengine airplane or FSTD equipped with propellers (including turboprop), the applicant must demonstrate feathering one propeller and engine shutdown unless:

- the practical test is for a type rating, and
- the airplane used for the practical test was not certificated with inflight unfeathering capability.

In this situation, the applicant may perform a simulated powerplant failure. In all other cases, the applicant must demonstrate the ability to safely feather and unfeather the propeller while airborne.

For safety reasons, when the practical test is conducted in an airplane, the applicant must perform Tasks that require feathering or shutdown only under conditions and at a position and altitude where it is possible to make a safe landing on an established airport if there is difficulty in unfeathering the propeller or restarting the engine. The evaluator must select an entry altitude that will allow the single-engine demonstration Tasks to be completed no lower than 3,000 feet AGL or the manufacturer's recommended altitude, whichever is higher). If it is not possible to unfeather the propeller or restart the engine while airborne, the applicant and the evaluator should treat the situation as an emergency. At altitudes lower than 3,000 feet AGL, engine failure should be simulated by reducing throttle to idle and then establishing zero thrust.

Practical tests conducted in an FSTD can only be accomplished as part of an approved curriculum or training program. Any limitations on powerplant failure will be noted in that program.

Engine failure (simulated) during takeoff should be accomplished prior to reaching 50 percent of the calculated $V_{MC}$.

### Single-Engine Considerations

For safety reasons, the evaluator will not request a simulated powerplant failure in a single-engine airplane unless it is possible to safely complete a landing.

### High Performance Aircraft Considerations

In some high performance airplanes, the power setting may have to be reduced below the ACS guidelines power setting to prevent excessively high pitch attitudes greater than 30° nose up.

## Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations

### Aircraft Requirements & Limitations

14 CFR part 61, section 61.45 prescribes the required aircraft and equipment for a practical test. The regulation states the minimum aircraft registration and airworthiness requirements as well as the minimum equipment requirements, to include the minimum required controls.

Multiengine practical tests require normal engine shutdowns and restarts in the air, to include propeller feathering and unfeathering. The Airplane Flight Manual (AFM) must not prohibit these procedures, but low power settings for cooling periods prior to the actual shutdown in accordance with the AFM are acceptable and encouraged. For a type rating in an airplane not certificated with inflight unfeathering capability, a simulated powerplant failure is acceptable.

If the multiengine airplane used for the practical test does not publish a $V_{MC}$, then the "Limited to Centerline Thrust" limitation will be added to the certificate issued from this check, unless the applicant has already demonstrated competence in a multiengine airplane with a published $V_{MC}$.

If the aircraft presented for the practical test has inoperative instruments or equipment, it must be addressed in accordance with 14 CFR part 91, section 91.213. If the aircraft can be operated in accordance with 14 CFR part 91, section 91.213, then it must be determined if the inoperative instruments or equipment are required to complete the practical test.

### Equipment Requirements & Limitations

The equipment examination should be administered before the flight portion of the practical test, but it must be closely coordinated and related to the flight portion.

This section requires the aircraft must be:

- Of U.S., foreign, or military registry of the same category, class and type, if applicable, for the certificate and/or rating for which the applicant is applying.
- The aircraft must have fully functional dual controls, except as provided for in 14 CFR part 61, section, 61.45(c) and (e); and
- Capable of performing all Areas of Operation appropriate to the rating sought and have no operating limitations, which prohibit its use in any of the Area of Operation, required for the practical test.

To assist in management of the aircraft during the practical test, the applicant is expected to demonstrate automation management skills by utilizing installed, available, or airborne equipment such as autopilot, avionics and systems displays, and/or flight management system (FMS). The evaluator is expected to test the applicant's knowledge of the systems that are installed and operative during both the ground and flight portions of the practical test.

If the practical test is conducted in an aircraft, the applicant is required by 14 CFR part 61, section 61.45(d)(2) to provide an appropriate view limiting device acceptable to the evaluator. The applicant and the evaluator should establish a procedure as to when and how this device should be donned and removed, and brief this procedure before the flight. The device must be used during all testing that requires flight "solely by reference to instruments." This device must prevent the applicant from having visual reference outside the aircraft, but it must not restrict the evaluator's ability to see and avoid other traffic.

## Operational Requirements, Limitations, & Task Information

***V. Performance and Ground Reference Maneuvers***

*Task B. Ground Reference Maneuvers*

As noted in the skill elements, the evaluator must choose at least one maneuver for the applicant to demonstrate:

- Rectangular course
- S-Turns
- Turns around a point

***VII. Slow Flight and Stalls***

*Task A. Maneuvering During Slow Flight*

Evaluation criteria for this Task should recognize that environmental factors (e.g., turbulence) may result in a momentary activation of stall warning indicators such as the stall horn. If the applicant recognizes the stall warning indication and promptly makes an appropriate correction, a momentary activation does not constitute unsatisfactory performance on this Task. As with other Tasks, unsatisfactory performance would arise from an applicant's continual deviation from the standard, lack of correction, and/or lack of recognition.

*Task B. Power-Off Stalls*

Evaluation criteria for a recovery from an approach to stall should not mandate a predetermined value for altitude loss and should not mandate maintaining altitude during recovery. Proper evaluation criteria should consider the multitude of external and internal variables which affect the recovery altitude.

*Task C. Power-On Stalls*

In some high performance airplanes, the power setting may have to be reduced below the ACS guidelines power setting to prevent excessively high pitch attitudes greater than 30° nose up. Evaluation criteria for a recovery from an approach to stall should not mandate a predetermined value for altitude loss and should not mandate maintaining altitude during recovery. Proper evaluation criteria should consider the multitude of external and internal variables which affect the recovery altitude.

***IX. Emergency Operations***

*Task E. Engine Failure During Takeoff Before $V_{MC}$ (Simulated) (AMEL, AMES)*

Engine failure (simulated) during takeoff should be accomplished prior to reaching 50 percent of the calculated $V_{MC}$.

***X. Multiengine Operations***

*Task B. $V_{MC}$ Demonstration (AMEL, AMES)*

Airplanes with normally aspirated engines will lose power as altitude increases because of the reduced density of the air entering the induction system of the engine. This loss of power will result in a $V_{MC}$ lower than the stall speed at higher altitudes. Therefore, recovery should be made at the first indication of loss of directional control, stall warning, or buffet. Do not perform this maneuver by increasing the pitch attitude to a high angle with both engines operating and then reducing power on the critical engine. This technique is hazardous and may result in loss of airplane control.

*Task C. Engine Failure During Flight (by Reference to Instruments) (AMEL, AMES)*

This Task is not required if an instrument-rated applicant has previously demonstrated instrument proficiency in a multiengine airplane, or if the applicant does not hold an Instrument Airplane Rating. If an applicant holds both a single- and multiengine rating on a pilot certificate, but has not demonstrated instrument proficiency in a multiengine aircraft, that airman's certificate must bear a limitation indicating that multiengine flight is permitted in visual flight rules (VFR) conditions only.

*Task D. Instrument Approach and Landing with an Inoperative Engine (Simulated) (by Reference to Instruments) (AMEL, AMES)*

This Task is not required if an instrument-rated applicant has previously demonstrated instrument proficiency in a multiengine airplane, or if the applicant does not hold an Instrument Airplane Rating. If an applicant holds both a single- and multiengine rating on a pilot certificate, but has not demonstrated instrument proficiency in a multiengine aircraft, that airman's certificate must bear a limitation indicating that multiengine flight is permitted in visual flight rules (VFR) conditions only.

# Appendix 8: Use of Flight Simulation Training Devices (FSTD) and Aviation Training Devices (ATD): Airplane Single-Engine, Multiengine Land and Sea

## Use of Flight Simulator Training Devices

14 CFR part 61, section 61.4, *Qualification and approval of flight simulators and flight training devices*, states in paragraph (a) that each full flight simulator (FFS) and flight training device (FTD) used for training, and for which an airman is to receive credit to satisfy any training, testing, or checking requirement under this chapter, must be qualified and approved by the Administrator for—

> *(1) the training, testing, and checking for which it is used;*
>
> *(2) each particular maneuver, procedure, or crewmember function performed; and*
>
> *(3) the representation of the specific category and class of aircraft, type of aircraft, particular variation within the type of aircraft, or set of aircraft for certain flight training devices.*

14 CFR part 60 prescribes the rules governing the initial and continuing qualification and use of all Flight Simulator Training Devices (FSTD) used for meeting training, evaluation, or flight experience requirements for flight crewmember certification or qualification.

An FSTD is defined in 14 CFR part 60 as an FFS or FTD:

> *Full Flight Simulator (FFS)—a replica of a specific type, make, model, or series aircraft. It includes the equipment and computer programs necessary to represent aircraft operations in ground and flight conditions, a visual system providing an out-of-the-flight deck view, a system that provides cues at least equivalent to those of a three-degree-of-freedom motion system, and has the full range of capabilities of the systems installed in the device as described in part 60 of this chapter and the qualification performance standard (QPS) for a specific FFS qualification level. (part 1)*
>
> *Flight Training Device (FTD)—a replica of aircraft instruments, equipment, panels, and controls in an open flight deck area or an enclosed aircraft flight deck replica. It includes the equipment and computer programs necessary to represent aircraft (or set of aircraft) operations in ground and flight conditions having the full range of capabilities of the systems installed in the device as described in part 60 of this chapter and the QPS for a specific FTD qualification level (part 1).*

The FAA National Simulator Program (NSP) qualifies Level A-D FFSs and Level 4 – 7[1] FTDs. In addition, each operational rule part identifies additional requirements for the approval and use of FSTDs in a training program[2]. Use of an FSTD for the completion of the private pilot airplane practical test is permitted only when accomplished in accordance with an FAA approved curriculum or training program.

[1]The FSTD qualification standards in effect prior to part 60 defined a Level 7 FTD for airplanes (see Advisory Circular 120-45A, Airplane Flight Training Device Qualification, 1992). This device required high fidelity, airplane specific aerodynamic and flight control models similar to a Level D FFS, but did not require a motion cueing system or visual display system. In accordance with the "grandfather rights" of 14 CFR part 60, section 60.17, these previously qualified devices will retain their qualification basis as long as they continue to meet the standards under which they were originally qualified. There is only one airplane Level 7 FTD with grandfather rights that remains in the U.S. As a result of changes to part 60 that were published in the Federal Register in March 2016, the airplane Level 7 FTD was reinstated with updated evaluation standards. The new Level 7 FTD will require a visual display system for qualification. The minimum qualified Tasks for the Level 7 FTD are described in Table B1B of Appendix B of part 60.

[2]14 CFR part 121, section 121.407; part 135, section 135.335; part 141, section 141.41; and part 142, section 142.59.

## Use of Aviation Training Devices

14 CFR part 61, section 61.4(c) states the Administrator may approve a device other than an FFS or FTD for specific purposes. Under this authority, the FAA's General Aviation and Commercial Division provide approval for aviation training devices (ATD).

Advisory Circular (AC) 61-136A, *FAA Approval of Aviation Training Devices and Their Use for Training and Experience*, provides information and guidance for the required function, performance, and effective use of ATDs for pilot training and aeronautical experience (including currency). FAA issues a letter of authorization (LOA) to an ATD manufacturer approving an ATD as a basic aviation training device (BATD) or an advanced aviation training device (AATD). The LOA will be valid for a five-year period with a specific expiration date and include the amount of credit a pilot may take for training and experience.

