

# AVIATION MAINTENANCE TECHNOLOGY



## PURPOSE

To evaluate each contestant's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of aviation maintenance technology.

First, refer to General Regulations, Page 9.

## CLOTHING REQUIREMENT

Official light blue work shirt and navy pants, black or brown leather work shoes, and safety glasses with side shields or goggles. (Prescription glasses can be used only if they are equipped with side shields. If not, they must be covered with goggles.)

These regulations refer to clothing items that are pictured and described at: [www.skillsusastore.org](http://www.skillsusastore.org). If you have questions about clothing or other logo items, call 800-401-1560 or 703-956-3723.

**Note:** Contestants must wear their official contest clothing to the contest orientation meeting.

## ELIGIBILITY

Open to active SkillsUSA members enrolled in programs with aviation maintenance technology as the occupational objective.

## EQUIPMENT AND MATERIALS

1. Supplied by the technical committee:
  - a. All necessary tools and equipment for the contest
  - b. All necessary information and furnishings for judges and technical committees
2. Supplied by the contestant:
  - a. Calculator (nonprogrammable)
  - b. All competitors must create a one-page résumé using a word processor and submit the résumé electronically at: [www.skillsusa.org/compete/](http://www.skillsusa.org/compete/)

[updates.shtml](#). Check the Web site for further instructions.

- c. Ear plugs
- d. Safety glasses

## SCOPE OF THE CONTEST

The contest will be consistent with the airframe and powerplant mechanics certification guide published by the Department of Transportation Federal Aviation Administration Advisory Circular EA-AC 65-2D [Amdt. 147-2, 35 FR 5535, April 3, 1970, as amended by Amdt. 147-5, 57 FR 28960, June 29, 1992] and Sec. 6(c), Dept. of Transportation Act; 49 U.S.C. 1655(c) [Amdt. 147-2, 35 FR 5535, April 3, 1970, as amended by Amdt. 147-5, 57 FR 28961, June 29, 1992].

The high school contest will cover the competencies classified as general aviation by the FAA.

The college/postsecondary contest will cover those competencies classified as power plant and airframe by the FAA.

## Knowledge Performance

The contest will include a written knowledge test assessing general knowledge of aviation maintenance technology. Definitions, knowledge, processes and procedures relevant to aviation maintenance technology will be assessed.

## Skill Performance

The contest will include a series of operations. A total of eight to 15 operations will be assigned; each operation must be broken down into specific criteria and points assigned based on the difficulty of the task.

## Contest Guidelines

1. Tasks assigned to a contestant will not have a set time limit or sequence.
2. The following shop safety rules will be followed:
  - a. Safety glasses must be used
  - b. No loose clothing is permitted
  - c. Long hair must be tied behind the head and netted or worn under a cap
  - d. No jewelry will be allowed

## **Standards and Competencies (High School Contest)**

### **AMT 1.0 — Apply knowledge of basic aviation electricity to FAA general aviation competencies**

- 1.1 Calculate and measure capacitance and inductance
- 1.2 Calculate and measure electrical power
- 1.3 Measure voltage, current, resistance and continuity
- 1.4 Determine the relationship of voltage, current and resistance in electrical circuits
- 1.5 Read and interpret aircraft electrical circuit diagrams including solid state devices and logic functions
- 1.6 Inspect and service batteries

### **AMT 2.0 — Interpret aircraft drawings to FAA general aviation competencies**

- 2.1 Use aircraft drawings, symbols and system schematics
- 2.2 Draw sketches of repairs and alterations
- 2.3 Use blueprint information
- 2.4 Use graphs and charts

### **AMT 3.0 — Utilize weight and balance knowledge to FAA general aviation competencies**

- 3.1 Weigh aircraft
- 3.2 Perform complete weight-and-balance check and record data

### **AMT 4.0 — Demonstrate the ability to install fluid lines/fittings to FAA general aviation competencies**

- 4.1 Fabricate and install rigid and flexible fluid lines and fittings

### **AMT 5.0 — Demonstrate a knowledge of materials and processes to FAA general aviation competencies**

- 5.1 Identify and select appropriate nondestructive testing methods
- 5.2 Perform dye penetrant, eddy current, ultrasonic and magnetic particle inspections
- 5.3 Perform basic heat-treating processes
- 5.4 Identify and select aircraft hardware and materials
- 5.5 Inspect and check welds
- 5.6 Perform precision measurements

