



U.S. Department
of Transportation

**Federal Aviation
Administration**

FAA-S-8081-27
(with Changes 1, 2, 3, & 4)

Aviation Mechanic Airframe Practical Test Standards

June 2003

Flight Standards Service
Washington, DC 20591

(this page intentionally left blank)

Aviation Mechanic Airframe Practical Test Standards

2003

Flight Standards Service
Washington, D.C. 20591

(this page intentionally left blank)

Note

FAA-S-8081-27, Aviation Mechanic Airframe Practical Test Standards (PTS) is to replace the oral and practical test guides currently used. Both testing procedures will be in effect until all examiners have been trained to administer the test in accordance with the PTS, or 2 years after the effective date of Order 8900.2, General Aviation Airman Designee Handbook. After which time, all tests must be administered under the PTS guidelines. New examiners must use the PTS upon completion of initial training. Previously appointed examiners must transition to the PTS within 60 days after completion of recurrent training.

(this page intentionally left blank)

Foreword

This Aviation Mechanic Airframe Practical Test Standards book has been published by the Federal Aviation Administration (FAA) to establish the standards for the Aviation Mechanic Airframe Practical Test. The passing of this practical test is a required step toward obtaining the Aviation Mechanic certificate with an Airframe rating. **FAA inspectors and Designated Mechanic Examiners (DMEs) shall conduct practical tests in compliance with these standards.** Applicants should find these standards helpful in practical test preparation.

/s/ 2-13-2003

Joseph K. Tintera
Manager, Regulatory Support Division
Flight Standards Service

(this page intentionally left blank)

Record of Changes

Change 1 (8/8/2003)

- **Introduction:** *Performance Levels*
 - Level 1 – Z3b. “Nondestructive” changed to “specified” (page 5).
 - Level 1 – Performance Standard deleted (page 5).
 - Level 2 – bullet 2: added additional text (page 5).
 - Level 2 – Performance Standard deleted (page 5).
 - Level 3 – bullet 4: added additional text (page 5).
 - Level 3 – Z3e. “verify” changed to “check” (page 6).
 - Level 3 – Performance Standard deleted (page 6).

Change 2 (9/24/2003)

- **Introduction:** *Performance Levels*
 - Level 1 – Performance Standard added (page 5).
 - Level 2 – Performance Standard added (page 5).
 - Level 3 – Performance Standard added (page 6).
- **Section II – Airframe Structures**
 - A. Wood Structures, Objective 1 – changed “at least four” to “at least two” (page 9).
 - B. Aircraft Covering, Objective 1 – changed “at least four” to “at least two” (page 10).
 - C. Aircraft Finishes, Objective 1 – changed “at least four” to “at least two” (page 11).
 - D. Sheet Metal and Non-metallic Structures, Objective 1 – changed “at least four” to “at least two” (page 12).
 - E. Welding, Objective 1 – changed “at least four” to “at least two” (page 13).
 - F. Assembly and Rigging, Objective 1 – changed “at least four” to “at least two” (page 14).
 - G. Airframe Inspection, Objective 1 – changed “at least four” to “at least two” (page 16).

- **Section III – Airframe Systems and Components**

- K. Aircraft Landing Gear Systems, Objective 1 – changed “at least four” to “at least two” (page 19).
- L. Hydraulic and Pneumatic Power Systems, Objective 1 – changed “at least four” to “at least two” (page 20).
- M. Cabin Atmosphere Control Systems, Objective 1 – changed “at least four” to “at least two” (page 21).
- N. Aircraft Instrument Systems, Objective 1 – changed “at least four” to “at least two” (page 22).
- O. Communication and Navigation systems, Objective 1 – changed “at least four” to “at least two” (page 23).
- P. Aircraft Fuel Systems, Objective 1 – changed “at least four” to “at least two” (page 24).
- Q. Aircraft Electrical Systems, Objective 1 – changed “at least four” to “at least two” (page 25).
- R. Position and Warning System, Objective 1 – changed “at least four” to “at least two” (page 27).
- S. Ice and Rain Control Systems, Objective 1 – changed “at least four” to “at least two” (page 28).
- T. Fire Protection Systems, Objective 1 – changed “at least four” to “at least two” (page 29).

Change 3 (6/21/2004)

- Revised *Unsatisfactory Performance* section of the Introduction (page 6).
- **Section III – Airframe Systems and Components**
 - G. Airframe Inspection (page 16).
 - K. Aircraft Landing Gear Systems (page 19).
 - L. Hydraulic and Pneumatic Power Systems (page 20).
 - M. Cabin Atmosphere Control Systems (page 21).
 - N. Aircraft Instrument Systems (page 22).

Change 4 (4/18/2014)

- Revised the Introduction (page 1).
- Revised the Reference List from the *Practical Test Standard Description* section of the Introduction (page 3).

- Revised *Unsatisfactory Performance* section of the Introduction (page 6).
- Revised References for all subject areas.

