U.S. Department of Transportation
Federal Aviation Administration

FAA-S-ACS-1
FAA-G-ACS-1

Airman Certification Standards

Aviation Mechanic

General, Airframe, and Powerplant

Flight Standards Service
Washington, DC 20591

Aviation Supplies & Academics, Inc.
Newcastle, Washington 98059

GENERAL AIRFRAME POWERPLANT



U.S. Department of Transportation
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AVIATION SUPPLIES & ACADEMICS, INC.
NEWCASTLE, WASHINGTON

Aviation Mechanic General, Airframe, and Powerplant Airman Certification Standards

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None of the material in this book supersedes any operational documents or procedures issued by the Federal Aviation Administration.

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Companion Guide
to the
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**Flight Standards Service
Washington, DC 20591**

Foreword

The Federal Aviation Administration (FAA) developed FAA-G-ACS-1, Companion Guide to the Aviation Mechanic General, Airframe, and Powerplant Airman Certification Standards, to be used as a companion guide to FAA-S-ACS-1, Aviation Mechanic General, Airframe, and Powerplant Airman Certification Standards (ACS).

This guide contains information that may be used in concert with the regulatory material in the ACS and assists the applicant and examiner in preparing for the knowledge, oral, and practical tests.

This guide and the ACS are available for download from www.faa.gov.

Please send comments regarding this document using the following link to the Airman Testing Branch Mailbox (afs630comments@faa.gov).

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Revision History

Document #	Description	Development Date
FAA-G-ACS-1	Companion Guide for Aviation Mechanic General, Airframe, and Powerplant Airman Certification Standards	May 2022

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Introduction

Why We Created This Guide

The FAA created this guide to provide information on non-regulatory material regarding the FAA-S-ACS-1, Aviation Mechanic General, Airframe, and Powerplant Airman Certification Standards that is relevant and useful to the community. The regulatory material is found in the ACS.

The FAA notes that the Aviation Mechanic General, Airframe, and Powerplant Airman Certification Standards will be used as the testing standard for the written, oral, and practical tests after July 31, 2023. Therefore, this guidance will be applicable after July 31, 2023. Until July 31, 2023, the FAA will use the Aviation Mechanic General, Airframe, and Powerplant Practical Test Standards as the testing standard.

How This Guide Works with the ACS

The material in this guide is for informational purposes. The guide is designed to provide the applicant for a certificate or rating with test preparatory information. The guide also provides a list of references and abbreviations/acronyms that may be used throughout the ACS for study and research.

The material in this guide is non-regulatory and may contain terms, such as should or may.

- Should indicates actions that are recommended, but not regulatory.
- May is used in a permissive sense to state authority or permission to do the act prescribed.

This guidance is not legally binding in its own right and will not be relied upon by the FAA as a separate basis for affirmative enforcement action or other administrative penalty. Conformity with the guidance is voluntary only and nonconformity will not affect rights and obligations under existing statutes and regulations.

Airman Certification Standards Concept

The goal of the airman certification process is to ensure the applicant possesses knowledge, risk management, and basic skills consistent with the privileges of the certificate or rating being exercised. The ACS concept forms a more comprehensive standard for what an applicant knows, considers, and does for the safe conduct and successful completion of each subject to be tested on the knowledge (written) test and oral and practical tests. The FAA notes that while 14 CFR parts 65 and 147 use the term “written test,” the FAA has historically used the terms “knowledge test” and “written test” in the context of airman certification testing interchangeably and continues to do so in this companion guide. Additionally, the terms “Mechanic” and “Aviation Maintenance Technician (AMT)” are used interchangeably in this document.

In fulfilling its responsibilities for the airman certification process, the FAA plans, develops, and maintains materials related to airman certification training and testing. The FAA written test measures the minimum standard of aeronautical knowledge required by Title 14 of the Code of Federal Regulations (14 CFR) part 65. Other materials, such as handbooks in the FAA-H-8083 series, provide information to applicants on aeronautical knowledge, risk management, and associated skills, including the knowledge and skill required to identify hazards and mitigate risks.