> *Aviation Training Device (ATD)—a training device, other than an FFS or FTD, that has been evaluated, qualified, and approved by the Administrator. In general, this includes a replica of aircraft instruments, equipment, panels, and controls in an open flight deck area or an enclosed aircraft cockpit. It includes the hardware and software necessary to represent a category and class of aircraft (or set of aircraft) operations in ground and flight conditions having the appropriate range of capabilities and systems installed in the device as described within the AC for the specific basic or advanced qualification level.*
>
> *Basic Aviation Training Device (BATD)—provides an adequate training platform for both procedural and operational performance Tasks specific to instrument experience and the ground and flight training requirements for the Private Pilot Certificate and Instrument Rating per 14 CFR parts 61 and 141.*
>
> *Advanced Aviation Training Device (AATD)—provides an adequate training platform for both procedural and operational performance Tasks specific to the ground and flight training requirements for the Private Pilot Certificate, Instrument Rating, Commercial Pilot Certificate, Airline Transport Pilot Certificate, and Flight Instructor Certificate per 14 CFR parts 61 and 141. It also provides an adequate platform for Tasks required for instrument experience and the instrument proficiency check.*

***Note:*** *ATDs cannot be used for practical tests, aircraft type specific training, or for an aircraft type rating; therefore the use of an ATD for the private pilot airplane practical test is not permitted.*

## Credit for Time in an FSTD

14 CFR part 61, section 61.109 specifies the minimum aeronautical experience requirements for a person applying for a Private Pilot Certificate. Paragraphs (a) and (b) specify the time requirements for a Private Pilot Certificate in a single-engine airplane and a multiengine airplane, respectively[3]. These paragraphs include specific experience requirements that must be completed in an airplane. Paragraph (k) of this section specifies the amount of credit a pilot can take for time in an FFS or FTD. For those that received training in programs outside of 14 CFR part 142, section 61.109(k)(1)[4] applies. For those pilots that received training through a 14 CFR part 142 program, section 61.109(k)(2) applies.

[3]The minimum aeronautical experience requirements may be further reduced as permitted in 14 CFR part 61, section 61.109(k)(3).

[4]As part of program approval, 14 CFR part 141 training providers must also adhere to the requirements for permitted time in an FFS or FTD per Appendix B to 14 CFR part 141.

## Credit for Time in an ATD

14 CFR part 61, section 61.109 specifies the minimum aeronautical experience requirements for a person applying for a private pilot certificate Paragraphs (a) and (b) specify the time requirements for a private pilot certificate in a single-engine airplane and a multiengine airplane, respectively[5]. These paragraphs include specific experience requirements that must be completed in an airplane. Paragraph (k) of this section specifies the amount of credit a pilot can take towards the private pilot certificate aeronautical experience requirements.

In order to credit the time, the ATD must be FAA-approved and the time must be provided by an authorized instructor. AC 61-136A, states the LOA for each approved ATD will indicate the credit allowances for pilot training and experience, as provided under 14 CFR parts 61 and 141. Time with an instructor in a BATD and an AATD may be credited towards the aeronautical experience requirements for the private pilot certificate as specified in the LOA for the device used. It is recommended that applicants who intend to take credit for time in a BATD or an AATD towards the aeronautical experience requirements for the private pilot certificate obtain a copy of the LOA for each device used so they have a record for how much credit may be taken. For additional information on the logging of ATD time reference AC 61-136A.

[5]The minimum aeronautical experience requirements may be further reduced as permitted in 14 CFR part 61, section 61.109(k)(3).

## Use of an FSTD on a Practical Test

14 CFR part 61, section 61.45 specifies the required aircraft and equipment that must be provided for a practical test unless permitted to use an FFS or FTD for the flight portion. 14 CFR part 61, section 61.64 provides the criteria for using an FSTD for a practical test. Specifically, paragraph (a) states –

> *If an applicant for a certificate or rating uses a flight simulator or flight training device for training or any portion of the practical test, the flight simulator and flight training device—*
>
> *(1) Must represent the category, class, and type (if a type rating is applicable) for the rating sought; and*
>
> *(2) Must be qualified and approved by the Administrator and used in accordance with an approved course of training under 14 CFR part 141 or part 142 of this chapter; or under 14 CFR part 121 or part 135 of this chapter, provided the applicant is a pilot employee of that air carrier operator.*

Therefore, practical tests or portions thereof, when accomplished in an FSTD, may only be conducted by FAA aviation safety inspectors (ASI), aircrew program designees (APD) authorized to conduct such tests in FSTDs in 14 CFR parts 121 or 135, qualified personnel and designees authorized to conduct such tests in FSTDs for 14 CFR part 141 pilot school graduates, or appropriately authorized 14 CFR part 142 Training Center Evaluators (TCE).

In addition, 14 CFR part, 61 section 61.64(b) states if an airplane is not used during the practical test for a type rating for a turbojet airplane (except for preflight inspection), an applicant must accomplish the entire practical test in a Level C or higher FFS and the applicant must meet the specific experience criteria listed. If the experience criteria cannot be met, the applicant can either—

> *(f)(1) […] complete the following Tasks on the practical test in an aircraft appropriate to category, class, and type for the rating sought: Preflight inspection, normal takeoff, normal instrument landing system approach, missed approach, and normal landing; or*
>
> *(f)(2) The applicant's pilot certificate will be issued with a limitation that states: "The [name of the additional type rating] is subject to pilot-in-command limitations," and the applicant is restricted from serving as pilot-in-command in an aircraft of that type.*

When flight Tasks are accomplished in an airplane, certain Task elements may be accomplished through "simulated" actions in the interest of safety and practicality. However, when accomplished in an FFS or FTD, these same actions would not be "simulated." For example, when in an airplane, a simulated engine fire may be addressed by retarding the throttle to idle, simulating the shutdown of the engine, simulating the discharge of the fire suppression agent, if applicable, and simulating the disconnection of associated electrical, hydraulic, and pneumatics systems. However, when the same emergency condition is addressed in an FSTD, all Task elements must be accomplished as would be expected under actual circumstances.

Similarly, safety of flight precautions taken in the airplane for the accomplishment of a specific maneuver or procedure (such as limiting altitude in an approach to stall or setting maximum airspeed for an engine failure expected to result in a rejected takeoff) need not be taken when an FSTD is used. It is important to understand that, whether accomplished in an airplane or FSTD, all Tasks and elements for each maneuver or procedure must have the same performance standards applied equally for determination of overall satisfactory performance.

# Appendix 9: References

This ACS is based on the following 14 CFR parts, FAA guidance documents, manufacturer's publications, and other documents.

| Reference | Title |
|---|---|
| 14 CFR part 39 | Airworthiness Directives |
| 14 CFR part 43 | Maintenance, Preventive Maintenance, Rebuilding and Alteration |
| 14 CFR part 61 | Certification: Pilots, Flight Instructors, and Ground Instructors |
| 14 CFR part 68 | Requirements for Operating Certain Small Aircraft Without a Medical Certificate |
| 14 CFR part 71 | Designation of Class A, B, C, D and E Airspace Areas; Air Traffic Service Routes; and Reporting Points |
| 14 CFR part 91 | General Operating and Flight Rules |
| 14 CFR part 93 | Special Air Traffic Rules |
| AC 00-6 | Aviation Weather |
| AC 00-45 | Aviation Weather Services |
| AC 60-28 | English Language Skill Standards Required by 14 CFR parts 61, 63 and 65 |
| AC 61-67 | Stall and Spin Awareness Training |
| AC 91-73 | Parts 91 and 135 Single Pilot, Flight School Procedures During Taxi Operations |
| AC 91.21-1 | Use of Portable Electronic Devices Aboard Aircraft |
| AIM | Aeronautical Information Manual |
| FAA-H-8083-1 | Aircraft Weight and Balance Handbook |
| FAA-H-8083-2 | Risk Management Handbook |
| FAA-H-8083-3 | Airplane Flying Handbook |
| FAA-H-8083-6 | Advanced Avionics Handbook |
| FAA-H-8083-15 | Instrument Flying Handbook |
| FAA-H-8083-23 | Seaplane, Skiplane, and Float/Ski Equipped Helicopter Operations Handbook |
| FAA-H-8083-25 | Pilot's Handbook of Aeronautical Knowledge |
| FAA-P-8740-66 | Flying Light Twins Safely Pamphlet |
| POH/AFM | Pilot's Operating Handbook/FAA-Approved Airplane Flight Manual |
| Other | Chart Supplements |
| | Navigation Charts |
| | Navigation Equipment Manual |
| | USCG Navigation Rules, International-Inland |
| | NOTAMs |

***Note:*** *Users should reference the current edition of the reference documents listed above. The current edition of all FAA publications can be found at www.faa.gov.*

# Appendix 10: Abbreviations and Acronyms

The following abbreviations and acronyms are used in the ACS.

| Abb./Acronym | Definition | Abb./Acronym | Definition |
|---|---|---|---|
| 14 CFR | Title 14 of the Code of Federal Regulations | IRA | Instrument Rating – Airplane |
| AATD | Advanced Aviation Training Device | KOEL | Kinds of Operation Equipment List |
| AC | Advisory Circular | LAHSO | Land and Hold Short Operations |
| ACS | Airman Certification Standards | LDA | Localizer-Type Directional Aid |
| AD | Airworthiness Directive | LOA | Letter of Authorization |
| ADF | Automatic Direction Finder | LOC | ILS Localizer |
| ADM | Aeronautical Decision-Making | LPV | Localizer Performance with Vertical Guidance |
| AFS | Flight Standards Service | LSC | Learning Statement Codes |
| AELS | Aviation English Language Standard | MAP | Missed Approach Point |
| AFM | Airplane Flight Manual | MDA | Minimum Descent Altitude |
| AFS | Flight Standards Service | MEL | Minimum Equipment List |
| AGL | Above Ground Level | MFD | Multi-functional Displays |
| AIM | Aeronautical Information Manual | NAS | National Airspace System |
| AKTR | Airman Knowledge Test Report | NOD | Notice of Disapproval |
| ALD | Alternative Lighting Devices | NOTAMs | Notices to Airmen |
| AMEL | Airplane Multiengine Land | NSP | National Simulator Program |
| AMES | Airplane Multiengine Sea | NTSB | National Transportation Safety Board |
| AOA | Angle of Attack | PA | Private Airplane |
| AOO | Area of Operation | PAR | Private Pilot Airplane |
| APD | Aircrew Program Designee | PAT | Private Pilot Airplane/Recreational Pilot – Transition |
| ASEL | Airplane Single-Engine Land | PCP | Private Pilot Canadian Conversion |
| ASES | Airplane Single-Engine Sea | PFD | Primary Flight Display |
| ASI | Aviation Safety Inspector | PIC | Pilot-in-Command |
| ATC | Air Traffic Control | POA | Plan of Action |
| ATD | Aviation Training Device | POH | Pilot's Operating Handbook |
| ATP | Airline Transport Pilot | PTS | Practical Test Standards |
| BATD | Basic Aviation Training Device | QPS | Qualification Performance Standard |
| CDI | Course Deviation Indicator | RAIM | Receiver Autonomous Integrity Monitoring |
| CFIT | Controlled Flight Into Terrain | RMP | Risk Management Process |
| CFR | Code of Federal Regulations | RNAV | Area Navigation |
| CG | Center of Gravity | RNP | Required Navigation Performance |
| CP | Completion Phase | SAE | Specialty Aircraft Examiner |
| CRM | Crew Resource Management | SFRA | Special Flight Rules Area |
| CTP | Certification Training Program | SIAP | Standard Instrument Approach Procedure |
| DA | Decision Altitude | SMS | Safety Management System |
| DH | Decision Height | SOP | Standard Operating Procedures |
| DME | Distance Measuring Equipment | SRM | Single-Pilot Resource Management |
| DP | Departure Procedures | SRM | Safety Risk Management |
| DPE | Designated Pilot Examiner | STAR | Standard Terminal Arrival |
| ELT | Emergency Locator Transmitter | SUA | Special Use Airspace |
| FAA | Federal Aviation Administration | TAEA | Track Advisory Environmental Assessment |
| FADEC | Full Authority Digital Engine Control | TAF | Terminal Forecast |
| FFS | Full Flight Simulator | TAS | True Airspeed |
| FMS | Flight Management System | TCE | Training Center Evaluator |
| FSB | Flight Standardization Board | TCH | Threshold Crossing Height |
| FSDO | Flight Standards District Office | TEM | Threat and Error Management |

| Abb./Acronym | Definition | Abb./Acronym | Definition |
|---|---|---|---|
| FSTD | Flight Simulation Training Device | TFR | Temporary Flight Restrictions |
| FTD | Flight Training Device | UTC | Coordinated Universal Time |
| GBAS | Ground Based Augmentation System | $V_A$ | Maneuvering speed |
| GBAS GLS | Ground Based Augmentation Landing System | VDP | Visual Descent Point |
| GNSS | Global Navigation Satellite System | $V_{FE}$ | Maximum flap extended speed |
| GPS | Global Positioning System | VFR | Visual Flight Rules |
| HAT | Height Above Threshold (Touchdown) | VLE | Landing Gear Expanding Speed** |
| HSI | Horizontal Situation Indicator | VMC | Visual Meteorological Conditions |
| IA | Inspection Authorization | $V_{MC}$ | Minimum Control Speed with the Critical Engine Inoperative |
| IAP | Instrument Approach Procedure | $V_{NE}$ | Never exceed speed |
| IFO | International Field Office | VOR | Very High Frequency Omnidirectional Range |
| IFR | Instrument Flight Rules | $V_S$ | Stall Speed |
| IFU | International Field Unit | $V_X$ | Best Angle of Climb Speed |
| ILS | Instrument Landing System | $V_Y$ | Best Rate of Climb Speed |
| IMC | Instrument Meteorological Conditions | $V_{SSE}$ | Safe, intentional one-engine-inoperative speed. Originally known as safe single-engine speed |
| IPC | Instrument Rating – Airplane Canadian Conversion | $V_{XSE}$ | Best angle of climb speed with one engine inoperative |
| IPC | Instrument Proficiency Check | $V_{YSE}$ | Best rate of climb speed with one engine inoperative |
| IR | Instrument Rating | $V_{SO}$ | Stalling Speed or the Minimum Steady Flight Speed in the Landing Configuration |

** Sporty's Academy Editor's Note: $V_{LE}$ is actually Landing Gear Extended Speed but the information in the table is what the FAA has in the ACS.