(this page intentionally left blank)

Table of Contents

Introduction

Practical Test Standard Concept	1
Practical Test Book Description	2
Practical Test Standard Description	2
Use of the Practical Test Standards	3
Aviation Mechanic Practical Test Prerequisites	4
Examiner Responsibility	4
Performance Levels	4
Satisfactory Performance	6
Unsatisfactory Performance	6

Section II – Airframe Structures

A. Wood Structures	9
B. Aircraft Covering	10
C. Aircraft Finishes	11
D. Sheet Metal and Non-Metallic Structures	12
E. Welding	13
F. Assembly and Rigging	14
G. Airframe Inspection	16
H. [Reserved]	17
I. [Reserved]	17
J. [Reserved]	17

Section III – Airframe Systems and Components

K. Aircraft Landing Gear Systems	19
L. Hydraulic and Pneumatic Power Systems	20
M. Cabin Atmosphere Control Systems	21
N. Aircraft Instrument Systems	22
O. Communication and Navigation Systems	23
P. Aircraft Fuel Systems	24
Q. Aircraft Electrical Systems	25
R. Position and Warning System	27
S. Ice and Rain Control Systems	28
T. Fire Protection Systems	29

(this page intentionally left blank)

Introduction

The Flight Standards Service of the Federal Aviation Administration (FAA) has developed these practical test standards (PTS) to be used by examiners¹ when conducting aviation mechanic practical tests. Instructors are expected to address all of the elements contained in this PTS when preparing applicants for practical tests. Applicants should be familiar with this PTS and refer to these standards during their training.

Information considered directive in nature is described in this practical test document 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.

The FAA gratefully acknowledges the valuable assistance provided by the many individuals and organizations that contributed their time and talent in assisting with the development of these practical test standards.

This PTS is available for download, in pdf format, from <http://www.faa.gov/mechanics/testing/practical/>

This PTS is published by the U.S. Department of Transportation, Federal Aviation Administration, Airman Testing Standards Branch, AFS-630, P.O. Box 25082, Oklahoma City, OK 73125.

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

Practical Test Standard Concept

Title 14 of the Code of Federal Regulations (14 CFR) specifies the subject areas in which knowledge and skill must be demonstrated by the applicant before the issuance of an Aviation Mechanic Certificate with an Airframe rating. The CFRs provide the flexibility that permits the FAA to publish practical test standards containing knowledge and skill specifics in which competency must be demonstrated.

¹ The word “examiner” denotes either the FAA inspector, FAA designated examiner, or other authorized person who conducts the practical test.

"Knowledge" (oral) elements are indicated by use of the words
"Exhibits knowledge of...."

"Skill" (practical) elements are indicated by the use of the words
"Demonstrates the ability to...."

The FAA will revise these standards whenever it is determined that changes are needed. **Adherence to the applicable regulations, the policies set forth in the current revision of FAA Order 8900.2 – General Aviation Airman Designee Handbook, and the practical test standards, is mandatory for the evaluation of aviation mechanic applicants.**

Practical Test Book Description

This test book contains the following Aviation Mechanic Airframe Practical Test Standards.

Section II – Airframe Structures

Section III – Airframe Systems and Components

Practical Test Standard Description

The Aviation Mechanic Airframe Practical Test Standards include the subject areas of knowledge and skill for the issuance of an aviation mechanic certificate and/or the addition of a rating. The subject areas are the topics in which aviation mechanic applicants must have knowledge and/or demonstrate skill.

The Reference identifies the publication(s) that describe(s) the subject area. Descriptions of the subject area are not included in the practical test standards, because this information can be found in references listed and/or in manufacturer or FAA-approved or acceptable data related to each subject area. Publications other than those listed may be used as references if their content conveys substantially the same information as the referenced publications. Except where appropriate, (e.g., pertinent CFRs) references listed in this document are not meant to supersede or otherwise replace manufacturer or other FAA-approved or acceptable data, but to serve as general information and study material sources.

Information contained in manufacturer and/ or FAA-approved/acceptable data always takes precedence over advisory or textbook referenced data. **Written instructions given to applicants for the completion of assigned skill portions of the**

practical test standard may include service bulletins, airworthiness directives or other CFRs; type certificate data sheets or specifications; manufacturer maintenance manuals or other similar approved/acceptable data necessary for accomplishment of objective testing.

Reference List:

14 CFR part 21	Certification Procedures for Products and Parts
14 CFR part 43	Maintenance, Preventive Maintenance Rebuilding, and Alteration
14 CFR part 45	Identification and Registration Markings
14 CFR part 65	Certification: Airmen Other Than Flight Crewmembers
14 CFR part 91	Air Traffic and General Operating Rules
AC 43.13-1&2B	Acceptable Methods, Techniques and Practices – Aircraft Inspection and Repair
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

Each subject area has an objective. The objective lists the important knowledge and skill elements that must be utilized by the examiner in planning and administering aviation mechanic tests, and that applicants must be prepared to satisfactorily perform.

Use of the Practical Test Standards

The FAA requires that all practical tests be conducted in accordance with the appropriate Aviation Mechanic Practical Test Standards and the policies and procedures set forth in the current revision of FAA Order 8900.2. When using the practical test book, the examiner must evaluate the applicant's knowledge and skill in sufficient depth to determine that the objective for each subject area element selected is met.