Safe operations on today’s aircraft require integration of aeronautical knowledge, risk management, and skill standards. To accomplish these goals, the FAA draws upon the expertise of organizations and individuals across the aviation and training community to develop the ACS.

The ACS defines the elements of knowledge and skill for each airman certificate or rating defined in 14 CFR part 65, subpart D.

Through the oral and practical portion of the test, the FAA evaluators assess the applicant’s application of the knowledge, risk management, and skill in the subject area. For some topics, the evaluator asks the applicant to describe or explain. For other items, the evaluator assesses the applicant’s understanding by providing a scenario that requires the applicant to appropriately apply knowledge and demonstrate skills as required for the circumstances of the given scenario.

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Note: As used in the ACS, an evaluator is any person authorized to conduct airman testing (e.g., an FAA Aviation Safety Inspector [ASI] or Designated Mechanic Examiner [DME]).

These procedures ensure that airman applicants meet a satisfactory level of competency and workmanship required for certification. Each applicant is required to demonstrate a minimum satisfactory competency level, regardless of their previous education or background, in order to obtain a certificate. All applicants for an FAA Aviation Mechanic Certificate must qualify by meeting the prescribed requirements as stated in 14 CFR part 65, section 65.77 (Experience requirements). They must additionally pass required written tests and the oral and practical tests for the certificate or rating(s) sought, in accordance with 14 CFR part 65, sections 65.75 (Knowledge requirements) and 65.79 (Skill requirements). The Aviation Mechanic General, Airframe, and Powerplant ACS is incorporated by reference into 14 CFR part 65 as the testing standard for each test after July 31, 2023. Additionally, the Aviation Mechanic General, Airframe, and Powerplant ACS is incorporated by reference into 14 CFR part 147, Aviation Maintenance Technician Schools (AMTS), as the training standard.

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Chapter 1: Overview of Mechanic Testing Process

Overview

The Administrator of the FAA has the authority to issue airman certificates to individuals when the Administrator finds that the individual is qualified for and able to perform the duties related to the certificate pursuant to 49 USC 44703. 14 CFR part 65, subpart D – Mechanics, contains the qualification regulations to obtain a mechanic certificate. All applicants for an FAA Mechanic Certificate must qualify by meeting the experience requirements of 14 CFR part 65, section 65.77. After meeting the applicable experience requirements, applicants must pass a written test, appropriate to the rating sought, which covers the subject areas contained in ACS, pursuant to 14 CFR part 65, section 65.75. After passing each section of the written test, each applicant must pass an oral test and a practical test, as appropriate to the rating sought, by demonstrating the assigned objectives for the subject areas contained in the ACS, pursuant to 14 CFR part 65, section 65.79. Through the oral and practical portion of the test, the FAA assesses the applicant's application of the knowledge, risk management, and skill in the subject area.

These procedures ensure that airman applicants meet a satisfactory level of competency and workmanship required for certification. Each applicant is required to demonstrate a minimum satisfactory competency level, designated in the applicable section of the ACS, regardless of their previous education or background.

Evaluators must adhere to the applicable regulations and will follow applicable guidance when evaluating an applicant's test performance for an FAA Mechanic Certificate. This includes:

- 14 CFR part 65;
- FAA Order 8000.95 Designee Management Policy (applicable sections as revised);
- FAA Order 8900.2, General Aviation Airman Designee Handbook applicable sections (as revised);
- FAA Order 8900.1, Flight Standards Information Management System (FSIMS) (as revised); and
- FAA-S-ACS-1, Aviation Mechanic General, Airframe, and Powerplant Airman Certification Standards.

