

# 2025 Aircraft Maintenance

## Program Standards

### CONTENT STANDARD 1.0: PROFESSIONAL ORGANIZATIONS AND LEADERSHIP

Performance Standard 1.1: Student Leadership in Career Technical Student Organizations (CTSO) and Professional Associations

- 1.1.1 Explore the role of professional organizations and/or associations in the Aircraft Maintenance industry.
- 1.1.2 Define the value, role, and opportunities provided through career technical student organizations.
- 1.1.3 Engage in career exploration and leadership development.

### CONTENT STANDARD 2.0: GENERAL

Performance Standard 2.1: Fundamentals of Electricity and Electronics

- 2.1.1 Perform circuit continuity test.
- 2.1.2 Measure voltage in a circuit.
- 2.1.3 Measure current in a circuit.
- 2.1.4 Measure resistance in a circuit.
- 2.1.5 Test a switch or relay.
- 2.1.6 Test a fuse or circuit breaker.
- 2.1.7 Interpret aircraft electrical circuit diagrams and symbols (e.g., grounds, shields, resistors, capacitors, fuses, circuit breakers, batteries, diodes, transistors, integrated circuits), including those for solid state devices and logic functions.
- 2.1.8 Troubleshoot a circuit (i.e., test for short-circuit and open-circuit conditions).
- 2.1.9 Measure voltage drop across a resistor.

Performance Standard 2.2: Aircraft Drawings

- 2.2.1 Draw a sketch of a repair or alteration.
- 2.2.2 Identify the meaning of lines and symbols used in an aircraft drawing.
- 2.2.3 Interpret dimensions used in an aircraft drawing.
- 2.2.4 Identify changes made to an aircraft drawing.
- 2.2.5 Determine material requirements from an aircraft drawing.
- 2.2.6 Interpret graphs and charts used in aircraft drawings.

Performance Standard 2.3: Weight and Balance

- 2.3.1 Describe the purpose of weighing an aircraft.
- 2.3.2 Describe proper ballast placement.
- 2.3.3 Describe the procedures for weighing an aircraft.
- 2.3.4 Calculate ballast weight shift and required weight location.
- 2.3.5 Check aircraft weighing scales for calibration.
- 2.3.6 Calculate weight and balance for an aircraft after an equipment change.
- 2.3.7 Compute forward and aft loaded Center of Gravity (CG) limit.
- 2.3.8 Create a maintenance record for a weight and balance change.
- 2.3.9 Compute the empty weight and empty weight CG of an aircraft.
- 2.3.10 Calculate the moment of an item of equipment.
- 2.3.11 Identify tare items.
- 2.3.12 Locate weight and balance information, datum, placarding, and limitation requirements for an aircraft.
- 2.3.13 Revise an aircraft equipment list after equipment change.
- 2.3.14 Calculate the change needed to correct an out-of-balance condition.

2.3.15 Determine an aircraft's CG range, using aircraft specifications, Type Certificate Data Sheets (TCDSs), and aircraft listings.

2.3.16 Calculate a weight change and complete required records.

#### Performance Standard 2.4: Fluid Lines and Fittings

2.4.1 Fabricate a rigid line with a flare and a bend.

2.4.2 Describe installation of an aircraft rigid line.

2.4.3 Describe installation of an aircraft flexible hose.

2.4.4 Fabricate a flexible hose.

2.4.5 Fabricate a flareless-fitting-tube connection.

#### Performance Standard 2.5: Aircraft Materials, Hardware, and Processes

2.5.1 Install safety wire on nuts, bolts, and turnbuckles.

2.5.2 Inspect and check welds.

2.5.3 Determine required aircraft bolts needed for a repair or installation.

2.5.4 Determine alloys used in structural repair (e.g., heat-treated and non-heat-treated aluminum, steel).

2.5.5 Identify rivets by physical characteristics.

2.5.6 Check for proper calibration of a micrometer.

#### Performance Standard 2.6: Ground Operations and Servicing

2.6.1 Describe how to prepare an aircraft for towing.

2.6.2 Move an aircraft, using hand signals.

2.6.3 Describe inspection procedures for an aircraft fuel system for water and foreign object debris (FOD) contamination.

