



U.S. Department of Transportation
Federal Aviation Administration

FAA-S-8081-21A

FLIGHT ENGINEER
Practical Test Standard
for
RECIPROCATING ENGINE,
TURBOPROPELLER,
and
TURBOJET POWERED AIRCRAFT

FLIGHT STANDARDS SERVICE
Washington, DC 20591

FOREWORD

FAA-S-8081-21A, Flight Engineer Practical Test Standard for Reciprocating Engine, Turbopropeller, and Turbojet Powered Aircraft, is published by the FAA to establish the standard for flight engineer practical tests. FAA inspectors and designated examiners shall conduct practical tests in compliance with these standards. Instructors and applicants should find these standards helpful in practical test preparation.

FAA-S-8081-21A supersedes FAA-S-8081-21B, Flight Engineer Practical Test Standards for Reciprocating Engine, Turbopropeller, and Turbojet Powered Aircraft, with Changes 1, 2, 3, & 4, dated January 1999.

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Major Enhancements to FAA-S-8081-21A

- Updated References throughout
- Changed “cockpit” to “flight deck” throughout
- Changed “flight simulation device” to “flight simulation training device” throughout
- Introduction:
 - Updated “General Information” section
 - Updated list of references in the “Practical Test Description” section
 - Removed AC 120-45
 - Revised “Medical Certificate” section under “Flight Engineer Practical Test Prerequisites”
 - Revised “Use of a Flight Simulation Training Device (FSTD) on a Practical Test” section (previously titled “Use of FAA- Approved Flight Simulators and Flight Training Devices for Testing”)
 - Updated FAA AELS

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Introduction

General Information

The FAA has developed this PTS for use by FAA inspectors and examiners when conducting flight engineer practical tests. Instructors and applicants may be guided by this standard when preparing for practical tests.

Throughout this PTS when the term “examiners” is used, “inspectors and examiners” should be understood.

Information considered directive in nature is described in this practical test book in terms, such as “shall” and “must,” indicating the actions are mandatory. Guidance information is described in terms such as “should” and “may,” indicating the actions are desirable or permissive, but not mandatory.

This PTS is available for download, in PDF format, from www.faa.gov.

Comments regarding this publication may be emailed to AFS630comments@faa.gov.

PTS Concept

14 CFR specifies areas of knowledge and skill that shall be demonstrated by an applicant before issuance of a Flight Engineer Certificate. The standards for airman certificates are published in this PTS and contain specific TASKS in which competency shall be demonstrated. The FAA will revise this PTS whenever it is determined that changes are needed in the interest of safety. Adherence to provisions of the regulations and the practical test standard is mandatory for evaluation of flight engineer applicants (14 CFR part 63, section 63.39).

For some aircraft types, provisions of the FSB may specify details as to how 14 CFR and this practical test standard apply to certain TASKS, procedures, or knowledge areas.

PTS Description

This PTS contains the practical test standard for the initial issuance of a Flight Engineer Certificate and for the addition of class ratings to that certificate. The Flight Engineer Practical Test Standard includes AREAS OF OPERATION and TASKS.

AREAS OF OPERATION are phases of the practical test arranged in a logical sequence in two sections within this standard. Section One is conducted on the ground and contains TASKS to determine the applicant’s knowledge of the aircraft, applicable equipment, documents, operating manuals, performance, and limitations. Section Two contains TASKS to determine the applicant’s knowledge and skill during preflight, ground, flight, and postflight procedures. The examiner may conduct the practical test in any sequence that results in an efficient and valid test.

TASKS list the required knowledge and skills appropriate to an AREA OF OPERATION.

NOTE is used to emphasize special considerations required in the AREA OF OPERATION or TASK.

The TASK's Objective lists the important elements that must be satisfactorily performed to demonstrate competency in a TASK. The Objective includes:

1. specifically, what the applicant must be able to do;
2. the conditions under which the TASK is to be performed; and
3. the minimum acceptable standards of performance.

The REFERENCE identifies the publication(s) that describe(s) the TASK. Descriptions of TASKS are not included in this standard because this information can be found in the current issue of the listed references. Materials other than those listed may be used for reference if their content conveys substantially the same meaning as the referenced materials.

This practical test standard is based on the following references.