Mechanic Certificate Eligibility Requirements

To be eligible to be issued a mechanic certificate and rating(s), pursuant to 14 CFR part 65, section 65.71, an applicant must:

- Be at least 18 years of age;
- Be able to read, write, speak, and understand the English language (or in the case of an applicant who does not meet this requirement and who is employed outside of the U.S. by a U.S. air carrier, have the certificate endorsed "valid only outside the United States");
- Meet the applicable experience requirements of 14 CFR part 65, section 65.77 (i.e., the applicant must present to the FAA either an authenticated document from a certificated aviation maintenance technician school in accordance with14 CFR part 147, section 147.21, or documentary evidence, satisfactory to the Administrator, of the prescribed amount of practical experience);
- Pass a written test, appropriate to the rating sought, in accordance with14 CFR part 65, section 65.75;
- Pass an oral test and a practical test, as appropriate to the rating sought, in accordance with14 CFR part 65, section 65.79; and
- Comply with the applicable sections of 14 CFR part 65, subpart D.

Pursuant to 14 CFR part 65, section 65.75(b), the applicant must pass the applicable written tests before applying for the oral and practical tests, unless the applicant is a student of a 14 CFR part 147 Aviation Maintenance Technician School (AMTS) and has been approved by the FAA to test under 14 CFR part 65, section 65.80.

In accordance with 14 CFR part 65, section 65.71(a)(3), the applicant must have passed all of the prescribed tests (i.e., written, oral, and practical) for the rating sought, within a period of 24 months.

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Applicants who otherwise cannot meet certification requirements may submit a petition for exemption from the applicable regulation in accordance with 14 CFR part 11. FAA field offices do not issue exemptions. A grant of exemption is not guaranteed.

Testing under 14 CFR part 65, section 65.80

14 CFR part 65, section 65.80 permits an applicant who is a student of an AMTS to take the oral and practical tests prior to the written tests if an AMTS shows to an FAA inspector that the applicant has made satisfactory progress at the school and is prepared to take the oral and practical tests.

Authorization for AMTS Students to Take General Written Test Early (14 CFR part 65, section 65.75(c))

Pursuant to 14 CFR part 65, section 65.75(c), applicants who are students of an AMTS may take the mechanic general written test prior to meeting the applicable experience requirements of 14 CFR part 65, section 65.77 provided the applicant presents an authenticated document from an AMTS that demonstrates satisfactory completion of the general portion of the school's curriculum and specifies the completion date.

Note: While an AMTS is required to provide an authenticated document to each graduating student, which can be utilized to meet the experience requirements of 14 CFR part 65, section 65.77, an AMTS is not required to provide authenticated documentation that demonstrates satisfactory completion of the general portion of the school's curriculum. The FAA notes that if the AMTS does not issue such a document, then the student will not be eligible to take the general written test early.

Aviation English Language Standard

In accordance with the requirements of 14 CFR part 65, section 65.71, and the FAA Aviation English Language Proficiency Standard, the applicant must demonstrate the ability to read, write, speak, and understand the English language throughout the application and testing process. English language proficiency is required. Normal restatement of questions as would be done for a native English speaker is permitted and does not constitute grounds for disqualification. Additional information may be found in Advisory Circular 60-28, FAA English Language Standard for an FAA Certificate Issued Under 14 CFR Part 61, 63, 65, and 107, as revised.

Applicant Misconduct During Written Testing

To avoid test compromise, airman knowledge testing centers follow strict security procedures established by the FAA. The FAA has directed testing centers to terminate a test anytime a proctor suspects a cheating incident has occurred.

No person who commits a prohibited act is eligible for any airman certificate or added rating for a period of 1 year after the date of that act, pursuant to 14 CFR part 65, section 65.18. In addition, the commission of that act is a basis for suspending or revoking any airman certificate or rating held by that person.

Requests for Special Accommodations

Applicants may request a special accommodation for their written test through the testing center test registration and scheduling process. The process allows the applicant to select the specific accommodation that meets the specific need in accordance with the Americans with Disabilities Act of 1990 (ADA). Requests for special accommodations are asked to include:

- a copy of medical documentation, including the diagnosing physician's name and contact information, verifying the applicant has condition requiring a special accommodation; and
- the requested method of test administration.

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Passing Grade

Pursuant to 14 CFR part 65, section 65.17, the minimum passing grade for each test is 70 percent.

Retests

An applicant for a written, oral, or practical test for a certificate or rating, or for an additional rating under 14 CFR part 65, may apply for retesting in accordance with 14 CFR part 65, section 65.19.