# Section 2 - Private Pilot Video Study Guide

The following pages should be used as reinforcing material while reviewing the various video volumes.

Please remember these notes cannot serve as a substitute for the instruction contained in the video. They are intended to reinforce essential material from the *What You Should Know* Video Series and will assist you in learning these subjects.

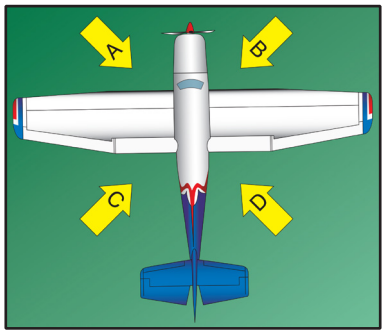
## Volume 1 - Your First Few Hours

### Aerodynamics

1) Taxiing

a) The figure below shows crosswinds at "A," "B," "C," and "D:"

**Crosswinds on an Airplane**




b) The pictured crosswinds should be addressed with the control inputs noted below:

| Pictured Crosswind | Aileron Positions | Tricycle Gear Elevator Position | Tricycle Gear Control Yoke or Stick Position | Conventional Gear Elevator Position | Conventional Gear Control Yoke or Stick Position |
|---|---|---|---|---|---|
| A--Left, quartering headwind | Left aileron up, right aileron down | Elevator neutral | Left and neutral | Elevator neutral or slightly up | Left and neutral or slightly back |
| B--Right, quartering headwind | Right aileron up, left aileron down | Elevator neutral | Right and neutral | Elevator neutral or slightly up | Right and neutral or slightly back |
| C--Left, quartering tailwind | Left aileron down, right aileron up | Elevator down | Right and forward | Elevator down | Right and forward |
| D--Right, quartering tailwind | Right aileron down, left aileron up | Elevator down | Left and forward | Elevator down | Left and forward |

c) Remember these guidelines:

i) Turn the ailerons away from a quartering tailwind when taxiing.

ii) Turn the ailerons into a quartering headwind when taxiing.

iii) Quartering tailwinds are critical since they can cause high wing airplanes to flip over on their back.

iv) Keep the elevator neutral in a headwind in a tricycle-gear airplane; elevator up in a headwind in a tailwheel airplane.

v) Keep the elevator down in a tailwind in a tricycle-gear or a tailwheel airplane.

## Engines/Preflight

1) If the recommended octane is not available for an aircraft, do not use a fuel that has a lower-than-specified fuel rating. Instead, use the next higher octane aviation gasoline.
2) After starting an aircraft engine, adjust to recommended warm-up settings and then check engine gauge indications.
3) It is extremely important that a competent pilot be at the controls in the cockpit when hand propping an airplane engine.

## Federal Aviation Regulations

1) A pilot must have a photo identification in his physical possession or readily accessible in the aircraft when exercising the privileges of a pilot certificate.
2) The photo identification must be one of the following:
   a) Valid U.S. driver's license.
   b) U.S. issued federal or state identification card.
   c) U.S. Armed Forces' identification card.
   d) Official passport.
   e) Credential that authorizes unescorted access to a security identification display area at an airport regulated under 49 CFR part 1542.
   f) Other form of identification that the Administrator finds acceptable.

# Volume 2 - Practicing Landings

## Engines/Preflight

1) The basic purpose of adjusting the fuel/air mixture at altitude is to decrease the fuel flow in order to compensate for decreased air density.
   a) The fuel/air mixture may become excessively lean if a descent is made to a lower altitude without readjusting the mixture.
   b) If, during the run-up at a high-elevation airport, a pilot notes a slight engine roughness that is not affected by the magneto check but grows worse during the carb heat check, better results may be obtained with a leaner fuel mixture.
   c) Oil temperature gauges that have exceeded their normal operating range may indicate a fuel mixture set too lean, too much power, detonation, or a low oil level.
2) The operating principle of float-type carburetors is based on the difference in air pressure at the venturi throat and the air inlet.
3) If **detonation** occurs during climb-out, lower the nose slightly to increase airspeed and cooling.
4) A pilot can avoid engine overheating by increasing airspeed, enriching the mixture, or reducing power.
5) Excessively high engine temperatures will cause loss of power, excessive oil consumption, and possible permanent internal engine damage.

## Aerodynamics

1) A positively stable airplane will tend to pitch nosedown when power is reduced and controls are not adjusted. This is due to a number of factors.
   a) The airplane will tend to seek out the speed for which it is trimmed.
      i) In airplanes with a rear mounted horizontal stabilizer (or stabilator), the nose "stays up" due to a downward force produced by air flowing over the horizontal stabilizer, a feature inherent in that design.
      ii) With less power, the airplane will slow down.
      iii) The slower speed produces less airflow over the horizontal stabilizer.
      iv) The decreased airflow reduces the downward force on the horizontal stabilizer.
      v) The reduced downward force allows the nose to pitch down.
      vi) The nosedown pitch will tend to stabilize at an attitude that will attain the trimmed speed.
   b) In airplanes with a low horizontal stabilizer, a portion of the downward force on this surface is related to the airflow created by the air pushed over the surface by the propeller. The velocity of this air may be greater than the velocity of the airplane moving through the surrounding air under certain flight conditions. This additional airflow is not apparent in T-tail aircraft where the horizontal surface is above the "prop blast".
   c) An additional downward force may be created by the downwash of airflow from the top of the wings in airplanes with a low horizontal stabilizer. This is not apparent in T-tail aircraft.
   d) This phenomenon is also the subject of an FAA knowledge test question. The most correct answer for this question indicates that this also occurs because the downwash on the elevators from the propeller slipstream is reduced, decreasing elevator effectiveness.
2) **Torque** effect is greatest in a single-engine airplane at low airspeed, high power, and high angle of attack.
3) The indicated airspeed at which a given airplane stalls does not change with altitude as long as its weight, load factor, and configuration remain the same.
4) With regard to **wingtip vortices**, a light, quartering tailwind requires maximum caution on takeoff or landing because wind moves the vortices down the runway.

# Volume 3 - Your First Solo

## Aerodynamics

1) The amount of excess load that can be imposed on the wing of an airplane depends upon the **speed** of the airplane.
2) Upon encountering severe turbulence, a pilot should attempt to maintain a level flight attitude that will keep the airplane at or below **maneuvering speed**.
3) The most important rule to remember in the event of a power failure after becoming airborne is to immediately establish the proper gliding attitude and airspeed. Fly the airplane!

## Weather Theory

1) Clouds, fog, or dew will always form when water vapor condenses.
2) **Evaporation** and **sublimation** are processes by which moisture is added to unsaturated air.
3) Fog
   a) Advection fog and **upslope fog** depend upon wind in order to exist.
   b) Low level turbulence can occur and icing can become hazardous in **steam fog**.

## Weather Data

1) **Aviation Routine Weather Report**, or **METAR** report, is an actual observation taken from the surface of the airport every hour. If rapid changes occur in the weather, special report observations are taken. METARs will contain any of the following information that is pertinent to the observation:
   a) Type of Report -- METAR or SPECI (special).
   b) Station Designator -- ICAO identifier.
   c) Time of Report -- Reported in UTC.
   d) Wind Information -- Direction in tens of degrees from true north and wind speed in knots.
   e) Visibility -- Reported in statute miles; may also include Runway Visual Range (RVR) for a particular runway in feet.
   f) Weather and Obstructions to Visibility.
   g) Sky Condition -- Height of ceiling and other layers, and amount of coverage of layers.
   h) Temperature and Dew Point -- Reported in degrees Celsius.
   i) Altimeter Setting -- Given in inches of mercury.
   j) Remarks -- Any significant data not reported above.
2) The hourly METAR for KJFK airport in New York is decoded for you below:

**METAR –Aviation Routine Weather Report**

| |
|---|
| **METAR KINK 121845Z 11012G18KT 15SM SKC 25/17 A3000** |
| **METAR KBOI 121854Z 13004KT 30SM SCT150 17/6 A3015** |
| **METAR KLAX 121852Z 25004KT 6SM BR SCT007 SCT250 16/15 A2991** |
| **SPECI KMDW 121856Z 32005KT 1 1/2SM RA OVC007 17/16 A2980 RMK RAB35** |
| **SPECI KJFK 121853Z 18004KT 1/2SM FG R04R/2200FT OVC005 20/18 A3006** |

   a) The full KJFK report reads:
      i) Special observation; 12th day of the month; time of observation 1853 (Zulu); wind direction 180° true, velocity 4 knots; 1/2 statute mile visibility in fog; Runway 4 Right visual range is 2,200 feet; ceiling 500 overcast; temperature 20°C, dew point 18°C; altimeter setting 30.06 inches.

3) Utilize **Terminal Aerodrome Forecasts** for information regarding expected weather at the time of arrival at your destination. Terminal Aerodrome Forecasts, or **TAF**s, predict weather conditions expected within 5 statute miles (SM) of the airport or "aerodrome". Use of the code "VC" (vicinity) applies to weather conditions expected to occur from between 5 to 10 SM from the airport. TAFs are issued four times daily and usually cover a 24-hour or 30-hour period.