14 CFR part 1	Definitions and Abbreviations
14 CFR part 60	Flight Simulation Training Device Initial and Continuing Qualification and Use
14 CFR part 63	Certification: Flight Crewmembers Other Than Pilots
14 CFR part 91	General Operating and Flight Rules
14 CFR part 121	Operating Requirements: Domestic, Flag, and Supplemental Operations
AC 00-6	Aviation Weather
AC 00-45	Aviation Weather Services
AC 120-27	Aircraft Weight and Balance Control
AC 120-35	Flightcrew Member Line Operational Simulations: Line Oriented Flight Training, Special Purpose Operational Training, Line Operational Evaluation
AC 120-40	Airplane Simulator Qualifications
AC 120-51	Crew Resource Management Training
AC 120-53	Guidance for Conducting and Use of Flight Standardization Board Evaluations
AC 120-54	Advanced Qualification Program
AIM	Aeronautical Information Manual
FDC NOTAM	National Flight Data Center Notice to Air Missions
AFM	FAA-Approved Airplane Flight Manual
MEL	Minimum Equipment List
FSB Reports	Flight Standardization Board Reports
OTHER	Aircraft Operating Manual Flight Manuals Master and Company Minimum Equipment Lists Configuration Deviation List Manufacturer's MEL Procedures Manual/Dispatch Deviation Guide Chart Supplements

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.

Acronyms/Abbreviations Used in this PTS

14 CFR	Title 14 of the Code of Federal Regulations
AC	Advisory Circular
ACFT	Aircraft
AFM	FAA-Approved Airplane Flight Manual
AIM	Aeronautical Information Manual
AKTR	Airman Knowledge Test Report
APU	Auxiliary Power Unit
ATC	AirTraffic Control
ATIS	Automatic Terminal Information Service
CDL	Configuration Deviation List
CRM	Crew Resource Management
DGPS	Differential Global Positioning Satellite (System)
EFIS	Electronic Flight Indicating Systems
FAA	Federal Aviation Administration
FDC	National Flight Data Center
FMS	Flight Management System(s)
FSB	Flight Standardization Board Reports
FSTD	Flight Simulation Training Device
FTD	Flight Training Device
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
INS	Inertial Navigation Systems
MEL	Minimum Equipment List
MLS	Microwave Landing System
METAR	Meteorological Aerodrome Report
NDB	Non-directional Beacon
NOTAM	Notice to Air Missions
PDF	Portable Document Format
PTS	Practical Test Standard
RNAV	Area Navigation
SID	Station Identifier
STAR	Standard Terminal Arrivals
V	Velocity
VOR	Very High Frequency Omnidirectional Range
VS	Versus

Use of the PTS

The TASKS contained in this practical test standard apply to applicants for an initial flight engineer certificate or when adding a class rating to an existing flight engineer certificate. With certain exceptions, some described by NOTES, all TASKS are required; however, when a particular element is not appropriate to the aircraft or its equipment, that element, at the discretion of the examiner, may be omitted.

It is not intended that the examiner follow the precise order that the AREAS OF OPERATION and TASKS appear in this practical test standard. The examiner may change the sequence or combine TASKS with similar Objectives to conserve time. Although TASKS with similar Objectives may be combined to conserve time, the Objectives of all TASKS must be demonstrated and evaluated at some time during the practical test. Examiners must develop a written plan of action that includes the order and combination of TASKS to be demonstrated by the applicant in a manner that results in an efficient and valid test. It is of utmost importance that the examiner accurately evaluates the applicant, placing special emphasis on operations considered critical to flight safety.

Flight Engineer Certification Requirements

14 CFR part 63, Subpart B, Flight Engineers provides certification prerequisites.

FAA AELS

The examiner must determine that the applicant meets AELS. An applicant for an FAA certificate or rating must be able to communicate in English in a discernible and understandable manner with ATC, pilots, and others involved in preparing an aircraft for flight and operating an aircraft in flight. This communication may or may not involve radio communications. An applicant for an FAA certificate issued in accordance with 14 CFR part 63 who cannot hear or speak due to a medical deficiency may be eligible for an FAA certificate with specific operational limitations. For additional information, reference AC 60-28, FAA English Language Standard for an FAA Certificate Issued Under 14 CFR parts 61, 63, 65, and 107, as amended.

If the applicant's ability to meet the FAA AELS comes into question before starting the practical test, the examiner will not begin the practical test. An examiner who is not an ASI¹ will check the box, *Referred to FSO for Aviation English Language Standard Determination*, located on the bottom of page 2 of the applicant's FAA Form 8400-3, Application for an Airman Certificate and/or Rating. The examiner will refer the applicant to the appropriate FSO.

If the applicant's ability to meet the FAA AELS comes into question after the practical test begins, an examiner who is not an ASI will discontinue the practical test and check the box, *Referred to FSO for Aviation English Language Standard Determination*, on the application. The examiner will also issue a Notice of Disapproval of Application, FAA Form 8060-5 with the comment "Does Not Demonstrate FAA AELS" in addition to any unsatisfactory Task(s).

In either case, the examiner must complete and submit the application file through normal application procedures and notify the appropriate FSO of the referral.

Knowledge and Aeronautical Experience Requirements

Applicants must present a valid AKTR and an FAA Form 8400-3 to the examiner prior to the practical test. Refer to 14 CFR part 63, sections 63.35 and 63.37 for knowledge and aeronautical experience requirements.