Retests do not require a 30-day waiting period if the applicant presents a signed statement from an airman holding the certificate and rating(s) sought by the applicant certifying that the airman has given the applicant additional instruction in each of the subjects failed and that the airman considers the applicant ready for retesting.

After a 30-day waiting period for retesting, a signed statement of additional training is not required.

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FAA-S-ACS-1

Aviation Mechanic General, Airframe, and Powerplant

Airman Certification Standards

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November 1, 2021

The Administrator of the Federal Aviation Administration signed the interim final rule "Part 147, Aviation Maintenance Technician Schools" on March 9, 2022. The interim final rule incorporates this version of the Aviation Mechanic General, Airframe, and Powerplant Airman Certification Standards (FAA-S-ACS-1) by reference. For identification and document-control purposes, this ACS is dated November 1, 2021. However, this ACS is not enforceable until the effective date of the interim final rule. Upon publication, the interim final rule can be found on the Federal Register's website, www.federalregister.gov, and will direct the effective date of compliance with this ACS.

**Flight Standards Service
Washington, DC 20591**

Foreword

The U.S. Department of Transportation (DOT), Federal Aviation Administration (FAA), Office of Safety Standards, Regulatory Support Division, Airman Testing Standards Branch has published the Aviation Mechanic General, Airframe, and Powerplant Airman Certification Standards (ACS) to communicate the aeronautical knowledge, risk management, and proficiency standards for the Mechanic Certificate.

This ACS is available for download from www.faa.gov. Please send comments regarding this document using the following link to the Airman Testing Branch Mailbox (afs630@faa.gov).

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Revision History

Document	Description	Revision Date
FAA-S-ACS-1	Aviation Mechanic - General, Airframe, and Powerplant Airman Certification Standards	11/01/2021

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I. General

Subject A. Fundamentals of Electricity and Electronics

References	*AC 43.13-1; FAA-H-8083-30*
Objective	*The following knowledge, risk management, and skill elements are required for basic electricity and electronics.*
Knowledge	*The applicant demonstrates understanding of:*
AM.I.A.K1	Electron theory (conventional flow vs. electron flow).
AM.I.A.K2	Magnetism.
AM.I.A.K3	Capacitance in a circuit.
AM.I.A.K4	Inductance in a circuit.
AM.I.A.K5	Alternating current (AC) electrical circuits.
AM.I.A.K6	Direct current (DC) electrical circuits.
AM.I.A.K7	Electrical laws and theory.
AM.I.A.K7a	a. Ohm's Law
AM.I.A.K7b	b. Kirchhoff's Laws
AM.I.A.K7c	c. Watt's Law
AM.I.A.K7d	d. Faraday's Law
AM.I.A.K7e	e. Lenz's Law
AM.I.A.K7f	f. Right-hand motor rule
AM.I.A.K8	Electrical measurement tools, principles, and procedures.
AM.I.A.K9	Voltage.
AM.I.A.K9a	a. Regulation
AM.I.A.K10	Current.
AM.I.A.K11	Resistance.
AM.I.A.K11a	a. Impedance
AM.I.A.K11b	b. Resistance in series
AM.I.A.K11c	c. Resistance in parallel
AM.I.A.K11d	d. Total resistance
AM.I.A.K12	Power.
AM.I.A.K13	Series circuits.
AM.I.A.K14	Parallel circuits.
AM.I.A.K15	Aircraft batteries.
AM.I.A.K16	Transformers.
AM.I.A.K17	Circuit continuity.
AM.I.A.K18	Controlling devices, including switches and relays.
AM.I.A.K19	Protective devices, including fuses, circuit breakers, and current limiters.
AM.I.A.K20	Resistor types and color coding.
AM.I.A.K21	Semiconductors, including diodes, transistors, and integrated circuits.
AM.I.A.K22	Digital logic, including RAM, ROM, NVRAM, logic gates, inverter, rectifier, and flip flop.
AM.I.A.K23	Binary numbers.