2.6.4 Identify different grades of aviation fuel (e.g., car gas, lower-lead fuel, jet fuel).

2.6.5 Describe procedure for selecting fuels and fueling an aircraft.

2.6.6 Summarize the steps to start up or shut down an aircraft reciprocating and turbine engine.

2.6.7 Describe the procedures for extinguishing fires in an engine induction system.

#### Performance Standard 2.7: Cleaning and Corrosion Control

2.7.1 Describe procedures for conducting corrosion inspection.

2.7.2 Determine corrosion prevention method and cleaning materials, based on corrosion.

2.7.3 Apply corrosion prevention/coating materials.

2.7.4 Inspect defects in finishes from a part.

2.7.5 Identify areas in which aircraft are likely to corrode.

2.7.6 Identify procedures to clean and protect plastics.

2.7.7 Determine location and size requirements for aircraft registration numbers.

2.7.8 Describe procedures for preparing composite and metal surfaces for painting (e.g., 10, 11, 12, 13).

2.7.9 Describe finishing materials and appropriate thinners.

2.7.10 Identify types of protective finishes (e.g., urethane, enamel, primer).

#### Performance Standard 2.8: Mathematics

2.8.1 Compute the volume of a cylinder.

2.8.2 Compute the area of a proposed structural repair.

2.8.3 Calculate the volume of a shape, such as a baggage compartment or fuel tank.

2.8.4 Convert between fractional and decimal numbers.

2.8.5 Compare two numerical values using ratios proportions.

2.8.6 Compute the torque value when converting from inch-pounds to foot-pounds and from foot-pounds to inch-pounds.

#### Performance Standard 2.9: Regulations, Maintenance Forms, Records, and Publications

2.9.1 Describe privileges and limitations of a mechanic certificate.

2.9.2 Describe the process for recording an entry for approval for return to service after maintenance and alterations.

- 2.9.3 Describe the process for recording entry for approval for return to service after inspection.
- 2.9.4 Identify agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (ACs), and airworthiness directives (ADs).
- 2.9.5 Identify manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists.
- 2.9.6 Identify Federal Aviation Administration (FAA) databases and resources available, including TCDSs and supplemental type certificates.
- 2.9.7 Describe compliance requirements for manufacturer-specified maintenance and inspection intervals.
- 2.9.8 Identify and define alert, caution, and warning indications, and notes that are used in maintenance and operating manuals.
- 2.9.9 Describe methods used to establish the serial number effectivity of an item (i.e., suitability of parts for repairs).
- 2.9.10 Complete an FAA Form 337 for a major repair or alteration.
- 2.9.11 Interpret an FAA Form 337 for accuracy.
- 2.9.12 Determine an aircraft's inspection status by reviewing the aircraft's maintenance records.
- 2.9.13 Complete an aircraft maintenance record entry for the compliance of a reoccurring AD for a specific airframe, aircraft engine, appliance, or propeller.
- 2.9.14 Locate applicable FAA aircraft specifications and FAA TCDS for an aircraft or component.
- 2.9.15 Complete an aircraft maintenance record entry for return to service.
- 2.9.16 Determine applicability of an AD.
- 2.9.17 Check a Technical Standard Order (TSO) or part manufacturing authorization for the proper markings.
- 2.9.18 Locate a specific part number and applicability, using a manufacturer's illustrated parts catalog.
- 2.9.19 Locate supplemental type certificates applicable to a specific aircraft.
- 2.9.20 Determine approved replacement parts for installation on a given aircraft.
- 2.9.21 Determine maximum allowable weight of a specific aircraft.
- 2.9.22 Complete a 100-hour inspection aircraft maintenance record entry.