Aircraft and Equipment Requirements for the Practical Test

Refer to 14 CFR part 63, sections 63.37 and 63.39 for aircraft and equipment requirements for the practical test.

Refer to 14 CFR part 63, section 63.39(b)(3) for skill requirements. See Task Authorization Chart in the following section.

¹ ASIs may assess an applicant's English language proficiency in accordance with FAA Order 8900.1.

Task vs. Simulation Device Credit

Examiners conducting Flight Engineer Practical Tests with simulation devices should consult appropriate documentation to ensure that the device has been approved for training and checking the TASKS in question.

The documentation for each device should reflect that the following activities have occurred:

1. The device must be evaluated, determined to meet the appropriate standards, and assigned the appropriate qualification level by the National Simulator Program Manager. The device must continue to meet the qualification standards through continuing evaluations as outlined in the appropriate AC. For aircraft FTD, refer to 14 CFR part 60, section 60.17. For FFS, refer to 14 CFR part 60 or AC 120-40 (as amended), Airplane Simulator Qualification, as appropriate.
2. The FAA must approve the device for specific TASKS.
3. The device must continue to support the level of student or applicant performance required by this practical test standard.

NOTE: Users of the following chart are cautioned that the use of the chart alone is incomplete; the chart should be utilized in tandem with applicable regulations and this PTS.

Use of Chart

X Creditable

A Creditable if appropriate systems are installed and operating.

Task Authorization Chart

Areas of Operation: Section Two	FLIGHT SIMULATION DEVICE LEVEL							ACFT		
	4	5	6	7	A	B	C		D	
II. Preflight Procedures										
A. Preflight Inspection and Flight Deck Setup	NOT AUTHORIZED							X		
B. Preflight Inspection (Exterior)	NOT AUTHORIZED							X		
III. Ground Operations										
A. Powerplant Start	NOT AUTHORIZED							X		
B. Taxi and Pretakeoff Checks	NOT AUTHORIZED							X		
IV. Normal										
A. Takeoff	NOT AUTHORIZED							X		
B. Inflight	NOT AUTHORIZED							X		
C. Approach and Landing	NOT AUTHORIZED							X		
D. Engine and Systems Monitoring	NOT AUTHORIZED							X		
V. Abnormal and Emergency Procedures										
A. Takeoff	—	A	X	X		X	X	X	X	X
B. Inflight	—	A	X	X		X	X	X	X	X
C. Approach and Landing	—	A	X	X		X	X	X	X	X
D. Engine and Systems Monitoring	—	A	X	X		X	X	X	X	X
VI. Postflight Procedures										
A. After Landing	NOT AUTHORIZED							X		
B. Parking and Securing	NOT AUTHORIZED							X		

Inspector and Examiner Responsibility

The inspector or examiner conducting the practical test is responsible for determining that the applicant meets the prerequisites for certification and the standards outlined in this practical test standard. The examiner shall meet this responsibility by determining that the applicant's knowledge and skill meet the Objectives in all required TASKS.

Practical Test Administered to Applicants Eligible Under 14 CFR part 63, section 63.37(b)(1), (2), (3), or (4)

The practical test is divided into three phases.

Phase 1—Equipment Examination. Phase 1 is conducted on the ground as an oral exam, written exam, or a combination of both, to determine the applicant's knowledge of the aircraft systems, required operating procedures, performance, and limitations.

Phase 2—Preflight. Phase 2 is conducted on the ground using an aircraft consisting of an inspection of the aircraft exterior, cabin interior, and the flight deck.

Phase 3—Flight. Phase 3 begins on the ground and includes flight phases that must be in an aircraft. This phase includes flight deck setup; engine start; taxi; before takeoff checks; after takeoff checks; inflight procedures; approach and landing checks; after-landing procedures; parking and securing; and normal, abnormal, and emergency procedures. The flight portion of the practical test may be conducted in as little as 1.5 to 2 hours in instances when the examiner prepares and conducts the flight check scenario effectively and when the applicant performs well.

NOTE: Certain portions of Phase 3, limited to emergency procedure(s), maybe conducted in an approved flight engineer training device (Level 5 or higher FTD or any approved flight simulator).

Satisfactory Performance

The practical test is passed if, in the judgment of the examiner, the applicant demonstrates satisfactory performance with regard to:

1. executing TASKS within the aircraft's performance capabilities and limitations, including use of its systems;
2. executing normal, abnormal, and emergency procedures TASKS appropriate to the aircraft;
3. executing procedures expeditiously and accurately;
4. demonstrating crew resource management;
5. applying systems knowledge; and
6. showing mastery of the aircraft systems and procedures, within the standards outlined in this practical test standard, with the successful outcome of a TASK never in doubt.