4) The **Terminal Aerodrome Forecast** for KSHV can be read below:

**TAF – Terminal Aerodrome Forecast**

| |
|---|
| **KSHV 191722Z 1918/2018 11006KT P6SM SCT040 BKN070 OVC250** |
| **FM192100 10005KT P6SM VCTS SCT025CB BKN060 OVC250** |
| **TEMPO 1921/1924 VRB15G20KT 5SM -TSRA SCT025CB BKN060** |
| **FM200000 12005KT P6SM SCT040 SCT250** |
| **PROB30 2012/2018 5SM TSRA BKN020CB=** |

a) The complete KSHV TAF reads: "**191722Z**" the first 2-digit pair represents the day of the month (in this case, the 19th), the next 4 digits indicate that the forecast was issued at **1722Z**. "1918/2018" indicates that the TAF is valid from **18**00Z on the **19**th through **18**00Z on the 20th. The weather then begins; wind **110**° true at **06 K**no**T**s, visibility **P**lus (greater than) than **6 S**tatute **M**iles with a **SC**a**T**tered layer of clouds at (**0**)**4**,**0**00 and a (**0**)**7**,**0**00 foot **B**ro**K**e**N** ceiling with an **OV**er**C**ast layer at **25**,**0**00 feet. **F**ro**M** (after) **2100**Z on the **19**th, the wind is expected to be **100**° at **5 K**no**T**s, visibility **P**lus (greater than) **6 S**tatute **M**iles with **T**hunder**S**torms in the **V**i**C**inity (5-10 statute miles) of the airport. A layer of **SC**a**T**tered **C**umulonim**B**us clouds is expected at (**0**)**25**00 feet with a **B**ro**K**e**N** ceiling of (**0**)**60**00 feet and an **OV**er**C**ast layer above at **25**,**0**00 feet. **TEMPO**rarily (generally less than an hour total and less than half of the forecast time period) between **21**00Z and **24**00Z on the **19**th, the winds are expected to be **V**a**R**i**B**le in direction at **15 G**usting to **20 K**no**T**s with **5 S**tatute **M**iles visibility in light (**-**) **T**hunder**S**torms and **RA**in. A layer of **SC**a**T**tered **C**umulonim**B**us clouds is expected at (**0**)**25**00 feet with a **B**ro**K**e**N** ceiling of (**0**)**60**00 feet during the temporary period. **F**ro**M 0000**Z on the **20**th, wind **120**° at **5 K**no**T**s, visibility **P**lus (greater than) than **6 S**tatute **M**iles with a **SC**a**T**tered layer of clouds at (**0**)**4**,**0**00 and another **SC**a**T**tered layer at **25**,**0**00 feet. There is a **30**% **PROB**ability that between **12**00Z and **18**00Z on the **20**th, the visibility will be **5 S**tatute **M**iles in **T**hunder**S**torms with **RA**in and a ceiling of (**0**)**2**,**0**00 feet **B**ro**K**e**N** with **C**umulonim**B**us clouds. "**=**" signifies the end of the forecast data.

5) Weather Briefings

a) When requesting a briefing, you should identify yourself as a pilot, that you are flying VFR, and give clear and concise facts about your flight:

i) Aircraft identification or pilot's name
ii) Aircraft type
iii) Departure point
iv) Proposed time of departure
v) Flight altitude(s)
vi) Route of flight
vii) Destination
viii) Estimated time en route (ETE)

b) A complete weather briefing calls for a **standard briefing**. If no preliminary weather information has been received, request a standard briefing.

c) To supplement mass disseminated data, request an **abbreviated briefing**. To update a previous weather briefing, request an abbreviated briefing.

d) An **outlook briefing** should be requested when the estimated time of departure is six or more hours away.

## Aircraft Instruments

1) Prior to takeoff, the altimeter should be set to the current local altimeter setting, if available, or the known elevation of the departure airport.
   a) Altimeter setting is the value to which the barometric pressure scale of the altimeter is set so the altimeter indicates true altitude at field elevation.
   b) Pressure levels are raised on warm days and the indicated altitude is lower than true altitude.
      i) This is referring to a vertical raising of the pressure levels, NOT an increase in pressure.
2) If the static vents become clogged, the altimeter and vertical speed indicator will become inoperative while the airspeed indicator will be inoperative in the sense that it is no longer accurate after you change altitudes. If the pitot tube becomes clogged, the airspeed indicator alone will become inoperative.

## Aeromedical

1) Large accumulations of **carbon monoxide** in the human body result in loss of muscle power and can lead to unconsciousness. Susceptibility to carbon monoxide poisoning increases as altitude increases.

## Federal Aviation Regulations

**Certification Categories vs. Classes**

| Type of Certification | Category Examples | Class Examples |
|---|---|---|
| With respect to the certification of **Airmen** | Airplane, Rotorcraft, Glider, Lighter-Than-Air, Powered-Lift | Single-Engine Land, Single-Engine Sea, Multiengine Land, Multiengine Sea |
| With respect to the certification of **Aircraft** | Normal, Utility, Acrobatic | Airplane, Helicopter, Glider, Hot Air Balloon |

## Collision Avoidance

1) Prior to starting each maneuver, pilots should visually scan the entire area for collision avoidance.
2) Haze causes all traffic and terrain features to appear to be farther away than their actual distance.

**Light Signals**

| Color and Type of Signal | On the Ground | In Flight |
|---|---|---|
| STEADY GREEN | Cleared for takeoff | Cleared to land |
| FLASHING GREEN | Cleared to taxi | Return for landing (to be followed by steady green at proper time) |
| STEADY RED | Stop | Give way to other aircraft and continue circling |
| FLASHING RED | Taxi clear of landing area (runway) in use | Airport unsafe--do not land |
| FLASHING WHITE | Return to starting point on airport | |
| ALTERNATING RED & GREEN | General Warning Signal--Exercise Extreme Caution | |

# Volume 4 - Your Dual Cross-Countries

## Airport Lighting & Marking

1) Airport taxiway edge lights are identified at night by **blue omnidirectional lights**.

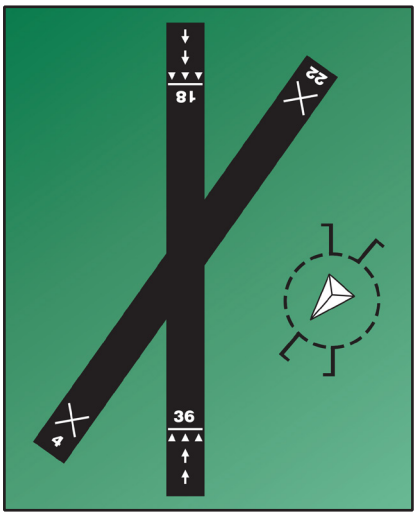
2) An airport's rotating beacon operating during daylight hours indicates that weather in **Class B, C & D airspace** and **Class E airspace designated for an airport** is below basic VFR weather minimums.

3) At airports without an operating control tower, a segmented circle, if installed, is designed to provide traffic pattern information. Unless otherwise indicated, the traffic pattern will be flown using turns to the left. If there is a variation to the normal left-hand traffic pattern, traffic pattern indicators will be used to indicate direction of turns.

4) The Airport Diagram to the right, illustrates runway orientation and shows a segmented circle with a tetrahedron wind indicator.

   a) The segmented circle indicates that there is right hand traffic for Runway 18 and there is left hand traffic for Runway 36. Runway 4-22 is closed as indicated by the "X" at the approach end of each runway. Runways 18-36 have displaced thresholds. The "threshold" is the beginning of the runway available and suitable for the landing of the aircraft. A "displaced threshold" is not at the beginning of the runway pavement, but located down the runway.

**Airport Diagram**




## Collision Avoidance

1) The most effective way to use the eyes during night flight is to scan slowly to permit off-center viewing.

## Publications

1) The Common Traffic Advisory Frequency (CTAF) may be a tower frequency (while tower not in operation), an **FSS frequency, UNICOM,** or **MULTICOM**.

   a) UNICOM is a non-government communication facility to provide airport information at certain airports. Unless otherwise indicated, 122.8 is the standard Unicom frequency.

   b) MULTICOM is a mobile service to conduct activities by or directed from private aircraft, standard frequency is 122.9 for airports with no control tower, FSS, or UNICOM and is122.95 for those with a control tower or FSS.

2) The correct method of stating 4,500 feet MSL to ATC is "Four Thousand Five Hundred."

3) If flying HAWK N666CB, the proper phraseology for initial contact with McAlester FSS is "McAlester Radio, Hawk Six Six Six Charlie Bravo, receiving Ardmore VORTAC, over."

4) FAA Advisory Circulars contain information of a non-regulatory nature, but of interest to pilots.

   a) Advisory Circulars containing matter covering the subject of Airmen are issued under subject number **60**.

   b) Advisory Circulars containing matter covering the subject of Airspace are issued under subject number **70**.

   c) Advisory Circulars containing matter covering the subjects of Air Traffic Control and General Operating Rules are issued under subject number **90**.

## Navigation

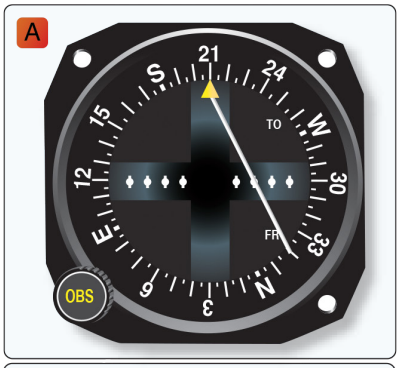
1) Tabulations of parachute jump areas in the U.S. are contained in the Chart Supplements (fomerly A/FD).

## VOR Navigation

1) VORs “A”, “B”, and “C” below illustrate common VOR indications.

**VOR – Very High Frequency Omnidirectional Range.**

a) VOR A: The OBS is set on 210° with a right CDI deflection and no TO or FROM indication. This means the aircraft is abeam of the facility on the 120-300° line through the station or the 120° radial.




b) VOR B: The OBS is set on 210°, with a TO indication. The course, if flown, would take the aircraft to the station.


c) VOR C: The OBS is set on 210°, with a FROM indication. The course, if flown, would take the aircraft away from the station on the 210° radial.

## Weather Data

1) A **PIREP** is a Pilot Weather Report. An example of a PIREP is shown and explained below:

**PIREP – Pilot Weather Report**

**UA/OV KOKC-KTUL/TM 1800/FL120/TP BE90/SK BKN018-TOP055/OVC072-TOP089/ CLR ABV/TA M7/WV 08021/TB LGT 055-072/IC LGT-MOD RIME 072-089**

a) This is a (UA) PIREP from an aircraft (/OV KOKC-KTUL) between Oklahoma City and Tulsa at (/TM 1800) 1800 UTC, altitude (/FL 120) 12,000 feet MSL, type of aircraft (/TP BE90) is a Beech 90. The aircraft reports (/SK BKN018-TOP055/OVC072-TOP089/CLR ABV) bases of broken clouds at 1,800 MSL with tops of that layer at 5,500 feet MSL, base of a second layer of clouds which are overcast is at 7,200 feet MSL, tops at 8,900 MSL, clear above. The temperature is (/TA M7) minus 7° Celsius, and the wind is (/WV 08021) 080° at 21 knots. This aircraft reported (/TB LGT 055-072) light turbulence existed between 5,500 feet MSL and 7,200 feet MSL along with (/IC LGT-MOD RIME 072-089) light to moderate rime icing between 7,200 feet MSL and 8,900 feet MSL.

## Airspace

1) There are **four** broad divisions of airspace. They are **Controlled, Uncontrolled, Special Use,** and **Other** airspace.

2) **Controlled** airspace is supported by air navigation aids, ground to air communication, and air traffic control services. **Controlled** airspace consists of **Class A, B, C, D,** and **E** airspace.

3) The United States does not have any airspace equivalent to the International Civil Aviation Organization's (ICAO) Class F.

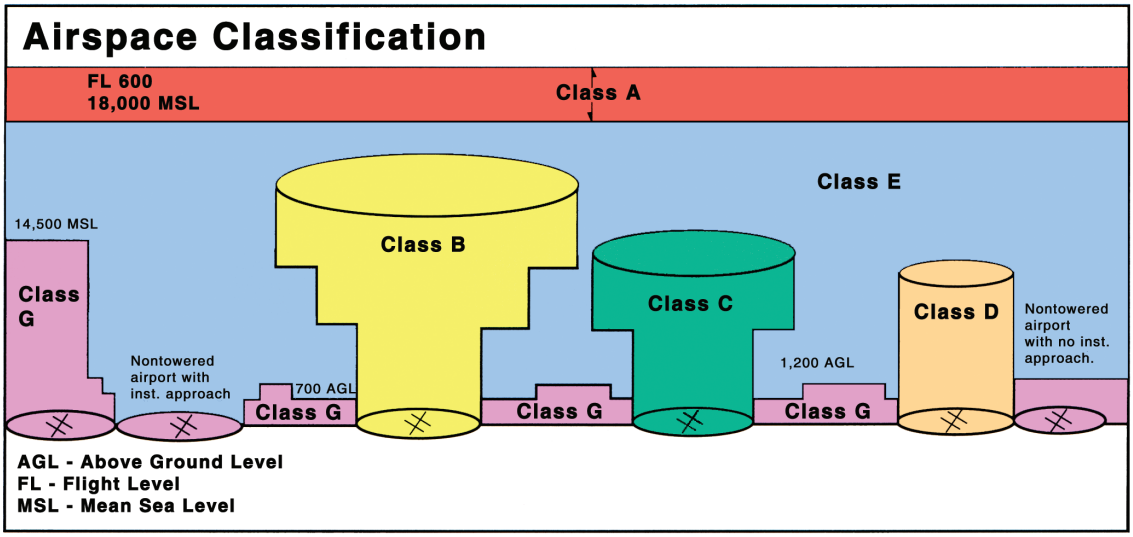
4) **Class G** is uncontrolled airspace where ATC has neither the authority nor the responsibility for controlling aircraft.