An applicant is not permitted to know before testing begins which selections in each subject area are to be included in his/her test (except the core competency elements, which all applicants are

required to perform). Therefore, an applicant should be well prepared in *all* oral and skill areas included in the practical test standard.

Further information about the requirements for conducting/taking the practical test is contained in FAA Order 8900.2.

Aviation Mechanic Practical Test Prerequisites

All applicants must have met the prescribed experience requirements as stated in 14 CFR part 65, section 65.77. (See FAA Order 8900.2 for information about testing under the provisions of 14 CFR part 65, section 65.80.)

Examiner Responsibility

The examiner who conducts the practical test is responsible for determining that the applicant meets acceptable standards of knowledge and skill in the assigned subject areas within the appropriate practical test standard. Since there is no formal division between the knowledge and skill portions of the practical test, this becomes an ongoing process throughout the test.

The following terms may be reviewed with the applicant prior to, or during, element assignment.

1. "Inspect" means to examine by sight and/or touch (with or without inspection enhancing tools/equipment).
2. "Check" means to verify proper operation.
3. "Troubleshoot" means to analyze and identify malfunctions.
4. "Service" means to perform functions that assure continued operation.
5. "Repair" means to correct a defective condition.

Performance Levels

The following is a detailed description of the meaning of each level.

Level 1

- Know basic facts and principles.
- Be able to find information and follow directions and written instructions.
- Locate methods, procedures, instructions, and reference material.
- Interpretation of information not required.

Changes 1 (8/8/2003) & 2 (9/24/2003)

- No skill demonstration is required.

Example:

Z3b. Locate specified nondestructive testing methods. (Level 1)

Performance Standard:	The applicant will locate information for nondestructive testing.
------------------------------	---

Level 2

- Know and understand principles, theories, and concepts.
- Be able to find and interpret maintenance data and information, and perform basic operations using appropriate data, tools, and equipment.
- A high level of skill is not required.

Example:

Z3c. Detect electrical leakage in electrical connections, terminal strips, and cable harness (at least 10 will have leakage faults). (Level 2)

Performance Standard:	Using appropriate maintenance data and a multimeter, the applicant will identify items with leakage faults.
------------------------------	---

Level 3

- Know, understand, and apply facts, principles, theories, and concepts.
- Understand how they relate to the total operation and maintenance of aircraft.
- Be able to make independent and accurate airworthiness judgments.
- Perform all skill operations to a return-to-service standard using appropriate data, tools, and equipment. Inspections are performed in accordance with acceptable or approved data.
- A fairly high skill level is required.

Changes 2 (9/24/2003), 3 (6/21/2004), & 4 (4/18/2014)

Example:

Z3e. Check control surface travel. (Level 3)

Performance Standard:	Using type certificate data sheets and the manufacturer's service manual, the applicant will measure the control surface travel, compare the travel to the maintenance data, and determine if the travel is within limits.
------------------------------	--

Satisfactory Performance

The practical test is passed if the applicant demonstrates the prescribed proficiency in the assigned elements (core competency and other selected elements) in each subject area to the required standard. Applicants shall not be expected to memorize all mathematical formulas that may be required in the performance of various elements in this practical test standard. However, where relevant, applicants must be able to locate and apply necessary formulas to obtain correct solutions.

Unsatisfactory Performance

If the applicant does not meet the standards of any of the elements performed (knowledge, core competency, or other skill elements), the associated subject area is failed, and thus the practical test is failed. The examiner or the applicant may discontinue testing any time after the failure of a subject area. In any case, the applicant is entitled to credit for only those subject areas satisfactorily completed. See the current revision of FAA Order 8900.2 for further information about retesting and allowable credit for subject areas satisfactorily completed.

Typical areas of unsatisfactory performance and grounds for disqualification include the following.

1. Any action or lack of action by the applicant that requires corrective intervention by the examiner for reasons of safety.
2. Failure to follow acceptable or approved maintenance procedures while performing skill (practical) projects.
3. Exceeding tolerances stated in the maintenance instructions.

4. Failure to recognize improper procedures.
5. The inability to perform to a return to service standard, where applicable.
6. Inadequate knowledge in any of the subject areas.

(this page intentionally left blank)

Section II – Airframe Structures

A. Wood Structures

References: AC 43.13-1B; FAA-H-8083-31.

Objective: To determine that the applicant:

1. Exhibits knowledge of at least two of the following—
 - a. inspection tools for wood structures.
 - b. inspection techniques and practices for wood structures.
 - c. effects of moisture/humidity on wood.
 - d. types and/or general characteristics of wood used in aircraft structures.
 - e. permissible substitutes and/or other materials used in the construction and repair of wood structures.
 - f. acceptable wood defects.
 - g. non-acceptable wood defects.
 - h. wood repair techniques and practices.
2. N/A
3. Demonstrates the ability to perform at least one of the following—
 - a. inspect aircraft wood structure or wood sample. (Level 3)
 - b. inspect a wood repair for airworthiness. (Level 3)
 - c. identify and select aircraft quality/acceptable wood. (Level 2)
 - d. determine acceptable repairs or limits for one or more
 - e. specific defects. (Level 2)
 - f. locate data for allowable substitute wood material. (Level 1)
 - g. determine the allowable species of wood that can be used as a substitute for spruce, and what, if any, dimensional changes are necessary. (Level 2)
 - h. locate wood spar and/or rib structure repair procedures. (Level 1)

B. Aircraft Covering

References: AC 43.13-1B; FAA-H-8083-31.