Unsatisfactory Performance

If in the judgment of the examiner, the applicant's performance of any TASK is unsatisfactory, the associated AREA OF OPERATION is failed; therefore, the practical test is failed. Examiners shall not repeat TASKS that have been attempted and failed. The examiner or the applicant may discontinue the test at any time after the failure of a TASK makes the applicant ineligible for the certificate or rating sought. The practical test will be continued only with the consent of the applicant. In such cases, it is usually better for the examiner to continue with the practical test to complete the other TASKS. If the examiner determines that the entire practical test must be repeated, the practical test should not be continued but should be terminated immediately. If the practical test is either continued or discontinued, the applicant is entitled to credit for AREAS OF OPERATION satisfactorily completed; however, during a retest and at the discretion of the examiner, any TASK may be reevaluated including those previously passed. Whether the remaining parts of the practical test are continued or not after a failure, a notice of disapproval must be issued.

Consistently exceeding tolerances or limitations stated in the TASK, Objective, or aircraft operating manual(s) or failure to take prompt corrective action when tolerances or limitations are exceeded are indicative of unsatisfactory performance. Any action, or lack thereof, by the applicant that requires corrective intervention by the examiner or another crewmember to maintain safe flight, shall be disqualifying.

NOTE: It is vitally important that the applicant, other crewmembers, and the examiner use proper and effective scanning techniques to observe other traffic in the area throughout the flight regime.

When the examiner determines that a TASK is incomplete, or the outcome uncertain, the examiner may require the applicant to repeat that TASK or portions of that TASK. This provision has been made in the interest of fairness and does not mean that instruction or practice is permitted during the certification process. When practical, the remaining TASKS of the practical test phase should be completed before repeating the questionable TASK. If the second attempt to perform a questionable TASK is not clearly satisfactory, the examiner shall consider it unsatisfactory.

If the practical test must be terminated for unsatisfactory performance and there are other TASKS that have not been tested or still need to be repeated, a notice of disapproval shall be issued listing the AREAS OF OPERATION that have not been successfully completed.

When a practical test is discontinued for reasons other than unsatisfactory performance (e.g., equipment failure, weather, air sickness), FAA Form 8400-3, Application for an Airman Certificate and/or Rating and, if applicable, the applicant's knowledge test report should be returned to the applicant. The examiner at that time should prepare, sign, and issue a Letter of Discontinuance to the applicant. The Letter of Discontinuance should identify the portions of the practical test that were successfully completed.

Recording Unsatisfactory Performance

This PTS uses the terms AREA OF OPERATION and TASK to denote areas in which competency must be demonstrated. When a disapproval notice is issued, the examiner must record the applicant's unsatisfactory performance in terms of AREA OF OPERATION and TASK appropriate to the practical test conducted. In addition, the examiner should document the date of satisfactory completion of the oral evaluation. Recording the date of successful oral completion on the disapproval notice is essential for determining when the oral must be re-accomplished.

CRM

CRM refers to the effective use of all available resources: human resources, hardware, and information. Human resources include all groups routinely working with the flight deck crew who are involved in decisions that are required to operate a flight safely. These groups include, but are not limited to: aircraft dispatchers, cabin crewmembers, maintenance personnel, and air traffic controllers. CRM is not a single TASK. CRM is a set of competencies relating to communication and crew coordination, which must be evident in all TASKS. CRM competencies may be grouped into three clusters of observable behavior, as follows.

COMMUNICATION PROCESSES AND DECISIONS

- Briefing
- Inquiry/Advocacy/Assertiveness
- Self-Critique
- Communication with Available Personnel Resources
- Decision Making

BUILDING AND MAINTENANCE OF A FLIGHT TEAM

- Leadership/Followership
- Interpersonal Relationships

WORKLOAD MANAGEMENT AND SITUATIONAL AWARENESS

- Preparation/Planning
- Vigilance
- Workload Distribution
- Distraction Avoidance
- Wake Turbulence Avoidance

How the Examiner Applies CRM

Examiners must exhibit good CRM in conducting tests while requiring the same from applicants undergoing those tests.

The majority of aviation accidents and incidents are due, at least in part, to CRM-related human failures. Valid and reliable criteria have not yet been developed for objective evaluation of CRM competencies; therefore, evaluations of performance with respect to CRM are often largely subjective. Pass/fail judgments based on CRM-related performance issues must be made carefully.

Some pass/fail judgments relating to CRM are entirely objective and simple to make. Judgments about required communications procedures, such as required briefings and required callouts are good examples. In such cases, the operator or the aircraft manufacturer specifies what should be briefed and when the briefings should occur. The examiner simply makes an objective judgment as to whether the required communications procedure was or was not performed correctly.

Deficiencies in CRM competencies usually contribute to unsatisfactory TASK performance; therefore, these competencies provide an extremely valuable framework for debriefing. For debriefing purposes, an amplified list of these competencies, expressed as behavioral markers, may be found in AC 120-51, Crew Resource Management Training, as amended.