### **AMT 6.0 — Demonstrate knowledge of ground operation and servicing to FAA general aviation competencies**

- 6.1 Start, ground operate, move, service and secure aircraft and identify typical ground operation hazards
- 6.2 Identify and select fuels

### **AMT 7.0 — Demonstrate knowledge of cleaning and corrosion control to FAA general aviation competencies**

- 7.1 Identify and select cleaning materials
- 7.2 Inspect, identify, remove and treat aircraft corrosion and perform aircraft cleaning

### **AMT 8.0 — Demonstrate knowledge of mathematics to FAA general aviation competencies**

- 8.1 Extract roots and raise numbers to a given power
- 8.2 Determine areas and volumes of various geometrical shapes
- 8.3 Solve ratio, proportion and percentage problem
- 8.4 Perform algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers

### **AMT 9.0 — Utilize maintenance forms and records to FAA general aviation competencies**

- 9.1 Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records
- 9.2 Complete required maintenance forms, records and inspection reports

### **AMT 10.0 — Recall knowledge of basic physics to FAA general aviation competencies**

- 10.1 Use and understand the principles of simple machines; sound, fluid and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight

### **AMT 11.0 — Utilize maintenance publications to FAA general aviation competencies**

- 11.1 Demonstrate ability to read, comprehend and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications and related federal guidelines

- 11.2 Utilize aviation regulations, airworthiness directives, and advisory material
- 11.3 Read technical data

**AMT 12.0 — Explain mechanic privileges and limitations to FAA general aviation competencies**

- 12.1 Exercise mechanic privileges within the limitations prescribed by part 65 of this chapter

**AMT 13.0 — Demonstrate Knowledge of job-related safety requirements to FAA general aviation competencies**

- 13.1 Demonstrate proper application of job site and shop rules and regulations (OSHA)
- 13.2 Demonstrate correct selection and use of electrical and hand tools
- 13.3 Demonstrate proper techniques and practices for working on and around live equipment

**Standards and Competencies: Airframe Structures, Systems and Components (College/Postsecondary Contest)**

**AMT 1.0 — Maintain wood structures to FAA power plant and airframe competencies**

- 1.1 Service and repair wood structures
- 1.2 Identify wood defects
- 1.3 Inspect wood structures

**AMT 2.0 — Maintain aircraft covering to FAA power plant and airframe competencies**

- 2.1 Select and apply fabric and fiberglass covering materials
- 2.2 Inspect, test and repair fabric and fiberglass

**AMT 3.0 — Maintain aircraft finishes to FAA power plant and airframe competencies**

- 3.1 Apply trim, letters and touchup paint
- 3.2 Identify and select aircraft finishing materials
- 3.3 Apply finishing materials
- 3.4 Inspect finishes and identify defects

**AMT 4.0 — Maintain sheet metal and nonmetallic structures to FAA power plant and airframe competencies**

- 4.1 Select, install and remove special fasteners for metallic, bonded and composite structures

- 4.2 Inspect bonded structures
- 4.3 Inspect, test and repair fiberglass, plastics, honeycomb, composite and laminated primary and secondary structures
- 4.4 Inspect, check, service and repair windows, doors and interior furnishings
- 4.5 Inspect and repair sheet-metal structures
- 4.6 Install conventional rivets
- 4.7 Form, lay out and bend sheet metal

**AMT 5.0 — Demonstrate ability in aviation welding to FAA power plant and airframe competencies**

- 5.1 Weld magnesium and titanium
- 5.2 Solder stainless steel
- 5.3 Fabricate tubular structures
- 5.4 Solder, braze, gas-weld and arc-weld steel
- 5.5 Weld aluminum and stainless steel

**AMT 6.0 — Demonstrate knowledge of assembly and rigging to FAA power plant and airframe competencies**

- 6.1 Rig rotary-wing aircraft
- 6.2 Rig fixed-wing aircraft
- 6.3 Check alignment of structures
- 6.4 Assemble aircraft components, including flight control surfaces
- 6.5 Balance, rig and inspect movable primary and secondary flight control surfaces
- 6.6 Jack aircraft