Objective: To determine that the applicant:

1. Exhibits knowledge of at least two of the following—
 - a. factors used in determining the proper type covering material.
 - b. types of approved aircraft covering material.
 - c. seams commonly used.
 - d. covering textile terms.
 - e. structure surface preparation.
 - f. covering methods commonly used.
 - g. covering means of attachment.
 - h. areas on aircraft covering most susceptible to deterioration.
 - i. aircraft covering preservation/restoration.
 - j. inspection of aircraft covering.
 - k. covering repair techniques and practices.
2. N/A
3. Demonstrates the ability to perform at least one of the following—
 - a. inspect the repair of a damaged covering for airworthiness. (Level 3)
 - b. test a finished covering sample to determine acceptability of strength. (Level 3)
 - c. determine the minimum fabric strength covering requirements for a specific aircraft. (Level 2)
 - d. determine if a covering sample has appropriate identification markings. (Level 2)
 - e. determine acceptable repairs for a specific defect. (Level 2)
 - f. determine the classification (major or minor) of a specific repair to a fabric-covered surface. (Level 2)
 - g. locate the requirements for repair of a specific fabric covering defect. (Level 1)

C. Aircraft Finishes

References: AC 43.13-1B; FAA-H-8083-31; 14 CFR part 45.

Objective: To determine that the applicant:

1. Exhibits knowledge of at least two of the following—
 - a. protection of airframe structures.
 - b. primer materials.
 - c. topcoat materials.
 - d. surface preparation for a desired finishing material.
 - e. effects of ambient conditions on finishing materials.
 - f. effects of improper surface preparation on finishing materials.
 - g. regulatory requirements for registration markings.
 - h. inspection of aircraft finishes.
 - i. safety practices/precautions when using finishing materials.
 - j. fungicidal, butyrate, and/or nitrate dopes.
 - k. finishing materials application techniques and practices.
 - l. where necessary, balance considerations after refinishing.
2. N/A
3. Demonstrates the ability to perform at least one of the following—
 - a. select appropriate finishing materials for a specific application. (Level 2)
 - b. determine preparation necessary for application of finishing materials to a particular surface. (Level 2)
 - c. prepare a surface for application of finishing materials. (Level 3)
 - d. apply primer and/or topcoat materials. (Level 3)
 - e. inspect one or more finished surfaces. (Level 3)
 - f. locate appropriate data to use for a specific finishing task. (Level 1)
 - g. determine the allowable location and size of registration numbers for a fixed-wing and/or rotorcraft aircraft. (Level 2)

D. Sheet Metal and Non-Metallic Structures

*Core competency element.

References: AC 43.13-1B; FAA-H-8083-31, FAA-H-8083-30.

Objective: To determine that the applicant:

1. Exhibits knowledge of at least two of the following—
 - a. inspection/testing of sheet metal structures.
 - b. types of sheet metal defects.
 - c. selection of sheet metal.
 - d. layout, and/or forming of sheet metal.
 - e. selection of rivets.
 - f. rivet layout.
 - g. rivet installation.
 - h. inspection/testing of composite structures.
 - i. types of composite structure defects.
 - j. composite structure fiber, core, and/or matrix materials.
 - k. composite materials storage practices and shelf life.
 - l. composite structure repair methods, techniques, and practices.
 - m. window inspection/types of defects.
 - n. window material storage and handling.
 - o. window installation procedures.
 - p. care and maintenance of windows.
 - q. window temporary and/or permanent repairs.
 - r. maintenance safety practices/precautions for sheet metal, and/or composite materials/structures, and/or windows.
2. *Demonstrates the ability to install and remove at least two each, of two or more types of rivets. (Level 3)
3. Demonstrates the ability to perform at least one of the following—
 - a. lay out and form sheet metal to given dimensions; include at least one bend. (Level 3)
 - b. determine a rivet lay out pattern. (Level 2)

Changes 2(9/24/2003) & 4 (4/18/2014)

- c. visually inspect an unpainted composite surface. (Level 3)
- d. inspect a composite structure using a non-destructive testing method (in addition to visual). (Level 3)
- e. select materials and clean a transparent surface. (Level 3)
- f. inspect a window or windscreen. (Level 3)
- g. remove one or more minor scratches from a transparent surface. (Level 3)
- h. determine hole size to use in a sheet metal repair. (Level 2)
- i. inspect a sheet metal assembly or repair for airworthiness. (Level 3)
- j. drill and countersink and/or dimple sheet metal. (Level 3)
- k. identify the fiber-reinforcing materials in at least three laminated composite structure samples. (Level 2)
- l. locate data for composite structure damage assessment. (Level 1)

E. Welding

References: AC 43.13-1B; FAA-H-8083-31, FAA-H-8083-30.