Applicant's Use of Checklists

Throughout the practical test, the applicant is evaluated on the use of each appropriate checklist. Proper use is dependent on the specific TASK being evaluated. The situation may be that the use of the checklist, while accomplishing elements of an Objective, would be either unsafe or impractical. In this case, a review of the checklist after the elements have been accomplished would be considered appropriate.

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Examiner's Practical Test Checklist —Flight Engineer

Applicant's Name _____

Location _____

Date/Time _____

I. PREFLIGHT PREPARATION

- ☐ A. Equipment Examination—Systems Knowledge
- ☐ B. Aircraft Handbooks, Manuals, MEL, CDL, and Operations Specifications
- ☐ C. Performance and Limitations

II. PREFLIGHT PROCEDURES

- ☐ A. Preflight Inspection and Flight Deck Setup
- ☐ B. Preflight Inspection—Exterior

III. GROUND OPERATIONS

- ☐ A. Powerplant Start
- ☐ B. Taxi and Pretakeoff Checks

IV. NORMAL PROCEDURES

- ☐ A. Takeoff
- ☐ B. Inflight
- ☐ C. Approach and Landing
- ☐ D. Engine and Systems Monitoring

V. ABNORMAL AND EMERGENCY PROCEDURES

- ☐ A. Takeoff
- ☐ B. Inflight
- ☐ C. Approach and Landing
- ☐ D. Engine and Systems Monitoring

VI. POSTFLIGHT PROCEDURES

- ☐ A. After Landing
- ☐ B. Parking and Securing

Section 1—Preflight Preparation

I. AREA OF OPERATION: PREFLIGHT PREPARATION

A. TASK: EQUIPMENT EXAMINATION—SYSTEMSKNOWLEDGE

REFERENCES: 14 CFR part 63; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant exhibits adequate knowledge appropriate to the aircraft; its systems and components; its normal, abnormal, and emergency procedures; and uses the correct terminology with regard to the following items:

1. Flight controls—ailerons, elevator(s), rudder(s), control tabs, stabilizer, flaps, spoilers, leading edge flaps/slats, and trim systems.
2. Landing gear—indicators, brakes, antiskid, tires, nose- wheel steering, and shock absorbers.
3. Powerplant—controls and indicators, induction system, carburetor and fuel injection, turbocharging, cooling, fire detection and protection, mounting points, thrust reversers, turbine wheels, compressors, deicing, anti-icing, and other related components.
4. Propellers—type, controls, feathering/unfeathering, autofeather, negative torque sensing, synchronizing, and synchrophasing.
5. Fuel system—capacity, drains, pumps, controls, indicators, crossfeeding, transferring, jettison, fuel grade, color and additives, fueling and defueling procedures, and substitutions, if applicable.
6. Oil system—capacity, grade, quantities, and indicators.
7. Hydraulic system—capacity, pumps, pressure, reservoirs, grade, and regulators.
8. Electrical system—alternators, generators, battery, circuit breakers and protection devices, controls, indicators, external and auxiliary power sources, and priority of electrical power distribution and ratings.
9. Environmental systems—heating, cooling, ventilation, oxygen and pressurization, controls, indicators, and regulating devices.
10. Pneumatic systems.
11. Avionics and communications—autopilot, flight director, EFIS, FMS, Doppler Radar, INS, GPS/DGPS, VOR, NDB, ILS/MLS, RNAV systems and components, indicating devices, transponder, and emergency locator transmitter.
12. Crewmember and passenger equipment—oxygen system(s), survival and emergency equipment and exits, smoke and firefighting equipment, evacuation procedures and crew duties, and quick donning oxygen mask for crewmembers and passengers.

B. TASK: AIRCRAFT HANDBOOKS, MANUALS, MEL, CDL, AND OPERATIONS SPECIFICATIONS

REFERENCES: 14 CFR parts 63, 91, 121; Aircraft Operating Manual, AFM, Master and Company MEL, CDL, Manufacturer's MEL Procedures, Manual/Dispatch Deviation Guide.

Objective. To determine that the applicant exhibits adequate knowledge of the contents of the Aircraft Operating Manual or AFM with regard to the systems and components listed in TASK A (above), the MEL and CDL, the MEL Procedures Manual or Dispatch Deviation Guide, if appropriate, and the Operations Specifications, if applicable.