**AMT 7.0 — Apply knowledge of airframe inspection to FAA power plant and airframe competencies**

- 7.1 Perform airframe conformity and airworthiness inspections

**AMT 8.0 — Apply knowledge of aircraft landing gear systems to FAA power plant and airframe competencies**

- 8.1 Inspect, check, service and repair landing gear, retraction systems, shock struts, brakes, wheels, tires and steering systems

**AMT 9.0 — Apply knowledge of hydraulic and pneumatic power systems to FAA power plant and airframe competencies**

- 9.1 Repair hydraulic and pneumatic power systems components
- 9.2 Identify and select hydraulic fluids
- 9.3 Inspect, check, service, troubleshoot and repair hydraulic and pneumatic power systems

**AMT 10.0 — Ability to apply knowledge of cabin atmosphere control systems to FAA power plant and airframe competencies**

- 10.1 Inspect, check, troubleshoot, service and repair heating, cooling, air conditioning and pressurization systems and air cycle machines
- 10.2 Inspect, check, troubleshoot, service and repair heating, cooling, air conditioning and pressurization systems
- 10.3 Inspect, check, troubleshoot, service and repair oxygen systems

**AMT 11.0 — Apply knowledge of aircraft instrument systems to FAA power plant and airframe competencies**

- 11.1 Inspect, check, service, troubleshoot and repair electronic flight instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure and position indicating systems to include the use of built-in test equipment
- 11.2 Install instruments and perform a static pressure system leak test

**AMT 12.0 — Apply knowledge of communication and navigation systems to FAA power plant and airframe competencies**

- 12.1 Inspect, check and troubleshoot autopilot, service and approach coupling systems
- 12.2 Inspect, check and service aircraft electronic communication and navigation systems, including VHF passenger address interphones and static discharge devices, aircraft VOR, ILS, LORAN, radar beacon transponders, flight management computers, and GPWS
- 12.3 Inspect and repair antenna and electronic equipment installations

**AMT 13.0 — Apply knowledge of aircraft fuel systems to FAA power plant and airframe competencies**

- 13.1 Check and service fuel dump systems
- 13.2 Perform fuel management transfer and defueling
- 13.3 Inspect, check and repair pressure fueling systems
- 13.4 Repair aircraft fuel system components
- 13.5 Inspect and repair fluid quantity indicating systems
- 13.6 Troubleshoot, service and repair fluid pressure and temperature warning systems

- 13.7 Inspect, check, service, troubleshoot and repair aircraft fuel systems

**AMT 14.0 — Apply knowledge of aircraft electrical systems to FAA power plant and airframe competencies**

- 14.1 Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications; and repair pins and sockets of aircraft connectors
- 14.2 Install, check and service airframe electrical wiring, controls, switches, indicators and protective devices
- 14.3 Inspect, check, troubleshoot, service and repair alternating and direct current electrical systems
- 14.4 Inspect, check and troubleshoot constant speed and integrated speed drive generators

**AMT 15.0 — Apply knowledge of position and warning systems to FAA power plant and airframe competencies**

- 15.1 Inspect, check and service speed and configuration warning systems, electrical brake controls and anti-skid systems
- 15.2 Inspect, check, troubleshoot and service landing gear position indicating and warning systems

**AMT 16.0 — Apply knowledge of ice and rain control systems to FAA power plant and airframe competencies**

- 16.1 Inspect, check, troubleshoot, service and repair airframe ice and rain control systems

**AMT 17.0 — Apply knowledge of fire protection systems to FAA power plant and airframe competencies**

- 17.1 Inspect, check and service smoke and carbon monoxide detection systems
- 17.2 Inspect, check, service, troubleshoot and repair aircraft fire detection and extinguishing systems

**AMT 18.0 — Demonstrate knowledge of job-related safety requirements to FAA power plant and airframe competencies**

- 18.1 Demonstrate proper application of job site and shop rules and regulations (OSHA)
- 18.2 Demonstrate correct selection and use of electrical and hand tools

- 18.3 Demonstrate proper techniques and practices for working on and around live equipment

### **Standards and Competencies: Power Plant Theory, Maintenance, Systems and Components (College/Postsecondary Contest)**