Objective: To determine that the applicant:

- 1. Exhibits knowledge of at least two of the following—
 - a. flame welding gasses.
 - b. storage/handling of welding gasses.
 - c. flame welding practices and techniques.
 - d. inert-gas welding practices and techniques.
 - e. purpose and types of shielding gasses.
 - f. characteristics of acceptable welds.
 - g. characteristics of unacceptable welds.
 - h. types of steel tubing welding repairs.
 - i. procedures for weld repairs.

Changes 2(9/24/2003) & 4 (4/18/2014)

- j. soldering preparation, types of solder, and/or flux usage.
 - k. welding and/or soldering safety practices/precautions.
2. N/A
3. Demonstrates the ability to perform at least one of the following—
- a. ignite a torch, set one or more specified flame patterns, and accomplish proper torch shutdown. (Level 2)
 - b. solder a joint or connection. (Level 2)
 - c. using aircraft quality materials, weld or braze a joint. (Level 2)
 - d. determine the appropriate method/material(s) to use for a specific welding, soldering, or brazing task. (Level 2)
 - e. determine the appropriate data to use for a specific welding, soldering, or brazing task. (Level 1)

F. Assembly and Rigging

*Core competency element.

References: AC 43.13-1B; FAA-H-8083-31, FAA-H-8083-30.

Objective: To determine that the applicant:

- 1. Exhibits knowledge of at least two of the following—
 - a. control cable.
 - b. control cable maintenance.
 - c. cable connectors.
 - d. cable guides.
 - e. control stops.
 - f. push pull tubes.
 - g. torque tubes.
 - h. bell cranks.
 - i. flutter and flight control balance.
 - j. rigging of airplane or rotorcraft flight controls.

- k. airplane or rotorcraft flight controls and/or stabilizer systems.
 - l. types of rotorcraft rotor systems.
 - m. rotor vibrations.
 - n. rotor blade tracking.
 - o. aircraft jacking procedures.
 - p. jacking safety practices/precautions.
2. *Demonstrates the ability to check and/or set control surface cable tension. (Level 3)
3. Demonstrates the ability to perform at least one of the following—
- a. install a control surface. (Level 3)
 - b. check the static balance of a control surface. (Level 3)
 - c. locate the procedures for rigging a helicopter. (Level 1)
 - d. locate helicopter rotor blade tracking procedures. (Level 1)
 - e. identify fixed-wing aircraft rigging adjustment locations. (Level 2)
 - f. locate leveling methods and procedures for a specific aircraft. (Level 1)
 - g. inspect a flight control system for travel and security. (Level 3)
 - h. inspect a primary flight control cable. (Level 3)
 - i. install one or more swaged cable terminals and check with appropriate gage. (Level 3)
 - j. install one or more Nicopress sleeves and check with appropriate gage. (Level 3)
 - k. check and adjust as necessary a push-pull flight control system. (Level 3)
 - l. locate jacking points and leveling locations for a specific aircraft. (Level 2)
 - m. determine the jacking requirements for a particular aircraft. (Level 2)
 - n. jack an aircraft or portion thereof (e.g., as appropriate for tire/wheel change, or gear retraction). (Level 3)

G. Airframe Inspection

*Core competency element.

Reference: FAA-H-8083-30.

Objective: To determine that the applicant:

1. Exhibits knowledge of at least two of the following—
 - a. one or more required inspections under 14 CFR part 91.
 - b. maintenance requirements under 14 CFR part 43.
 - c. inspection requirements under 14 CFR part 43.
 - d. requirements for complying with airworthiness directives.
 - e. compliance with service letters, instructions for continued airworthiness, and/or bulletins.
 - f. maintenance record requirements under 14 CFR part 43.
 - g. maintenance record requirements under 14 CFR part 91.
2. *Demonstrates the ability to examine an aircraft maintenance record, and determine if inspection and/or maintenance is due. (Level 3)
3. Demonstrates the ability to perform at least one of the following—
 - a. accomplish a 14 CFR part 91 required inspection on an airframe portion or component thereof. (Level 3)
 - b. inspect an aircraft or portion thereof after maintenance or preventive maintenance. (Level 3)
 - c. determine placarding requirements for a specific aircraft and condition. (Level 2)
 - d. determine if all required instruments and equipment for specific operating conditions under 14 CFR part 91 are installed in a particular aircraft. (Level 2)
 - e. accomplish a conformity inspection on an airframe portion or component thereof and record results. (Level 3)

- f. generate a checklist for conducting a 100-hour airframe inspection on a specific aircraft. (Level 2)

H. [Reserved]

I. [Reserved]

J. [Reserved]

(this page intentionally left blank)

Section III – Airframe Systems and Components

K. Aircraft Landing Gear Systems

*Core competency element.