C. TASK: PERFORMANCE AND LIMITATIONS

REFERENCES: 14 CFR parts 1, 63, 91, 121; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of performance and limitations, including a thorough knowledge of the adverse effects of exceeding any limitation.
2. Demonstrates proficient use of (as appropriate to the aircraft) performance charts, tables, graphs, or other data relating to items such as—
 - a. accelerate-stop distance.
 - b. accelerate-go distance.
 - c. takeoff performance and calculations, all engines and engine(s) inoperative.
 - d. climb performance, including segmented climb performance, with all engines operating, with one or more engine(s) inoperative, and with other engine malfunctions as may be appropriate.
 - e. service ceiling, all engines, engine(s) inoperative, including drift down, if appropriate.
 - f. cruise performance.
 - g. fuel planning, loading, consumption, range, and endurance.
 - h. descent performance.
 - i. go-around performance.
 - j. other performance data (appropriate to the aircraft).
3. Describes (as appropriate to the aircraft) the airspeeds used during specific phases of flight.
4. Describes the effects of meteorological conditions upon performance characteristics and correctly applies these factors to a specific chart, table, graph, or other performance data. Demonstrates the ability to read METAR weather data and interpret ATIS.
5. Computes the weight and balance and center-of-gravity location for a specific load condition (as specified by the examiner), including adding, removing, or shifting weight.
6. Determines if the computed center of gravity is within the forward and aft center-of-gravity limits and that lateral fuel balance is within limits for takeoff, cruise, and landing.
7. Demonstrates good planning and knowledge of procedures in applying operational factors affecting aircraft performance, such as high altitude airports, cluttered/contaminated runways, ground and in-flight icing precautions, and MEL/CDL corrections.

Section 2—Preflight, Ground, Flight, and Postflight Procedures

II. AREA OF OPERATION: PREFLIGHT PROCEDURES

A. TASK: PREFLIGHT INSPECTION AND FLIGHT DECK SETUP

REFERENCES: 14 CFR parts 63, 91; Aircraft Operating Manual, AFM.

NOTE: When the flight deck preflight is accomplished in an FTD or flight simulator, the examiner should include typical failures and inoperative items.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of the preflight inspection procedures, while explaining briefly—
 - a. the purpose of inspecting the items which must be checked;
 - b. how to detect possible defects; and
 - c. the corrective action to take.
2. Exhibits adequate knowledge of the operational status of the aircraft by locating and explaining the significance and importance of related documents such as—
 - a. airworthiness and registration certificates and radio station license;
 - b. operating limitations, handbooks, and manuals;
 - c. MEL and CDL, if appropriate;
 - d. weight and balance data, aircraft performance data, and airport analysis information, as appropriate; and
 - e. maintenance requirements, tests, and appropriate records applicable to the proposed flight or operation, and maintenance that may be performed by the pilot or other designated crewmember.
3. Uses the approved checklist to inspect the aircraft internally, including the passenger cabin, and configures the aircraft in preparation for flight.
4. Uses the challenge-and-response (or other approved) method with the other crewmembers, where applicable, to accomplish the checklist procedures.
5. Verifies the aircraft is safe for flight by emphasizing (as appropriate) the need to look at and explain the purpose of inspecting items such as—
 - a. powerplant—including controls and indicators;
 - b. fuel quantity—grade, type, contamination safeguards, and normal and alternate servicing procedures;
 - c. oil quantity—grade and type;
 - d. hydraulic fluid quantity—grade, type, and servicing procedures;
 - e. oxygen quantity—pressures, servicing procedures, and associated systems and equipment for crew and passengers;
 - f. landing gear—brakes and steering system;
 - g. tires—condition, inflation, and correct mounting, where applicable;
 - h. fire protection/detection systems—proper operation, servicing, pressures, and discharge indications;
 - i. pneumatic system—pressures and servicing;

- j. ground environmental systems—proper servicing and operation;
 - k. APU—servicing and operation;
 - l. flight control systems—trim, spoilers, and leading/trailing edge devices; and
 - m. anti-ice, deice systems—servicing and operation.
- 6. Coordinates with ground crew and ensures adequate clearance prior to powering any system which results in device movements such as door hatches and flight control surfaces.
 - 7. Complies with the provisions of the appropriate Operations Specifications, if applicable, as they pertain to the particular aircraft and operation.
 - 8. Demonstrates proper operation of all applicable aircraft systems.
 - 9. Notes any discrepancies, determines if the aircraft is airworthy and safe for flight, and takes the proper corrective action.

B. TASK: PREFLIGHT INSPECTION—EXTERIOR

REFERENCES: 14 CFR parts 63, 91; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

- 1. Exhibits adequate knowledge of the preflight inspection procedures, while explaining briefly—
 - a. the purpose of inspecting the items that must be checked;
 - b. how to detect possible defects; and
 - c. the corrective action to take.
- 2. Exhibits adequate knowledge of the operational status of the aircraft by locating and explaining the significance and importance of exterior aircraft components.
- 3. Checks the general area around the aircraft for hazards to the safety of the aircraft and personnel.

NOTE: For initial certification, the exterior and interior preflight must be observed by the examiner or inspector on an actual, airworthy aircraft of the type used during training.

III. AREA OF OPERATION: GROUND OPERATIONS

A. TASK: POWERPLANT START

REFERENCES: 14 CFR part 63; Aircraft Operating Manual, AFM.