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AM.I.A.K24	Electrostatic discharge.
AM.I.A.K25	Electrical circuit drawings.
AM.I.A.K26	Complex/combined circuits.
AM.I.A.K27	AC and DC motors.
Risk Management	*The applicant demonstrates the ability to identify, assess, and mitigate risks associated with:*
AM.I.A.R1	Taking voltage, current, resistance, and capacitance measurements.
AM.I.A.R2	Handling, storage, and inspection of different types of batteries (i.e., lead acid, NiCad, lithium ion, gel cell).
AM.I.A.R3	High-voltage circuits (e.g., strobe lighting).
AM.I.A.R4	Working around batteries.
Skills	*The applicant demonstrates the ability to:*
AM.I.A.S1	Perform circuit continuity test.
AM.I.A.S2	Measure voltage.
AM.I.A.S3	Measure current.
AM.I.A.S4	Measure resistance.
AM.I.A.S5	Test a switch or relay.
AM.I.A.S6	Test a fuse or circuit breaker.
AM.I.A.S7	Read and interpret aircraft electrical circuit diagrams, and symbols, including solid state devices and logic functions.
AM.I.A.S8	Troubleshoot a circuit.
AM.I.A.S9	Identify symbols used in electrical and electronic schematic diagrams (e.g., grounds, shields, resistors, capacitors, fuses, circuit breakers, batteries, diodes, transistors, and integrated circuits).
AM.I.A.S10	Demonstrate how to test for short-circuit and open-circuit conditions.
AM.I.A.S11	Measure voltage drop across a resistor.
AM.I.A.S12	Determine or measure for open electrical circuits.
AM.I.A.S13	Inspect an aircraft battery.
AM.I.A.S14	Service an aircraft battery.

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I. General	Subject B. Aircraft Drawings
References	*AC 43.13-1; FAA-H-8083-30*
Objective	*The following knowledge, risk management, and skill elements are required for aircraft drawings.*
Knowledge	*The applicant demonstrates understanding of:*
AM.I.B.K1	Drawings, blueprints, sketches, charts, graphs, and system schematics, including commonly used lines, symbols, and terminology.
AM.I.B.K2	Repair or alteration of an aircraft system or component(s) using drawings, blueprints, or system schematics to determine whether it conforms to its type design.
AM.I.B.K3	Inspection of an aircraft system or component(s) using drawings, blueprints, or system schematics.
AM.I.B.K4	Terms used in conjunction with aircraft drawings, blueprints, or system schematics.
Risk Management	*The applicant demonstrates the ability to identify, assess, and mitigate risks associated with:*
AM.I.B.R1	Interpretation of plus or minus tolerances as depicted on aircraft drawings.
AM.I.B.R2	Specifications for design of alterations and repairs.
AM.I.B.R3	Applicability of the drawing or schematic to the particular aircraft by model and serial number.
AM.I.B.R4	Identification of the current version and applicability of drawing being used.
Skills	*The applicant demonstrates the ability to:*
AM.I.B.S1	Draw a sketch of a repair or alteration.
AM.I.B.S2	Identify the meaning of lines and symbols used in an aircraft drawing.
AM.I.B.S3	Interpret dimensions used in an aircraft drawing.
AM.I.B.S4	Identify changes on an aircraft drawing.
AM.I.B.S5	Determine material requirements from an aircraft drawing.
AM.I.B.S6	Interpret graphs and charts.

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This Federal Aviation Administration (FAA) Aviation Mechanic – General, Airframe, and Powerplant Airman Certification Standards (ACS) document provides the knowledge, risk management, and skill standards required to earn an FAA airman certificate. This ACS also includes the ACS Companion Guide (FAA-G-ACS-1) as well as FAA references for each subject.

The ACS is the guide for students, instructors, and evaluators to understand what applicants must know, do, and consider to pass their FAA Knowledge Exams and Oral & Practical (O&P) Test and earn their Aviation Mechanic Certificate.

Materials for aviation mechanics to prepare for FAA certification:



FAA Airman Certification Standards available from ASA:

- **Private Pilot** Airplane
- **Instrument Rating** Airplane
- **Commercial Pilot** Airplane
- **Airline Transport Pilot** Airplane
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