References: FAA-H-8083-31; AC 43.13-1B

Objective: To determine that the applicant:

1. Exhibits knowledge of at least two of the following—
 - a. landing gear strut servicing/lubrication.
 - b. landing gear steering systems.
 - c. landing gear retraction/extension systems.
 - d. landing gear inspection.
 - e. brake assembly inspection.
 - f. wheel and tire construction
 - g. tire mounting.
 - h. wheel and tire inspection.
 - i. wheel bearing inspection.
 - j. tire storage, care, and/or servicing.
 - k. landing gear and/or tire and wheel safety practices/precautions.
2. *Demonstrates the ability to perform inspection of an installed brake for serviceability. (Level 3)
3. Demonstrates the ability to perform at least one of the following—
 - a. determine the proper lubricant(s) for a landing gear. (Level 1)
 - b. inspect a landing gear or landing gear component(s). (Level 3)
 - c. service an oleo strut. (Level 3)
 - d. install a brake lining or brake assembly. (Level 3)
 - e. clean and inspect wheel bearings. (Level 3)
 - f. disassemble, clean as necessary, and inspect a wheel. (Level 3)
 - g. select lubricant, and lubricate wheel bearings. (Level 3)

Changes 2 (9/24/2003), 3 (6/21/2004), & 4 (4/18/2014)

- h. remove and replace/install a wheel and tire assembly on a landing gear. (Level 3)
- i. inspect a wheel and tire assembly, check tire pressure, and service as necessary. (Level 3)
- j. service a nosewheel shimmy damper. (Level 3)
- k. accomplish a landing gear retraction/extension check. (Level 3)
- l. replace a tire or tube valve core and check for leaks. (Level 3)

L. Hydraulic and Pneumatic Power Systems

*Core competency element.

References: FAA-H-8083-31; AC 43.13-1B.

Objective: To determine that the applicant:

1. Exhibits knowledge of at least two of the following—
 - a. hydraulic and/or pneumatic system, and/or system component(s) function/operation.
 - b. servicing, function, and/or operation of accumulators.
 - c. types of hydraulic/pneumatic seals and/or fluid/seal compatibility.
 - d. hydraulic/pneumatic seal maintenance procedures.
 - e. types of hydraulic/pneumatic filters and/or filter operation.
 - f. filter maintenance procedures.
 - g. pressure regulators and valves.
 - h. servicing hydraulic and/or pneumatic systems.
 - i. types/identification and/or characteristics of various hydraulics fluids used in aircraft.
 - j. hydraulic/pneumatic system safety practices/precautions.
2. *Demonstrates the ability to select and install a hydraulic seal. (Level 3)
3. Demonstrates the ability to perform at least one of the following—

Changes 2 (9/24/2003), 3 (6/21/2004), & 4 (4/18/2014)

- a. service a pneumatic or hydraulic system filter. (Level 3)
- b. inspect components or portions of a hydraulic or pneumatic system. (Level 3)
- c. locate fluid servicing instructions and identify/select fluid for a particular aircraft. (Level 2)
- d. service a hydraulic reservoir. (Level 3)
- e. troubleshoot a hydraulic or pneumatic system. (Level 3)
- f. repair a hydraulic or pneumatic system defect. (Level 3)
- g. remove and install hydraulic or pneumatic system component(s) and check operation. (Level 3)
- h. service a hydraulic system accumulator. (Level 3)

M. Cabin Atmosphere Control Systems

References: FAA-H-8083-31; AC 43.13-1B.

Objective: To determine that the applicant:

- 1. Exhibits knowledge of at least two of the following—
 - a. exhaust heat exchanger and/or system component(s) function, operation, and/or inspection procedures.
 - b. combustion heater and/or system component(s) function, operation, and/or inspection procedures.
 - c. vapor-cycle system and/or system component(s) operation, servicing and/or inspection procedures.
 - d. air-cycle system and/or system component(s) operation and/or inspection procedures.
 - e. cabin pressurization and/or system component(s) operation and/or inspection procedures.
 - f. types of oxygen systems and/or oxygen system component(s) operation.
 - g. oxygen system maintenance procedures.
- 2. N/A
- 3. Demonstrates the ability to perform at least one of the following—

Changes 2 (9/24/2003), 3 (6/21/2004), & 4 (4/18/2014)

- a. inspect and/or troubleshoot an exhaust heat exchanger cabin heat system or system component(s). (Level 3)
- b. inspect and/or troubleshoot a combustion air heater system and/or system component(s). (Level 3)
- c. select proper solution and leak test oxygen system component(s). (Level 3)
- d. inspect and/or troubleshoot an oxygen system and/or system component(s). (Level 3)
- e. check the operation of an oxygen system. (Level 3)
- f. service an oxygen system. (Level 3)
- g. purge an oxygen system. (Level 3)
- h. inspect and/or troubleshoot a vapor cycle cooling system and/or system component(s). (Level 3)
- i. inspect and/or troubleshoot a cabin pressurization system and/or system component(s). (Level 3)
- j. inspect and/or troubleshoot an air cycle machine system and/or system component(s). (Level 3)
- k. locate procedures for protecting a vapor-cycle system from contamination during component replacement. (Level 1)
- l. locate procedures for servicing a vapor-cycle cooling system. (Level 1)
- m. locate procedures for inspecting a cabin outflow valve. (Level 1)

N. Aircraft Instrument Systems

References: FAA-H-8083-31; AC 43.13-2B

Objective: To determine that the applicant:

- 1. Exhibits knowledge of at least two of the following—
 - a. magnetic compass operation.
 - b. magnetic compass swinging procedures.
 - c. gyroscopic instrument(s) purpose and operation.
 - d. vacuum/pressure and/or electrically operated instrument system operation.
 - e. vacuum/pressure and/or electricity operated instrument system maintenance procedures.