#### **AMT 1.0 — Apply knowledge of reciprocating engines to FAA power plant and airframe competencies**

- 1.1 Inspect and repair a radial engine
- 1.2 Overhaul reciprocating engine
- 1.3 Inspect, check, service and repair reciprocating engines and engine installations
- 1.4 Install, troubleshoot and remove reciprocating engines

#### **AMT 2.0 — Apply knowledge of turbine engines to FAA power plant and airframe competencies**

- 2.1 Overhaul turbine engine
- 2.2 Inspect, check, service and repair turbine engines and turbine engine installations
- 2.3 Install, troubleshoot and remove turbine engines

#### **AMT 3.0 — Apply knowledge of engine inspection to FAA power plant and airframe competencies**

- 3.1 Perform power plant conformity and air worthiness inspections

#### **AMT 4.0 — Demonstrate knowledge of engine instrument systems to FAA power plant and airframe competencies**

- 4.1 Troubleshoot, service and repair electrical and mechanical fluid rate-of-flow indicating systems
- 4.2 Inspect, check, service, troubleshoot and repair electrical and mechanical engine temperature, pressure and r.p.m. indicating systems

#### **AMT 5.0 — Demonstrate knowledge of engine fire protection systems to FAA power plant and airframe competencies**

- 5.1 Inspect, check, service, troubleshoot and repair engine fire detection and extinguishing systems

#### **AMT 6.0 — Demonstrate knowledge of engine electrical systems to FAA powerplant and airframe competencies**

- 6.1 Repair engine electrical system components

- 6.2 Install, check and service engine electrical wiring, controls, switches, indicators and protective devices

#### **AMT 7.0 — Demonstrate knowledge of lubrication systems to FAA powerplant and airframe competencies**

- 7.1 Identify and select lubricants
- 7.2 Repair engine lubrication system components
- 7.3 Inspect, check, service, troubleshoot and repair engine lubrication systems

#### **AMT 8.0 — Demonstrate knowledge of ignition and starting systems to FAA power plant and airframe competencies**

- 8.1 Overhaul magneto and ignition harness
- 8.2 Inspect, service, troubleshoot and repair reciprocating and turbine engine ignition systems and components
- 8.3 Inspect, service, troubleshoot and repair turbine engine electrical starting systems
- 8.4 Inspect, service, and troubleshoot turbine engine pneumatic starting systems

#### **AMT 9.0 — Demonstrate knowledge of fuel metering systems to FAA power plant and airframe competencies**

- 9.1 Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls
- 9.2 Overhaul carburetor
- 9.3 Repair engine fuel metering system components
- 9.4 Inspect, check, service, troubleshoot and repair reciprocating and turbine engine fuel metering systems

#### **AMT 10.0 — Demonstrate knowledge of engine fuel systems to FAA power plant and airframe competencies**

- 10.1 Repair engine fuel system components
- 10.2 Inspect, check, service, troubleshoot and repair engine fuel systems

#### **AMT 11.0 — Demonstrate knowledge of induction and engine airflow systems to FAA power plant and airframe competencies**

- 11.1 Inspect, check, troubleshoot, service and repair engine ice and rain control systems
- 11.2 Inspect, check, service, troubleshoot and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems

- 11.3 Inspect, check, service and repair carburetor air intake and induction manifolds

**AMT 12.0 — Demonstrate knowledge of engine cooling systems to FAA power plant and airframe competencies**

- 12.1 Repair engine cooling system components  
12.2 Inspect, check, troubleshoot, service and repair engine cooling systems

**AMT 13.0 — Demonstrate knowledge of engine exhaust and reverser systems to FAA power plant and airframe competencies**

- 13.1 Repair engine exhaust system components  
13.2 Inspect, check, troubleshoot, service and repair engine exhaust systems  
13.3 Troubleshoot and repair engine thrust reverser systems and related components

**AMT 14.0 — Demonstrate knowledge of propellers to FAA power plant and airframe competencies**

- 14.1 Inspect, check, service and repair propeller synchronizing and ice control systems  
14.2 Identify and select propeller lubricants  
14.3 Balance propellers  
14.4 Repair propeller control system components  
14.5 Inspect, check, service and repair fixed-pitch, constant-speed and feathering propellers, and propeller governing systems  
14.6 Install, troubleshoot and remove propellers  
14.7 Repair aluminum alloy propeller blades