5) **Special Use Airspace** consists of Prohibited, Restricted, Warning, Military Operations, Alert, and Controlled Firing Areas.
   a) **Prohibited Areas** specifically prohibit aircraft flight.
   b) **Restricted Areas** are defined as airspace where aircraft flight is subject to restrictions.
      i) Pilots may fly through a restricted area with the controlling agency's authorization.
   c) **Warning Areas** are in international airspace. Activities in Warning Areas may be hazardous to non-participating aircraft.
      i) Unusual, often invisible hazards such as aerial gunnery or guided missiles over international waters may exist in Warning Areas.
   d) **Military Operations Areas** (MOAs) are segments of airspace defined by vertical and lateral limits used to segregate military training activities from aircraft operating under IFR.
      i) High-density military training activities may exist in MOAs.
      ii) When operating under VFR in a MOA, a pilot should exercise extreme caution when military activity is being conducted.
   e) **Alert Areas** are depicted on charts to warn pilots of a high volume of pilot training or other unusual aerial activity.
      i) Responsibility for collision avoidance in an alert area rests with **all pilots**.
   f) **Controlled Firing Areas** have activities that, if not controlled, would be hazardous to non-participating aircraft.
      i) Activities are suspended immediately when spotter aircraft, radar, or ground lookout positions indicate an aircraft might be approaching the area.

6) **Other Airspace** designations are not airspace classifications but could be **within** any of the classes of airspace.
   a) An **Airport Advisory Area** is the area within 10 statute miles of an airport where an FSS is located and a control tower is not operating.
      i) Prior to entering an Airport Advisory Area, a pilot should contact the local FSS for airport and traffic advisories.
   b) **Military Training Routes** (MTRs) are mutually developed by the FAA and the Department of Defense.
      i) MTRs designated "IR" indicate a route to be flown IFR regardless of weather. "VR" routes are to be flown VFR and only with a visibility and ceiling greater than 5 miles and 3000 feet, respectively.
      ii) A 3-digit number identifies a route with one or more segments above 1,500 feet AGL, and a 4-digit number identifies a route with all segments below 1,500 AGL.
   c) **Terminal Radar Service Areas (TRSAs)** are established to provide radar separation of participating VFR aircraft and all aircraft operating under Instrument Flight Rules.
      i) Stage III service in the terminal radar program provides sequencing and separation for participating VFR aircraft. Participation is not mandatory.
      ii) Prior to entering a **TRSA**, a pilot should contact approach control on the appropriate frequency if radar traffic information is desired.
      iii) **TRSA**s are depicted on charts with a **solid black line**.
      iv) **TRSA**s, as entities, **are not** an airspace class.

7) Transponders
   a) An operable transponder with Mode C (an encoding altimeter) is required:
      i) In **Class A, B,** and **C** airspace.
      ii) Within 30 miles of a **Class B** primary airport from the surface upward to 10,000 ft. MSL, with certain exceptions.
      iii) In all airspace above the ceiling and within the lateral boundaries of a **Class B** or **Class C** airspace area designated for an airport upward to 10,000 ft. MSL.
      iv) In all airspace of the 48 contiguous states and the District of Columbia at and above 10,000 feet MSL, excluding the airspace at and below 2,500 feet above the surface.

## Controlled and Uncontrolled Airspace Classifications




| Airspace | Class A | Class B | Class C | Class D | Class E | Class G |
|---|---|---|---|---|---|---|
| Entry Requirements | IFR clearance | ATC clearance | Prior two-way communications | Prior two-way communications | None | None |
| Minimum Pilot Qualifications | Instrument Rating | Private or Student certification. Local restrictions apply | Student certificate | Student certificate | Student certificate | Student certificate |
| Two-Way Radio Communications | Yes | Yes | Yes | Yes | Not required | Not required |
| Special VFR Allowed | No | Yes | Yes | Yes | Yes | N/A |
| VFR Visibility Minimum | N/A | 3 statute miles | 3 statute miles | 3 statute miles | 3 statute miles* | 1 statute mile** |
| VFR Minimum Distance from Clouds | N/A | Clear of clouds | 500' below, 1,000' above, 2,000' horizontal | 500' below, 1,000' above, 2,000' horizontal | 500' below,* 1,000' above, 2,000' horizontal | Clear of clouds** |
| VFR Aircraft Separation | N/A | All | IFR aircraft | Runway Operations | None | None |
| Traffic Advisories | Yes | Yes | Yes | Workload permitting | Workload permitting | Workload permitting |
| Airport Application | N/A | •Radar<br>•Instrument Approaches<br>•Weather<br>•Control Tower<br>•High Density | •Radar<br>•Instrument Approaches<br>•Weather<br>•Control Tower | •Instrument Approaches<br>•Weather<br>•Control Tower | •Instrument Approaches<br>•Weather | |

*Only true below 10,000 feet.
**Only true during day at or below 1,200 feet AGL (see 14 CFR part 91).

# Volume 5 - Your Solo Cross-Countries

## Aircraft Performance

1) Propeller efficiency is directly related to the amount of air it accelerates. In other words, less air, less propulsion.
   a) High density altitude reduces propeller efficiency because the propeller exerts less force at high density altitudes than at low density altitudes.
2) Fewer air molecules at a given level in the atmosphere due to warmer than standard temperatures, lower than standard pressures, or higher humidity, will cause density altitude to be higher.

## Weather Theory

1) Icing
   a) Conditions necessary for structural icing to form are:
      i) Visible moisture.
      ii) Temperature below freezing at the point of impact.
   b) Aircraft structural ice is most likely to have the highest accumulation rate in freezing rain.
2) Stability
   a) Warming from below will decrease the stability of an air mass.
3) Clouds
   a) The suffix nimbus, used in naming clouds, means a rain cloud.
   b) Cumulonimbus clouds have the greatest turbulence.
4) General
   a) Thunderstorms are obscured by massive cloud layers when a current SIGMET forecasts embedded thunderstorms.
   b) Possible mountain wave turbulence can be anticipated when winds of 40 knots or greater blow across a mountain ridge, and the air is stable.

# Volume 6 - Your Private Pilot Test

## Federal Aviation Regulations

1) No person may operate an aircraft that has an experimental certificate along a congested airway (unless otherwise specifically authorized).

Page Intentionally Left Blank

# Section 3 - Appendices and Supplemental Material

## Appendix A – Airworthiness Requirements for VFR Flight

1) The following instruments and equipment are required for a flight in an airplane under day VFR conditions:
   a) Airspeed indicator.
   b) Altimeter.
   c) Magnetic direction indicator.
   d) Tachometer for each engine.
   e) Oil pressure gauge for each engine using a pressure system.
   f) Temperature gauge for each liquid-cooled engine.
   g) Oil temperature gauge for each air-cooled engine.
   h) Manifold pressure gauge for each altitude engine.
   i) Fuel gauge indicating the quantity of fuel in each tank.
   j) Landing gear position indicator, if the aircraft has a retractable landing gear.
   k) For small civil airplanes certificated after March 11, 1996, an approved aviation red or aviation white anticollision light system.
   l) If the aircraft is operated for hire over water and beyond power-off gliding distance from shore, approved flotation gear readily available to each occupant and at least one pyrotechnic signaling device.
   m) An approved safety belt with an approved metal-to-metal latching device for each occupant 2 years of age or older.
   n) For small civil airplanes manufactured after July 18, 1978, an approved shoulder harness for each front seat.
   o) An emergency locator transmitter, if required by 14 CFR Section 91.207.
   p) For normal, utility, and acrobatic category airplanes with a seating configuration, excluding pilot seats, of 9 or less, manufactured after December 12, 1986, a shoulder harness for all forward or aft facing seats. Seats facing other directions must afford the same level of protection.

2) The following instruments and equipment are required for a flight in an airplane under night VFR conditions:
   a) All equipment and instruments required for day VFR.
   b) Approved position lights.
   c) An approved aviation red or aviation white anticollision light system.
   d) If the aircraft is operated for hire, one electric landing light.
   e) An adequate source of electrical energy for all installed electrical and radio equipment.
   f) One spare set of fuses, or three spare fuses of each kind required, that are accessible to the pilot in flight.

3) When an airplane has inoperative equipment, the pilot's required actions will differ depending on whether or not the aircraft has an approved Minimum Equipment List (MEL) and letter of authorization.
   a) The letter of authorization is issued by the FAA Flight Standards district office having jurisdiction over the area in which the operator is located and authorizes operation of the aircraft under the MEL. The MEL and the letter of authorization constitute a supplemental type certificate for the aircraft and must be in the airplane.
   b) If an airplane has an approved MEL, the aircraft must be operated in accordance with the provisions of the MEL.

4) If no Minimum Equipment List is available and the airplane is small and not turbine powered, the pilot may elect to conduct the operation with the inoperative equipment under certain conditions.
   a) The inoperative instruments and equipment must not:
      i) Be required by the airworthiness regulations under which the aircraft was type certificated.
      ii) Be indicated as required on the aircraft's equipment list, or on the Kinds of Operations Equipment List for the kind of flight operation being conducted.
      iii) Be required by 14 CFR Section 91.205 or any other rule for the specific kind of flight operation being conducted.
      iv) Be required to be operational by an airworthiness directive.
      v) Constitute a hazard to the aircraft as determined by a pilot, who is certificated and appropriately rated under 14 CFR Part 61, or by a person, who is certificated and appropriately rated to perform maintenance on the aircraft,
   b) The inoperative instruments and equipment must be handled in one of the following ways:
      i) It must be removed from the aircraft, the cockpit control placarded, and the maintenance recorded in accordance with applicable regulations.
      ii) It must be deactivated and placarded "Inoperative." If deactivation of the inoperative instrument or equipment involves maintenance, it must be accomplished and recorded in accordance with applicable regulations.
      iii) Though generally required for VFR operations, operation of the aircraft may continue to a location where repairs or replacement can be made for the failure of any light of the anticollision light system.

5) A special flight permit may be issued for an aircraft that may not currently meet applicable airworthiness requirements but is capable of safe flight, for the following purposes:
   a) Flying the aircraft to a base where repairs, alterations, or maintenance are to be performed, or to a point of storage.
   b) Delivering or exporting the aircraft.
   c) Production flight testing new production aircraft.
   d) Evacuating aircraft from areas of impending danger.
   e) Conducting customer demonstration flights in new production aircraft that have satisfactorily completed production flight tests.

6) A special flight permit may also be issued to authorize the operation of an aircraft at a weight in excess of its maximum certificated takeoff weight for flight beyond the normal range over water, or over land areas where adequate landing facilities or appropriate fuel is not available. The excess weight that may be authorized under this paragraph is limited to the additional fuel, fuel-carrying facilities, and navigation equipment necessary for the flight.

7) The issuance of a special flight permit requires an applicant to submit a statement in a manner acceptable to the FAA Administrator with the following information:
   a) The purpose of the flight.
   b) The proposed itinerary.
   c) The crew required to operate the aircraft and its equipment.
   d) The ways, if any, in which the aircraft does not comply with the applicable airworthiness requirements.
   e) Any restriction the applicant considers necessary for safe operation of the aircraft.
   f) Any other information considered necessary by the Administrator for the purpose of prescribing operating limitations.

8) The Administrator may make, or require the applicant to make appropriate inspections or tests necessary for safety.