- f. pitot and/or static instruments purpose and operation.
 - g. pitot and/or static system operation.
 - h. 14 CFR parts 43 and/or 91 requirements for static system checks.
 - i. aircraft instrument range markings.
2. N/A
3. Demonstrates the ability to perform at least one of the following—
- a. remove and install an aircraft instrument. (Level 3)
 - b. accomplish a magnetic compass swing. (Level 3)
 - c. determine range/limit markings for one or more instruments. (Level 2)
 - d. remove, inspect, and install one or more vacuum or pressure system filters. (Level 3)
 - e. determine the proper setting of a vacuum and/or pressure system for a particular aircraft. (Level 2)
 - f. inspect and/or troubleshoot portions of a vacuum and/or pressure and/or electrically operated instrument power system. (Level 3)
 - g. inspect portions of a pitot-static system. (Level 3)
 - h. find barometric pressure using an altimeter. (Level 2)

O. *Communication and Navigation Systems*

References: FAA-H-8083-31; 14 CFR part 91; AC 43.13.2B.

Objective: To determine that the applicant:

- 1. Exhibits knowledge of at least two of the following—
 - a. 14 CFR part 91 emergency locator transmitter (ELT) maintenance requirements.
 - b. 14 CFR part 91 ELT record keeping requirements.
 - c. checking/inspecting coaxial cable.
 - d. coaxial cable installation and/or routing requirements.
 - e. communication and/or navigation systems commonly used.

Changes 2 (9/24/2003) & 4 (4/18/2014)

- f. proper installation of a com/nav radio in an existing radio rack.
 - g. means of identification of commonly used communication and/or navigation antennas.
 - h. autopilot system basic components and/or sensing elements.
 - i. static discharger function and operation.
 - j. static discharger maintenance procedures.
2. N/A
3. Demonstrates the ability to perform at least one of the following—
- a. identify and inspect com/nav cable and connectors. (Level 3)
 - b. inspect an ELT and/or ELT installation. (Level 3)
 - c. determine ELT battery serviceability/status. (Level 2)
 - d. inspect one or more antenna installations. (Level 3)
 - e. inspect a coaxial cable installation. (Level 3)
 - f. inspect a com/nav radio installation. (Level 3)
 - g. inspect a shock mount base. (Level 3)
 - h. locate and identify various antennas installed on a particular aircraft. (Level 2)
 - i. inspect one or more static dischargers for security, resistance. (Level 3)

P. Aircraft Fuel Systems

*Core competency element.

References: FAA-H-8083-31, FAA-H-8083-30; AC 43.13-1B.

Objective: To determine that the applicant:

- 1. Exhibits knowledge of at least two of the following—
 - a. fuel system strainer servicing.
 - b. construction characteristics of one or more types of fuel tanks.
 - c. fuel tank maintenance procedures.
 - d. fuel line routing/installation requirements.

Changes 2 (9/24/2003) & 4 (4/18/2014)

- e. hazards associated with fuel system maintenance.
 - f. types, characteristics, and/or operation of fuel systems and/or components thereof.
 - g. characteristics, and/or operation of fuel jettison systems and/or components thereof.
2. *Demonstrates the ability to service a fuel system strainer. (Level 3)
3. Demonstrates the ability to perform at least one of the following—
- a. install a fuel quantity transmitter and/or accomplish an operational check. (Level 3)
 - b. install a fuel valve and/or accomplish an operational check. (Level 3)
 - c. install a fuel pump and/or accomplish an operational check. (Level 3)
 - d. troubleshoot a fuel system. (Level 3)
 - e. determine the airworthiness of a specified size fuel system leak/seep. (Level 2)
 - f. inspect a fuel system and/or fuel system component(s). (Level 3)
 - g. check the operation of one or more fuel system components. (Level 3)
 - h. inspect a metal fuel tank. (Level 3)
 - i. inspect a bladder fuel tank. (Level 3)
 - j. locate fuel system operating instructions. (Level 1)
 - k. locate fuel system inspection procedures. (Level 1)

Q. Aircraft Electrical Systems

*Core competency element.

References: FAA-H-8083-31, FAA-H-8083-30; AC 43.13-1B.

Objective: To determine that the applicant:

- 1. Exhibits knowledge of at least two of the following—
 - a. factors to consider when selecting wire size for an aircraft circuit.