Objective: To determine that the applicant:

1. Exhibits adequate knowledge of the correct powerplant start procedures, including the use of an APU or external power source, starting under various atmospheric conditions, normal and abnormal starting limitations, and the proper action required in the event of a malfunction.
2. Exhibits adequate knowledge of normal starts, battery starts, bottle starts, cross-bleed starts, start valve failures, ignition failure, hot/hung starts, fire during start, and APU failure during start.
3. Ensures the ground safety procedures are followed during the before-start, start, and after-start phases.
4. Ensures the use of appropriate ground crew personnel during the start procedures.
5. Performs all items of the start procedures by systematically following the approved checklist items for the before-start, start, and after-start phases.
6. Demonstrates sound judgment and operating practices in those instances where specific instructions or checklist items are not published.

B. TASK: TAXI AND PRETAKEOFF CHECKS

REFERENCES: 14 CFR part 63; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of the correct taxi and pretakeoff procedures (as appropriate to the aircraft), including pushback or powerback, as applicable, by stating the reason for checking the items outlined on the approved checklist, and explaining how to detect possible malfunctions.
2. Accomplishes the applicable checklist items and performs the recommended procedures.
3. Ensures that all systems are within their normal operating range prior to beginning, during the performance of, and at the completion of those checks required by the approved checklist.
4. Explains, as may be requested by the examiner, any normal or abnormal system operating characteristic or limitation, and the corrective action for a specific malfunction.
5. Determines if the aircraft is safe for the proposed flight or requires maintenance.
6. Determines the aircraft's takeoff performance, considering such factors as wind, density altitude, weight, temperature, pressure altitude, and runway condition and length.
7. Determines airspeeds/V-speeds and properly sets all applicable instrument and systems references.
8. Upon request, reviews procedures for emergency and abnormal situations which may be encountered during takeoff, and states the corrective action required of the other concerned crewmembers.
9. Monitors and correctly interprets the takeoff and departure clearance as issued by ATC and other radio communications.

IV. AREA OF OPERATION: NORMAL PROCEDURES

A. TASK: TAKEOFF

REFERENCES: 14 CFR parts 63, 91; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of normal takeoff and climbs, including (as appropriate to the aircraft) airspeeds, configurations, meteorological considerations, and normal procedures.
2. Takes into account, prior to beginning the takeoff, operational factors that could affect the maneuver such as Takeoff Warning Inhibit Systems or other aircraft characteristics; runway length, surface condition, obstructions, and other hazards; wind, wake turbulence, and other related factors that could adversely affect safety.
3. Verifies and correctly computes takeoff performance requirements and applies correction for the existing wind component to the aircraft speeds.
4. Adjusts the powerplant controls as recommended by the FAA-approved guidance for the existing conditions.
5. Accomplishes or calls for and verifies the accomplishment of the appropriate checklist items to ensure that the aircraft systems are operating properly.

B. TASK: INFLIGHT

REFERENCES: 14 CFR parts 63, 91; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of instrument procedures, including SIDs, Low and High Altitude Charts, STARs and related pilot/crew/controller responsibilities.
2. Accomplishes or calls for and verifies the accomplishment of the appropriate checklist items to ensure that the aircraft systems are operating properly.
3. Exhibits adequate knowledge of high altitude performance and specific flight characteristics appropriate to the specific aircraft. FSB reports should be used when applicable.
4. Possesses adequate knowledge of the aircraft systems, subsystems, and devices relative to the aircraft type (as determined by the examiner).
5. Demonstrates the proper use of the aircraft systems, subsystems, and devices (as determined by the examiner) appropriate to the aircraft, such as
 - a. powerplant.
 - b. fuel system.
 - c. electrical system.
 - d. hydraulic system.
 - e. environmental and pressurization systems.
 - f. fire detection and extinguishing systems.
 - g. navigation and avionics systems.
 - h. automatic flight control system, electronic flight instruments system, and related subsystems.
 - i. flight control systems.
 - j. anti-ice and deice systems.
 - k. aircraft and personal emergency equipment.
 - l. other systems, subsystems, and devices specific to the type aircraft, including make, model, and series.
 - m. pneumatic system(s).

C. TASK: APPROACH AND LANDING

REFERENCES: 14 CFR parts 63, 91; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of descents, precision and nonprecision instrument approaches, visual approaches, missed approach, and other procedures; and aircraft performance requirements, including (as appropriate to the specific aircraft), airspeeds, configurations, meteorological considerations, and normal procedures.
2. Takes into account, prior to beginning the descent, approach and/or landing, operational factors that could affect the maneuver such as inoperative aircraft systems or other aircraft characteristics; runway length, surface condition, obstructions, and other hazards; and wind, wake turbulence, and other related factors that could adversely affect safety.
3. Verifies and correctly computes approach and landing performance requirements and applies correction for the existing wind component and aircraft configuration to the aircraft speeds.
4. Adjusts the powerplant controls and aircraft systems as recommended by the FAA-approved guidance for the existing conditions.
5. Accomplishes or calls for and verifies the accomplishment of the appropriate checklist items to ensure that the aircraft systems are operating properly.