9) Airworthiness Directives (ADs) are regulatory notices issued by the FAA requiring the correction or prevention of an unsafe condition found in an aircraft, aircraft engine, propeller, or appliance.
   a) The unsafe condition may be the result of a design defect, a maintenance issue, or other causes.
   b) 14 CFR Part 39 defines the authority and responsibility of the FAA Administrator with regard to ADs.
   c) ADs must be complied with unless a specific exemption is received from the Administrator.
   d) The aircraft owner or operator is responsible for ensuring compliance with applicable ADs.

10) ADs may be divided into two categories:
   a) Those of an emergency nature requiring immediate compliance.
   b) Those of a less urgent nature requiring compliance within a specified period of time.

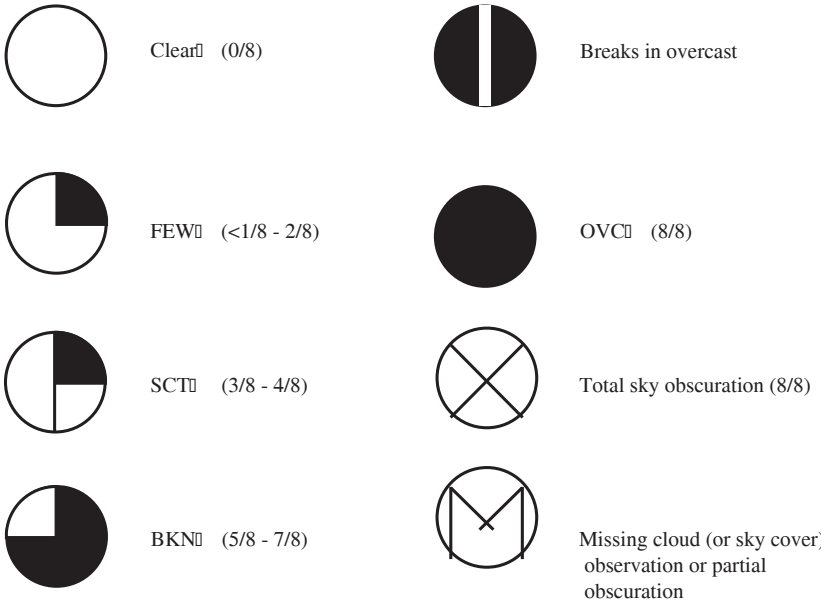
11) The regulations require that a record be maintained showing the current status of the applicable ADs. This record must include:
   a) The method of compliance.
   b) The signature and certificate number of the repair station or mechanic who performed the work.
   c) This record is typically found in the aircraft logbooks.

12) A summary of the valid Airworthiness Directives is available from the FAA.

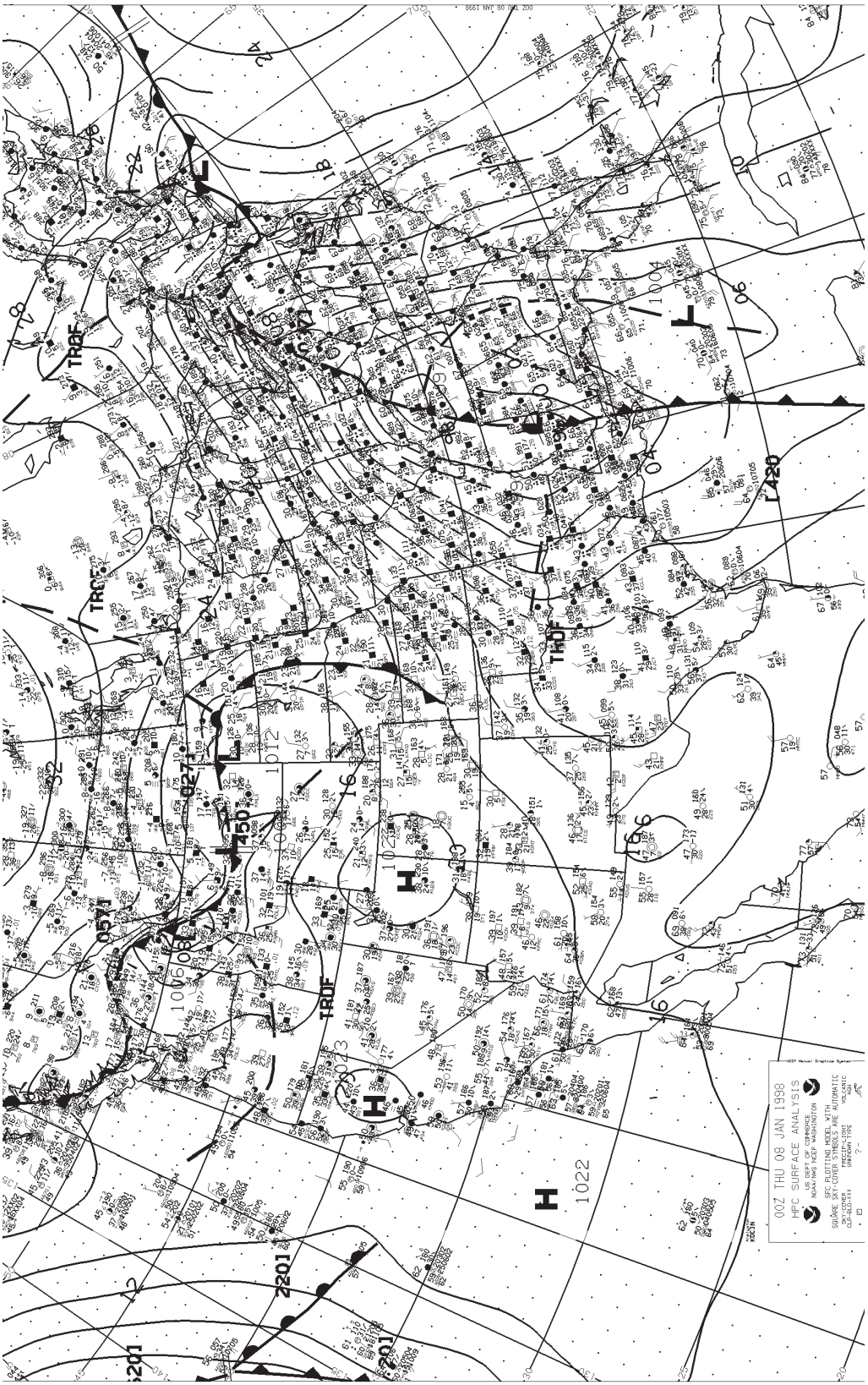
# Appendix B – Additional Weather Information

1) Surface Analysis Chart
   a) The surface analysis chart is a computer-generated chart, with frontal analysis by forecasters from the Hydrometeorolgical Prediction Center (HPC) in Camp Springs, Maryland.
   b) It is transmitted every 3 hours and covers the contiguous 48 states and adjacent areas.
   c) The surface analysis chart provides a ready means of locating pressure systems and fronts and it gives an overview of winds, temperatures, and dew point temperatures at chart time.
   d) Keep in mind that this chart is historical in nature and shows the conditions at the time the chart was created.
   e) Use the surface analysis chart in conjunction with other information to give a more complete weather picture.

**Sky Cover Symbols**



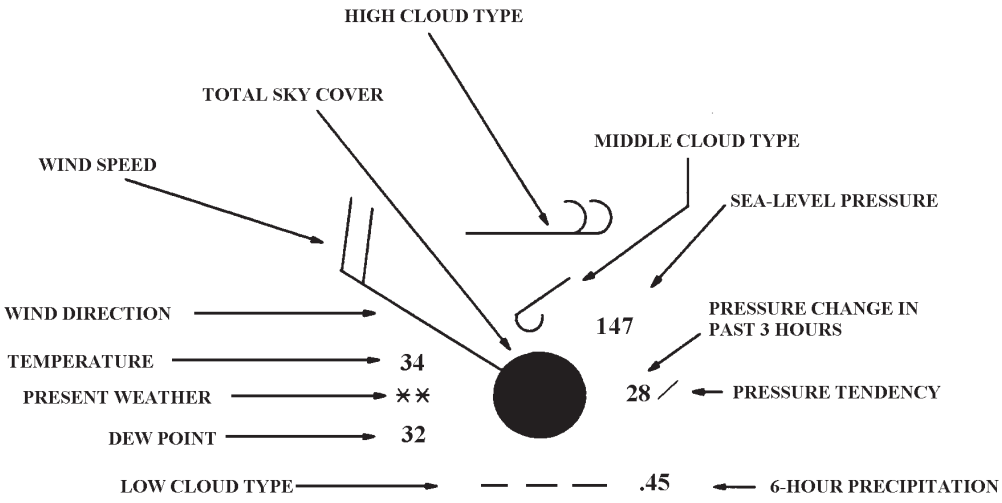
**Surface Analysis Chart**



**Symbols on Surface Analysis Chart**

| Color | Symbol | Description |
|---|---|---|
| Blue | H | High Pressure Center |
| Red | L | Low Pressure Center |
| Blue |  | Cold Front |
| Red |  | Warm Front |
| Red/Blue |  | Stationary Front |
| Purple |  | Occluded Front |
| Blue |  | Cold Frontogenesis |
| Red |  | Warm Frontogenesis |
| Red/Blue |  | Stationary Frontogenesis |
| Blue |  | Cold Frontolysis |
| Red |  | Warm Frontolysis |
| Red/Blue |  | Stationary Frontolysis |
| Purple |  | Occluded Frontolysis |
| Purple |  | Squall Line |
| Brown |  | Dryline |
| Brown |  | Trough |
| Yellow |  | Ridge |

**Station Model and Explanation**




1. **Total sky cover: Overcast.**
2. **Temperature: 34 degrees F, Dew Point: 32 degrees F.**
3. **Wind: From the northwest at 20 knots (relative to true north).**

## Examples of wind direction and speed


4. **Present Weather: Continuous light snow.**
5. **Predominate low, middle, high cloud reported: Strato fractus or cumulus fractus of bad weather, altocumulus in patches, and dense cirrus.**
6. **Sea-level pressure: 1,014.7 millibars (mbs).**
   **NOTE: Pressure is always shown in three digits to nearest tenth of an mb. For 1,000 mbs or greater, prefix a "10" to the three digits. For less than 1,000 mbs, prefix a "9" to the three digits.**
7. **Pressure change in the past 3 hours: Increased steadily or unsteadily by 2.8 mbs. The actual change is in tenths of a mb.**
8. **6 - hour precipitation in hundredths of an inch: 45 hundredths of an inch.**

**Type of Front**

| Code Figures | Descriptions |
|---|---|
| 0 | Quasi-stationary at surface |
| 2 | Warm front at surface |
| 4 | Cold front at surface |
| 6 | Occlusion |
| 7 | Instability line |

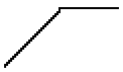
**Intensity of Front**

| Code Figures | Descriptions |
|---|---|
| 0 | No specification |
| 1 | Weak, decreasing |
| 2 | Weak, little, or no change |
| 3 | Weak, increasing |
| 4 | Moderate, decreasing |
| 5 | Moderate, little, or no change |
| 6 | Moderate, increasing |
| 7 | Strong, decreasing |
| 8 | Strong, little, or no change |
| 9 | Strong, increasing |