- b. routing and/or installation of electric wire or wire bundles.
 - c. wire splicing.
 - d. use of derating factors in switch selection.
 - e. requirements for circuit protection devices.
 - f. voltage regulator—purpose and operating characteristics.
 - g. lighting and/or lighting system components.
 - h. electric motor operation and/or motor components.
 - i. constant speed drive (CSD) and/or integrated drive generator (IDG) systems and/or system components.
 - j. airframe electrical system components.
 - k. wiring defects and/or inspection.
2. *Demonstrates the ability to troubleshoot an electrical system or portion thereof, using appropriate tools and/or test equipment. (Level 3)
3. Demonstrates the ability to perform at least one of the following—
- a. select a circuit switch or circuit protection device for a specific aircraft and application. (Level 2)
 - b. install a circuit switch or circuit protection device. (Level 3)
 - c. select materials and tools and accomplish a wire splice. (Level 3)
 - d. adjust one or more voltage regulators. (Level 3)
 - e. select and install one or more wires and pins and/or sockets in a connector. (Level 3)
 - f. select materials and fabricate a bonding wire. (Level 3)
 - g. install a bonding wire and accomplish a resistance check. (Level 3)
 - h. check the operation of one or more airframe electrical system circuits and/or system components. (Level 3)
 - i. inspect and check a landing light. (Level 3)
 - j. inspect and check anti-collision and position lights. (Level 3)
 - k. inspect generator brushes and determine serviceability. (Level 3)

R. Position and Warning System

Reference: FAA-H-8083-31.

Objective: To determine that the applicant:

1. Exhibits knowledge of at least two of the following—
 - a. anti-skid system basic components.
 - b. anti-skid system operating characteristics.
 - c. takeoff warning system basic components.
 - d. takeoff warning system function and operation.
 - e. control-surface trim indicating system basic components and/or operating characteristics.
 - f. landing gear position indicators.
 - g. flap position indicators.
 - h. landing gear warning system basic components and/or operating characteristics.
 - i. checking and/or repairing a landing gear warning system.
 - j. types of stall warning/lift detector systems and/or operating characteristics.
 - k. common annunciator system indications.
 - l. mach warning system indicator(s) and/or operating characteristics.
2. N/A
3. Demonstrates the ability to perform at least one of the following—
 - a. inspect and/or adjust a landing gear position switch. (Level 3)
 - b. accomplish an operational check of a landing gear position indicating and/or warning system. (Level 3)
 - c. inspect and/or adjust a flap position indicating system. (Level 3)
 - d. check the operation of a flap position indicating and/or warning system. (Level 3)
 - e. troubleshoot a landing gear warning system. (Level 3)
 - f. check the operation of an annunciator system. (Level 3)

Changes 2 (9/24/2003) & 4 (4/18/2014)

- g. check the operation of an anti-skid warning system. (Level 3)
- h. identify landing gear position/warning system components. (Level 2)
- i. locate troubleshooting procedures for an anti-skid system. (Level 1)
- j. locate troubleshooting procedures for a landing gear warning system. (Level 1).

S. Ice and Rain Control Systems

Reference: FAA-H-8083-31.

Objective: To determine that the applicant:

- 1. Exhibits knowledge of at least two of the following—
 - a. aircraft icing causes/effects.
 - b. ice detection systems.
 - c. anti-ice and/or deice areas.
 - d. anti-ice and/or deice methods commonly used.
 - e. checking and/or troubleshooting a pitot-static anti-ice system.
 - f. anti-icing and/or de-icing system components/operation.
 - g. anti-icing and/or de-icing system maintenance.
 - h. types of rain removal systems and/or operating characteristics.
- 2. N/A
- 3. Demonstrates the ability to perform at least one of the following—
 - a. troubleshoot a pitot anti-ice system. (Level 3)
 - b. check the operation of a pitot-static anti-ice system. (Level 3)
 - c. inspect a deicer boot. (Level 3)
 - d. check deicer boot operation. (Level 3)
 - e. inspect windshield wiper blade(s) and check blade tension. (Level 3)
 - f. adjust a windshield wiper blade tension to specification. (Level 3)

Changes 2 (9/24/2003) & 4 (4/18/2014)

- g. inspect an electrically-heated windshield. (Level 3)
- h. check an electrically-heated windshield operation. (Level 3)
- i. troubleshoot a pneumatic deicer boot system. (Level 3)
- j. service or repair on a pneumatic deicer boot. (Level 3)

T. Fire Protection Systems

Reference: FAA-H-8083-31.

Objective: To determine that the applicant:

- 1. Exhibits knowledge of at least two of the following—
 - a. fire and/or smoke detection system(s) or system components.
 - b. fire extinguishing system(s) and/or system components.
 - c. fire and/or smoke detection system operating characteristics.
 - d. fire extinguishing system operating characteristics.
 - e. determining proper container pressure for an installed fire extinguisher system.
 - f. maintenance procedures for fire detection and/or extinguishing system(s) and/or system component(s).
 - g. inspecting and/or checking a fire detection/overheat system.
 - h. inspecting and/or checking a smoke and/or toxic gas detection system.
 - i. troubleshooting a fire detection and/or extinguishing system.
- 2. N/A
- 3. Demonstrates the ability to perform at least one of the following—
 - a. inspect a fire extinguisher container and determine if the pressure is within limits. (Level 3)

- b. determine the hydrostatic test date of a fire extinguisher container. (Level 2)
- c. troubleshoot a fire detection system. (Level 3)
- d. install/replace one or more smoke and/or fire detection and/or extinguishing system components. (Level 3)
- e. inspect a smoke and/or fire detection and/or extinguishing system, or system component(s). (Level 3)
- f. locate inspection procedures for carbon monoxide detectors. (Level 1)
- g. locate procedures for checking a smoke detection system. (Level 1)