#### Performance Standard 2.10: Physics for Aviation

- 2.10.1 Describe the areas of physics that should be foundational to aircraft repair technicians (e.g., heat and pressure; Bernoulli's principle; Newton's law of motion; gas law and fluid mechanics; theory of flight [aerodynamics]; standard atmosphere and factors affecting atmospheric conditions; primary and secondary aircraft flight controls; additional aerodynamic devices including vortex generators, wing fences, and stall strips; relationship between temperature, density, weight, and volume; force, area, or pressure).
- 2.10.2 Convert temperature units (e.g., Celsius to Fahrenheit, metric to standard).
- 2.10.3 Determine density altitude.
- 2.10.4 Determine pressure altitude.
- 2.10.5 Calculate force, area, or pressure in a specific application.
- 2.10.6 Describe mechanical advantage of various types of levers.
- 2.10.7 Describe mechanical advantages and applications.
- 2.10.8 Identify changes in pressure and velocity as fluid passes through a venturi.

#### Performance Standard 2.11: Inspection Concepts and Techniques

- 2.11.1 Identify aircraft inspection programs (e.g., progressive, 100-hour, annual).
- 2.11.2 Inspect equipment and repairs, using precision measuring instruments (e.g., micrometers, calipers, gauges).
- 2.11.3 Calibrate precision measuring equipment.
- 2.11.4 Select inspection techniques appropriate to repairs and maintenance.

#### Performance Standard 2.12: Human Factors

- 2.12.1 Describe safety culture and organizational factors affecting safety.
- 2.12.2 Describe human error factors.
- 2.12.3 Investigate historic events of aircraft accidents (e.g., dirty dozen, magnificent seven).
- 2.12.4 Locate information regarding human factor errors.

### **CONTENT STANDARD 3.0: AIRFRAME**

#### **Performance Standard 3.1: Repairs**

- 3.1.1 Describe basic procedures for airframe repairs for metallic structures, based on FAA standards for acceptable practices and techniques.
- 3.1.2 Describe basic procedures for airframe repairs for non-metallic structures, based on FAA standards for acceptable practices and techniques.
- 3.1.3 Describe basic procedures for airframe repairs for flight controls, based on FAA standards for acceptable practices and techniques.
- 3.1.4 Describe basic procedures for airframe repairs for aircraft instrument systems, based on FAA standards for acceptable practices and techniques.
- 3.1.5 Describe basic procedures for airframe repairs for aircraft fuel systems, based on FAA standards for acceptable practices and techniques.
- 3.1.6 Describe basic procedures for airframe repairs for aircraft electrical systems, based on FAA standards for acceptable practices and techniques.
- 3.1.7 Describe basic procedures for airframe repairs for rotocraft fundamentals, based on FAA standards for acceptable practices and techniques.

### **CONTENT STANDARD 4.0: POWERPLANT**

#### **Performance Standard 4.1: Engines, Fuel, Induction, Cooling, Exhaust, and Propellers**

- 4.1.1 Describe reciprocating engine theory, components, and controls, according to FAA standards.
- 4.1.2 Describe turbine engine theory, types, components, and common repairs, according to FAA standards.
- 4.1.3 Describe a 100-hour inspection of an engine in accordance with part 43, FAA standards.
- 4.1.4 Describe engine instrument systems and operational parameters (e.g., temperatures, pressures), according to FAA standards.
- 4.1.5 Identify fire detection sensing units and the schematics of a fire extinguisher discharge circuit, according to FAA standards.
- 4.1.6 Describe the components of engine electrical wiring, switches, and protective devices and related troubleshooting procedures, according to FAA standards.
- 4.1.7 Describe engine lubrication system oil types, components, common engine oil pressure malfunctions and indications, and replacement procedures, according to FAA standards.
- 4.1.8 Describe procedures for troubleshooting and repairing a starting and ignition system, according to FAA standards.
- 4.1.9 Describe engine fuel systems and fuel metering systems operation, components, and common repairs, according to FAA standards.
- 4.1.10 Describe reciprocating engine induction and cooling systems operation, components, and common repairs, according to FAA standards.
- 4.1.11 Describe steps in a turbine engine induction and cooling system inspection, according to FAA standards.
- 4.1.12 Describe engine exhaust and reverser system types and components, according to FAA standards.
- 4.1.13 Describe procedures to install, repair, and inspect propellers, according to FAA standards.