D. TASK: ENGINE AND SYSTEMS MONITORING

REFERENCES: 14 CFR parts 63, 91; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of the aircraft systems, including normal procedures and checklists.
2. Adjusts the powerplant controls and aircraft systems, as recommended by the FAA-approved guidance, for the existing conditions.
3. Accomplishes or calls for and verifies the accomplishment of the appropriate checklist items to ensure that the aircraft systems are operating properly.

V. AREA OF OPERATION: ABNORMAL AND EMERGENCY PROCEDURES

NOTE: Abnormal or emergency procedures should be tested for engines and each major system such as hydraulic, pneumatic, and electrical.

A. TASK: TAKEOFF

REFERENCES: 14 CFR parts 63, 91; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of the technique and procedure for accomplishing a rejected takeoff after powerplant/system(s) failure/warnings, and related safety factors.
2. Exhibits adequate knowledge of the procedures used during powerplant failure on takeoff, the appropriate reference airspeeds, aircraft performance requirements, and the specific crew actions required.
3. Exhibits adequate knowledge of abnormal and emergency procedures, including, as appropriate, airspeeds, configurations, and meteorological considerations.
4. Adjusts the powerplant controls as recommended by the FAA-approved guidance for the existing conditions.
5. Accomplishes immediate action items; calls for and verifies the accomplishment of the appropriate checklist.

B. TASK: INFLIGHT

REFERENCES: 14 CFR parts 63, 91; AC 61-27; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of the emergency procedures relating to the particular aircraft type (as may be determined by the examiner).
2. Exhibits adequate knowledge of two-way radiocommunication failure procedures.
3. Identifies malfunctions and applies the proper procedure relating to abnormal operation of aircraft systems, subsystems, and devices relative to the aircraft type (as determined by the examiner) such as—
 - a. powerplant.
 - b. fuel system.
 - c. electrical system.
 - d. hydraulic system.
 - e. environmental and pressurization systems.
 - f. fire detection and extinguishing systems.
 - g. navigation and avionics systems.
 - h. automatic flight control system, electronic flight instruments system, and related subsystems.
 - i. flight control systems.
 - j. anti-ice and deice systems.
 - k. aircraft and personal emergency equipment.
 - l. other systems, subsystems, and devices specific to the type aircraft, including make, model, and series.
 - m. pneumatic system(s).

4. Demonstrates the proper emergency procedures relating to the particular aircraft type, including —
 - a. emergency descent.
 - b. inflight fire and smoke removal.
 - c. rapid decompression.
 - d. emergency evacuation.
 - e. engine fire.
 - f. others (as required by the AFM).
5. Adjusts the powerplant controls, as recommended by the FAA-approved guidance, for the existing conditions.
6. Accomplishes immediate action items; calls for and verifies the accomplishment of the appropriate checklist.

C. TASK: APPROACH AND LANDING

REFERENCES: 14 CFR parts 63, 91; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of the emergency procedures relating to the particular aircraft type (as determined by the examiner).
2. Correctly computes approach and landing performance requirements taking into account operational factors that may affect the maneuver such as malfunctioning aircraft systems, abnormal or emergency situations, or other related factors that could adversely affect safety.
3. Adjusts the powerplant controls and aircraft systems as recommended by the FAA-approved guidance for the existing conditions.
4. Accomplishes or calls for and verifies the accomplishment of the appropriate checklist items to ensure that the aircraft systems are operating properly.

D. TASK: ENGINE AND SYSTEMS MONITORING

REFERENCES: 14 CFR parts 63, 91; Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of the aircraft systems, including malfunctions, abnormal and emergency procedures, and checklists.
2. Identifies and applies the appropriate procedure relating to subtle system failures such as slow leaks in the lubricating or hydraulics system(s), minor electrical overloads, inadequate pressurization, fuel imbalance/transfer/jettison, and abnormal procedures specified by the AFM.
3. Adjusts the powerplant controls and aircraft systems as recommended by the FAA-approved guidance for the existing conditions.
4. Accomplishes or calls for and verifies the accomplishment of the appropriate checklist items to ensure that the aircraft systems are operating properly.

VI. AREA OF OPERATION: POSTFLIGHT PROCEDURES

A. TASK: AFTER LANDING

REFERENCES: Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of safe after-landing/taxi procedures, as appropriate.
2. Accomplishes the applicable checklist items and performs therecommended procedures.

B. TASK: PARKING AND SECURING

REFERENCES: Aircraft Operating Manual, AFM.

Objective. To determine that the applicant:

1. Exhibits adequate knowledge of the parking and the securing aircraft procedures.
2. Accomplishes the applicable checklist items and performs therecommended procedures.
3. Has adequate knowledge of the aircraft forms/logs to record the flight time and discrepancies.