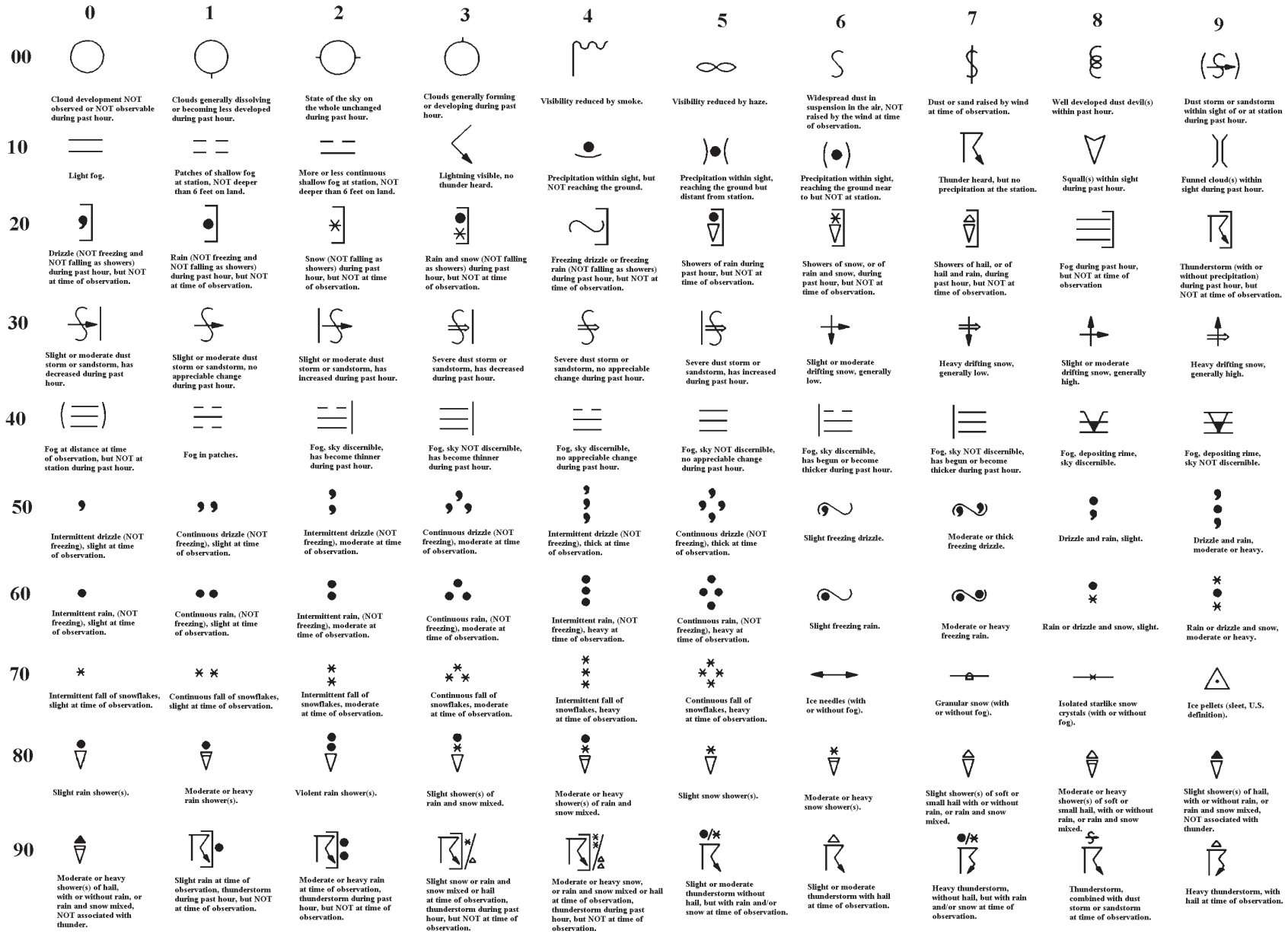
**Character of Front**

| Code Figures | Descriptions |
|---|---|
| 0 | No specification |
| 5 | Forming or existence expected |
| 6 | Quasi-stationary |
| 7 | With waves |
| 8 | Diffuse |

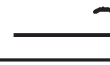
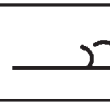
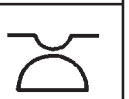
**Pressure Tendencies**

| Description of Characteristic | | | |
|---|---|---|---|
| **Primary Requirements** | **Additional Requirements** | **Graphic** | **Code Figure** |
| Higher<br><br>Atmospheric pressure now higher than 3 hours ago. | Increasing, then decreasing |  | 0 |
| | Increasing, then steady; or Increasing, then increasing more slowly |  | 1 |
| | Increasing; steadily or unsteadily |  | 2 |
| | Decreasing; or steady, then increasing; or Increasing, then increasing more rapidly |  | 3 |
| | Increasing, then decreasing |  | 0 |
| Same<br><br>Atmospheric pressure now same as 3 hours ago. | Steady |  | 4 |
| | Decreasing, then increasing |  | 5 |
| Lower<br><br>Atmospheric pressure now lower than 3 hours ago. | Decreasing, then increasing |  | 5 |
| | Decreasing, then steady; or Decreasing, then decreasing more slowly |  | 6 |
| | Decreasing; steadily or unsteadily |  | 7 |
| | Steady; or increasing, then decreasing; or Decreasing, then decreasing more rapidly |  | 8 |

# Present Weather Symbols



## Cloud Symbols

| CLOUD ABBREVIATION | | $C_L$ | DESCRIPTION (Abridged from W.M.O. Code) | | $C_M$ | DESCRIPTION (Abridged from W.M.O. Code) | | $C_H$ | DESCRIPTION (Abridged from W.M.O. Code) |
|---|---|---|---|---|---|---|---|---|---|
| St or Fs - Stratus or Fractostratus | 1 |  | Cu, fair weather, little vertical development and flattened | 1 |  | Thin As (most of cloud layer is semitransparent) | 1 |  | Filaments of Ci, or "mares tails," scattered and not increasing |
| Ci - Cirrus | 2 |  | Cu, considerable development, towering with or without other Cu or Sc bases at same level | 2 |  | Thick As, greater part sufficiently dense to hide sun (or moon), or Ns | 2 |  | Dense Ci in patches or twisted sheaves, usually not increasing, sometimes like remains of Cb; or towers tufts |
| Cs - Cirrostratus | 3 |  | Cb with tops lacking clearcut outlines, but distinctly not cirroform or anvil shaped; with or without Cu, Sc, or St | 3 |  | Thin Ac, mostly semitransparent; cloud elements not changing much at a single level | 3 |  | Dense Ci, often anvil shaped derived from or associated Cb |
| Cc - Cirrocumulus | 4 |  | Sc formed by spreading out of Cu; Cu often present also | 4 |  | Thin Ac in patches; cloud elements continually changing and/or occurring at more than one level | 4 |  | Ci, often hook shaped gradually spreading over the sky and usually thickening as a whole |
| Ac - Altocumulus | 5 |  | Sc not formed by spreading out of Cu | 5 |  | Thin Ac in bands or in a layer gradually spreading over sky and usually thickening as a whole | 5 |  | Ci and Cs, often in converging bands or Cs alone; generally overspreading and growing denser; the continuous layer not reaching 45 altitude |
| As - Altostratus | 6 |  | St or Fs or both, but no Fs of bad weather | 6 |  | Ac formed by the spreading out of Cu | 6 |  | Ci and Cs, often in converging bands or Cs alone; generally overspreading and growing denser; the continuous layer exceeding 45 altitude |
| Sc - Stratocumulus | 7 |  | Fs and/or Fc of bad weather (scud) | 7 |  | Double-layered Ac, or a thick layer of Ac, not increasing; or Ac with As and/or Ns | 7 |  | Veil of Cs covering the entire sky |
| Ns - Nimbostratus<br>Cu or Fc - Cumulus or Fractocumulus | 8 |  | Cu and Sc (not formed by spreading out of Cu) with bases at different levels | 8 |  | Ac in the form of Cu-shaped tufts or Ac with turrets | 8 |  | Cs not increasing and not covering the entire sky |
| Cb - Cumulonimbus | 9 |  | Cb having a clearly fibrous (cirroform) top, often anvil shaped, with or without Cu, Sc, St, or scud | 9 |  | Ac of chaotic sky, usually at different levels; patches of dense Ci are usually present | 9 |  | Cc alone or Cc with some Ci or Cs but the Cc being the main cirroform cloud |

# Appendix C – Motion Sickness and Dehydration

1) **Motion sickness** is caused by continued stimulation of the inner ear, which controls the sense of balance.
2) The symptoms are progressive. Pilots or passengers may experience:
   a) A loss of appetite.
   b) Saliva collecting in the mouth.
   c) Perspiration.
   d) Nausea / vomiting.
   e) Disorientation.
   f) Headaches.
3) If allowed to become severe, a pilot could become incapacitated.
4) When suffering from motion sickness:
   a) Open the air vents.
   b) Loosen clothing.
   c) Use oxygen if available.
   d) Try to focus on things outside of the airplane toward the horizon and minimize head movements.
   e) Terminate the flight as soon as practical.
5) A pilot should not use drugs intended to prevent motion sickness as they might have detrimental side effects.
6) **Dehydration** occurs when the human body does not get or retain the fluid it requires.
   a) Dehydration symptoms include:
      i) a feeling of thirst
      ii) dryness of the mouth, eyes, nose, and/or skin
      iii) headache
      iv) dizziness
      v) sleepiness
      vi) cramps
      vii) fatigue
   b) Prolonged dehydration can impair judgment and may lead to debilitating conditions.
7) Being in a hot and dry climate, breathing dry air or oxygen at altitude, being sick or sunburned, wearing improper clothing for hot conditions, eating salty foods, and the intake of diuretics such as drinks with caffeine or alcohol may contribute to the severity of dehydration.
8) Avoid dehydration while flying by drinking plenty of water, avoiding foods and drinks which promote the condition, and being dressed for the weather conditions.

# Appendix D – Securing Loose Items

1) The cockpit and cabin should always be checked for loose articles during the preflight process. Loose articles can become projectiles or jam controls during turbulence or sudden aircraft movements.
2) Loose articles should be secured using appropriate tiedowns within the aircraft.
   a) Seatbelts in unoccupied seats may be useful for securing flight bags and other bulky articles. Be sure that these items are accounted for in the weight and balance and will not interfere with any controls even if they shift during flight.

# Appendix E – Noise Abatement Procedures

1) Noise around airports has become a major concern at many locations around the country.
2) Noise abatement procedures have been developed at a large number of airports to help minimize noise for nearby sensitive areas.
3) These procedures are available from a number of sources within the aviation community and may include:
   a) Airport/Facility Directory.
   b) Local and regional publications.
   c) Printed handouts.
   d) Operator bulletin boards.
   e) Safety briefings.
   f) Local air traffic facilities.
4) Noise abatement reminder signs may be present along taxiways to encourage pilots to follow these procedures.
5) Even if noise abatement procedures are not in place, you should try to be a good neighbor and do your part to reduce or minimize the exposure to noise for individuals on the ground.

# Appendix F – Determining Minimum Safe Altitude for Emergency Instrument Navigation

1) There are a number of considerations when determining the minimum safe altitude for emergency navigation via instruments.
2) If you are communicating with ATC and in radar contact, ask the controller for a minimum safe altitude for your location and route of flight.
3) If you are not communicating with ATC, then attempt to contact them for the assistance above.
4) If you are unable to communicate with ATC or they do not have you on radar, you will need to determine a minimum safe altitude on your own.
   a) The first item that must be considered is the minimum altitude required for adequate terrain and obstacle clearance. This is of paramount importance.
      i) Determine your location.
      ii) Using your sectional chart, determine the Maximum Elevation Figure (MEF) for the chart quadrangle in which you are located or in which you intend to fly.
      iii) Add at least 1000 feet to the MEF to determine an adequate terrain and obstacle clearance altitude. A 2000 foot addition may be more appropriate in mountainous terrain.
   b) Next, you must determine the minimum altitude required for the navigational aids, communication services, and radar services to be used.
      i) VHF communications and navigation equipment requires line-of-site contact with a ground station.
      ii) Refer to the Airport/Facility Directory for the service class and any limitations to the reception of a particular VHF navigational ground station.
   c) The higher of the minimum altitude for adequate terrain and obstacle clearance and the minimum altitude for navigation and communication is your minimum safe altitude for emergency navigation via instruments.

# Appendix G – Emergency and Survival Equipment

There are a number of emergency and survival products that may be available in your airplane. Items such as the Emergency Locator Transmitter are required by the regulations. Other products may include fire extinguishers, emergency flotation gear, equipment to protect you from the elements, or any number of other supplies. Regardless of the type of equipment on board, you should be familiar with its operation. Refer to the documentation supplied with the equipment for its operating instructions, servicing requirements, and safe storage methods.

The type of emergency and survival equipment you should carry will be highly dependent on the environment in which you will be flying. In general, you will want an aviation fire extinguisher and a small first aid kit onboard at all times. An emergency strobe light and flashlight with adequate batteries are also good to keep onboard. You should carry a mobile telephone with you while flying for use after an emergency landing. Review the lists below for a few environmentally influenced basics. Flying over remote locations may require additional equipment.