**AMT 15.0 — Demonstrate knowledge of unducted fans to FAA power plant and airframe competencies**

- 15.1 Inspect and troubleshoot unducted fan systems and components

**AMT 16.0 — Demonstrate knowledge of auxiliary power units to FAA power plant and airframe competencies**

- 16.1 Inspect, check, service and troubleshoot turbine-driven auxiliary power units

**AMT 17.0 — Demonstrate knowledge of job-related safety requirements to FAA power plant and airframe competencies**

- 17.1 Demonstrate proper application of job site and shop rules and regulations to OSHA standards  
17.2 Demonstrate correct selection and use of electrical and hand tools  
17.3 Demonstrate proper techniques and practices for working on and around live equipment

**Committee Identified Academic Skills**

The technical committee has identified that the following academic skills are embedded in this contest.

**Math Skills**

- Use fractions to solve practical problems
- Solve practical problems involving percents
- Measure angles
- Find surface area and perimeter of two-dimensional objects
- Find volume and surface area of three-dimensional objects

**Science Skills**

- Describe and recognize solids, liquids and gases
- Describe characteristics of types of matter based on physical and chemical properties
- Use knowledge of physical properties (shape, density, solubility, odor, melting point, boiling point, color)
- Use knowledge of chemical properties (acidity, basicity, combustibility, reactivity)
- Use knowledge of classification of elements as metals, metalloids and nonmetals
- Use knowledge of potential and kinetic energy
- Use knowledge of mechanical, chemical and electrical energy
- Use knowledge of heat, light and sound energy
- Use knowledge of temperature scales, heat and heat transfer
- Use knowledge of speed, velocity and acceleration
- Use knowledge of Newton's laws of motion
- Use knowledge of work, force, mechanical advantage, efficiency and power
- Use knowledge of simple machines, compound machines, powered vehicles, rockets and restraining devices

- Use knowledge of principles of electricity and magnetism
- Use knowledge of static electricity, current electricity and circuits
- Use knowledge of magnetic fields and electromagnets
- Use knowledge of motors and generators

### **Language Arts Skills**

- Provide information in conversations and in group discussions
- Demonstrate knowledge of appropriate reference materials
- Use print, electronic databases and online resources to access information in books and articles
- Demonstrate informational writing

### **Connections to National Standards**

State-level academic curriculum specialists identified the following connections to national academic standards.

#### **Math Standards**

- Numbers and operations
- Algebra
- Geometry
- Measurement
- Data analysis and probability
- Problem solving
- Reasoning and proof
- Communication
- Connections
- Representation

*Source:* NCTM Principles and Standards for School Mathematics. To view high school standards, visit: [standards.nctm.org/document/chapter7/index.htm](http://standards.nctm.org/document/chapter7/index.htm). Select “Standards” from menu.

#### **Science Standards**

- Understands atmospheric processes and the water cycle
- Understands the structure and properties of matter
- Understands the sources and properties of energy
- Understands forces and motion
- Understands the nature of scientific inquiry

*Source:* McREL compendium of national science standards. To view and search the compendium, visit: [www.mcrel.org/standards-benchmarks/](http://www.mcrel.org/standards-benchmarks/).

#### **Language Arts Standards**

None Identified

*Source:* IRA/NCTE Standards for the English Language Arts. To view the standards, visit: [www.readwritethink.org/standards/index.html](http://www.readwritethink.org/standards/index.html).

# Aviation Maintenance Technology Scorecard (High School)

Items Evaluated	Possible Points	Contestant Number					
		1	2	3	4	5	6
Precision Measurion	75						
Hardware Identification	75						
Electrical	75						
Tube Bend and Flare	75						
T.C.D.S./AD's	75						
A/C Parts Identification	75						
Safety	175						
Federal Aviation Regulations	75						
Weights and Balance	75						
Safety Wire	75						
Logbook Entries, Forms and Records	75						
Hose Fabrication	75						
Résumé Penalty	0 or -50 only						
Clothing Penalty	0 to -50						
<b>Total Possible Points</b>	<b>1,000</b>						