1) Cold weather
   a) Coats, hats, and gloves.
   b) Blankets.
2) Hot weather
   a) Water.
   b) Sun protection.
3) Over water
   a) Personal flotation device (inflatable is preferred).
   b) Inflatable raft and water for extended over water flights.

# Appendix H – Runway Incursion Avoidance

1) The FAA defines a runway incursion as "any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft." It could also be defined as "Any unauthorized intrusion onto a runway, regardless of whether or not an aircraft presents a potential conflict."
2) According to FAA data, approximately 65% of all runway incursions are caused by pilots. Additionally, 75% of the 65% of runway incursions are caused by general aviation pilots. Incursions do not always lead to accidents but they can and have.
3) Inattention to what is going on outside the airplane during ground operations can quickly result in aircraft damage or an embarrassing situation. Situational awareness is paramount during taxi operations. The pilot must be aware of the entire area around the airplane to ensure obstruction and other aircraft clearance. If there is ever a doubt about being clear of an object, the pilot should stop the airplane and have someone check the clearance. It may be necessary to have the airplane moved by ground personnel.
4) AC 91-73 describes a number of items that a pilot should be add to his checklist to assist in preventing runway incursions.
5) A pilot should seek to maintain a sterile cockpit during ground operations and operations near the airport. The concept of a sterile cockpit indicates that the pilot or pilots should refrain from conversations that are not necessary for the flight thus allowing concentration on the task at hand.
   a) If the aircraft is equipped with a modern intercom system and the passengers are tied into the system, the pilot should use the isolate features of the system as needed to allow focus on the task at hand. The pilot may also ask the passengers to refrain from conversations during the sterile period.
   b) Tuning a radio, programming a GPS, non-pertinent conversations, and other distractions should be avoided while taxiing.
6) Pilots can help to prevent runway incursions through knowledge of the airport and planning for taxi operations just as they plan for other phases of the flight. The pilot must know where he is and where he is going on the airport at all times. He should also have a reasonable expectation as to how he will get there.

7) The pilot should know the side of the runway from which he would like to exit to most easily reach his destination on the airport when landing. With all of this, the pilot should not be so tied to that expectation that it can't be amended when conditions or a clearance dictates otherwise.

8) Planning for taxi should begin prior to engine start when on the ground and well before touchdown when approaching an airport for landing.

9) Tools for planning may include information from the Airport / Facility Directory. The Chart Supplements includes airport diagrams with the taxiways and runways identified for specific airports with complex configurations. These diagrams also identify hot spots at these complex airports. Textual descriptions of the hot spots will also be found in the Chart Supplement. A small scale representation of the airport with the runways identified and the taxiways shown may also appear within some Chart Supplement entries.

10) Many GPS's contain runway diagrams but may not include any information on taxiways. While less useful for planning, this information can serve a purpose in helping the pilot to remain oriented to the layout and location of the runways. Some of these units may also be useful, when set to their tightest scale in navigation "map" mode, as a monitoring tool for maintaining orientation to the runways. Glass cockpit and electronic flight bag representations of taxiways are becoming more prevalent.

11) Another important tool for maintaining orientation is ensuring that the heading indicator is set properly before any taxi operations.

12) While the basis for a plan, all of these diagrams and tools should only be considered correct on the day that they were published. More up to date information is required to supplement these tools. Additional information should be gathered from NOTAMs; through monitoring of ATIS, ASOS, AWSS, and AWOS broadcasts; through ATC and Common Traffic Advisory Frequency (CTAF) transmissions; through discussion with local pilots; and through visual observation.
    a) The ATIS broadcast will indicate the runway or runways that are in use and the ASOS, AWSS, or AWOS broadcast will indicate the wind speed and direction to help in determining the runway to expect. This runway expectation is important for taxi planning.
    b) ATC and CTAF transmissions may provide the most up to date information on the runway or runways in use and the condition of the taxiways. ATC will assign runways at a tower-controlled field. The controllers will also have the latest information on runway and taxiway issues.
    c) Transmissions on the advisory frequency at a non-tower airport may provide an indication of the runway in use.

13) The pilot must take a look out the windscreen and observe his surroundings. Common sense must be applied to what is seen and heard. If an ATC clearance causes concern based upon what is observed out the window, the pilot should stop in a safe location and question the clearance.

14) When preparing to enter or cross a runway, even with clearance at a tower-controlled field, a pilot should scan the entire length of the runway and the approach path at both ends before proceeding. Verbally confirming within the cockpit "clear left and clear right" reinforces this scan.

15) The pilot should also listen to the radio for indications of where to expect to see other traffic. Maintaining a "big picture" of the traffic is important.

16) At a tower-controlled field, ATC will issue clearances and instructions with which a pilot must comply. Compliance with these will help to reduce runway incursions. An ATC clearance is required prior to crossing or entering any runway at these airports. Use caution when runways are close together or when a taxiway exit from a runway is near another runway. Additional caution should be used when exiting between two parallel runways. The location of potential concerns should be a part of the pilot's taxi plan and any cockpit briefing.

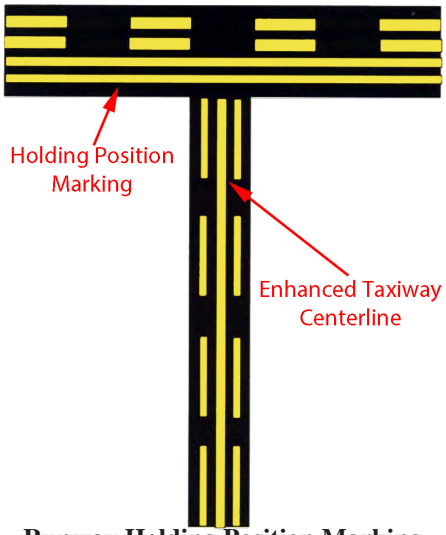
17) To help ensure compliance, the pilot should write down any lengthy instructions. Like copying an IFR clearance, he should not try to comprehend the information while writing it. Instructions that involve taxiing to or onto a runway should be read back. A read back is especially important if the instructions involve any hold short, line up and wait, or runway crossing requirements. The instructions should be compared to taxiway charts and visible signs after the read back is complete. The instructions and available taxiway information should be readily available during taxi. Review the instructions carefully to ensure adherence.

18) To help increase visibility, an aircraft's lighting should be used to maximum advantage.
    a) The aircraft's anti-collision and navigation lights should be used during all ground operations.
    b) The taxi light should be used on the ground at night.
    c) The landing light and any additional strobe lights should be turned on just prior to takeoff regardless of the time of day.
        i) A pilot should turn on the strobes if ATC clears him to line up and wait then turn on the landing light when cleared for takeoff and ready to roll.
        ii) The strobes should be left on for the entire flight unless safety precludes this and the landing light should be left on until well clear of the airport traffic.
        iii) The landing light should be turned back on when approaching the airport area for landing and left on until clear of the runway after landing.
    d) Common sense and common courtesy should be used with all lighting guidelines while on the ground. This is especially a concern at night. Improper use of lights can create more of a hazard than the potential for an incursion.

19) When approaching an airport, the pilot's scan should include not only the traffic in the air but the traffic on the ground as well. Aircraft and vehicles near each runway intersection should be noted. Scan the entire length of intersecting runways as aircraft on these may be moving very quickly toward the intersection.
    a) The pilot should never assume that an aircraft or vehicle that is stopped at an intersection will remain stopped. He should be prepared to go around if the hold short line is violated while approaching to land.

20) Radio communications with ATC at a tower-controlled airport and with the other traffic at a non-towered field should use standard radio phraseology as defined in the Aeronautical Information Manual.

21) There are a number of types of holding position markings. With all such markings, you must ensure that no part of the aircraft crosses the marking without ATC clearance at a tower-controlled airport or without making sure of adequate separation from other aircraft at a non-towered airport. You must also ensure that the entire aircraft has crossed the marking when exiting the area that the marking protects. Holding position markings will be yellow, even if they are on a runway.



**Runway Holding Position Marking with Enhanced Taxiway Centerline**

22) Runway holding position markings consist of two solid and two dashed yellow lines extending across the width of the taxiway or runway. The solid lines are always on the side where the aircraft is to hold.
    a) On taxiways, these markings identify the locations on the taxiway where an aircraft is supposed to stop when it does not have clearance to proceed onto the runway. When instructed by ATC to hold short of a runway, you must stop prior to the marking.
    b) Runway holding position markings are installed on runways only if the runway is normally used for "land and hold short" or taxiing operations. The markings only have operational significance for these two types of operations.
    c) Runway holding position markings may also be used at some airports where it is necessary to hold an aircraft on a taxiway located in the approach or departure area of a runway so that the aircraft does not interfere with operations on that runway.
    d) An enhanced taxiway centerline has dashed yellow markings on each side of the normal centerline when within 150 feet of the holding side of a runway holding position marking. These have been added to increase your awareness of an approaching holding position.

23) Ground operations at night and in low visibility conditions present their own unique challenges. The pilot's responsibilities don't change but seeing signs, markings, and obstacles can be more difficult. Aircraft lighting can help at night but its use must be such that it won't be a detriment to the pilot's own night vision or that of others.
    a) Some larger airports may have a Surface Movement Guidance Control System or 'SMIGS' plan to assist taxiing aircraft during low visibility operations, when the RVR is below 1200 feet.

# Appendix I – Emergency Descents

1) An emergency descent is a maneuver for descending as rapidly as possible to a lower altitude or to the ground for an emergency landing. The need for this maneuver may result from an uncontrollable fire, a sudden loss of cabin pressurization, or any other situation demanding an immediate and rapid descent.
   a) The objective is to descend the airplane as soon and as rapidly as possible, within the structural limitations of the airplane.
   b) Simulated emergency descents should be made in a turn to check for other air traffic below and to look around for a possible emergency landing area. A radio call announcing descent intentions may be appropriate to alert other aircraft in the area. When initiating the descent, a bank of approximately 30 to 45° should be established to maintain positive load factors on the airplane.
2) Emergency descent training should be performed as recommended by the manufacturer, including the configuration and airspeeds. Utilize an approved checklist as appropriate. Except when prohibited by the manufacturer:
   a) The power should be reduced to idle
   b) The propeller control (if equipped) should be placed in the low pitch (or high rpm position) to allow the propeller to act as an aerodynamic brake and help prevent an excessive airspeed buildup during the descent.
   c) The landing gear and flaps should be extended as recommended by the manufacturer to provide maximum drag.
   d) The pilot should not allow the airplane's airspeed to pass the never-exceed speed ($V_{NE}$), the maximum landing gear extended speed ($V_{LE}$), or the maximum flap extended speed ($V_{FE}$), as applicable. The descent should be made at the maximum allowable airspeed consistent with the procedure used. This will provide increased drag and therefore the loss of altitude as quickly as possible.
      i) In the case of an engine fire, a high airspeed descent could blow out the fire. However, the weakening of the airplane structure is a major concern and descent at low airspeed would place less stress on the airplane.
      ii) If the descent is conducted in turbulent conditions, the pilot must also comply with the design maneuvering speed ($V_A$) limitations.
   e) The recovery from an emergency descent should be initiated at a high enough altitude to ensure a safe recovery back to level flight or a precautionary landing.
      i) When the descent is established and stabilized during training and practice, the descent should be terminated rather than a precautionary landing.
      ii) In airplanes with piston engines, prolonged practice of emergency descents should be avoided to prevent excessive cooling of the engine cylinders.

# Appendix J – Instructor Certification for Private Pilot Knowledge Test

**NOTE:** The endorsement below is representative of that required by 14 CFR Section 61.35 and 61.103(d)(1) and (2) and **MUST** be made in the applicant's logbook.

**INSTRUCTOR CERTIFICATION**

**PRIVATE PILOT KNOWLEDGE TEST**

I certify I have reviewed the home study curriculum of (First name, MI, Last name) on the required training of § 61.105. I have determined he/she is prepared for the Private Pilot knowledge test.

Date: _____

Signed: _____

Certificate #: _____

Expires: _____