

III.E. Airworthiness Requirements - General Overview

References: 14 CFR part [23](#), [39](#), [43](#), [91](#), [Pilot's Handbook of Aeronautical Knowledge](#) (FAA-H-8083-25), [Min Equipment Requirements for GA Ops under Part 91](#) (AC 91-67), [Sample Type Certificate](#), [Sample MEL](#)

Objectives	The student should exhibit knowledge of the elements regarding airworthiness requirements as necessary based on their respective ACS/PTS.
Key Elements	<ol style="list-style-type: none">1. CFR 91.205 – Required Instruments2. CFR 91.213(d) – Deferral without MEL3. Required Inspections
Elements	<ol style="list-style-type: none">1. Airworthiness without a MEL2. Airworthiness with a MEL3. Obtaining a Special Flight Permit4. Appropriate Record Keeping
Schedule	<ol style="list-style-type: none">1. Discuss Objectives2. Review material3. Development4. Conclusion
Equipment	<ol style="list-style-type: none">1. White board and markers2. References
IP's Actions	<ol style="list-style-type: none">1. Discuss lesson objectives2. Present Lecture3. Ask and Answer Questions4. Assign homework
SP's Actions	<ol style="list-style-type: none">1. Participate in discussion2. Take notes3. Ask and respond to questions
Completion Standards	The lesson is complete when the student can explain, and when necessary, locate, the elements and documents related to airworthiness requirements.

Instructor Notes:

Introduction:

Attention

Interesting fact or attention-grabbing story

Just as you would never scuba dive without your regulator operating properly or sky dive without the rip cord functioning, you should never fly an airplane without essential equipment working properly.

Overview

Review Objectives and Elements/Key ideas

What

Airworthiness requirements are the basis for deciding whether an aircraft is worthy of safe flight. They are what must be met to ensure an aircraft is safe and therefore legal to fly.

Why:

In order for an airplane to be airworthy certain documents must be on board and current, certain inspections must be completed, and certain instruments must be functioning, otherwise the airplane is unfit for flight and therefore un-airworthy or illegal to fly. An un-airworthy aircraft cannot be flown.

How:

1. Airworthiness without a MEL (Required Instruments and Equipment)

- A. Widely used by most pilots due to the simplicity and minimal paperwork
- B. When inoperative equipment is found prior to flight, decide whether to:
 - i. Cancel the flight
 - ii. Obtain maintenance prior to the flight, or
 - iii. Defer the item or equipment - [91.213\(d\)](#)
 - a. To defer, it must not be required by the documents discussed in part C. i, ii, iii, iv
 - iv. If the item is not required, it can be deferred
 - a. Inoperative equipment is deactivated (or removed) and placarded INOPERATIVE
 - Any necessary maintenance must be accomplished by certified maintenance personal
 - The item/equipment must be placarded INOPERATIVE
- C. Required Equipment - [91.213\(d\)\(2\)](#) – Follow these steps to decide whether equipment is required:
 - i. [14 CFR 91.205](#): Required Instruments and Equipment for Day and Night VFR Flight
 - a. Visual-Flight Rules (Day), The following instruments and equipment are required:
 - Remember: TOMATO FFLAAMES
 - Tachometer for each engine
 - Oil pressure gauge for each engine
 - Manifold pressure gauge for each altitude engine
 - Airspeed Indicator
 - Temperature gauge for each liquid-cooled engine
 - Oil temperature gauge for each air-cooled engine
 - Fuel gauge indicating the quantity of fuel in each tank
 - Flotation gear (if operated for hire over water beyond power-off glide distance from shore)

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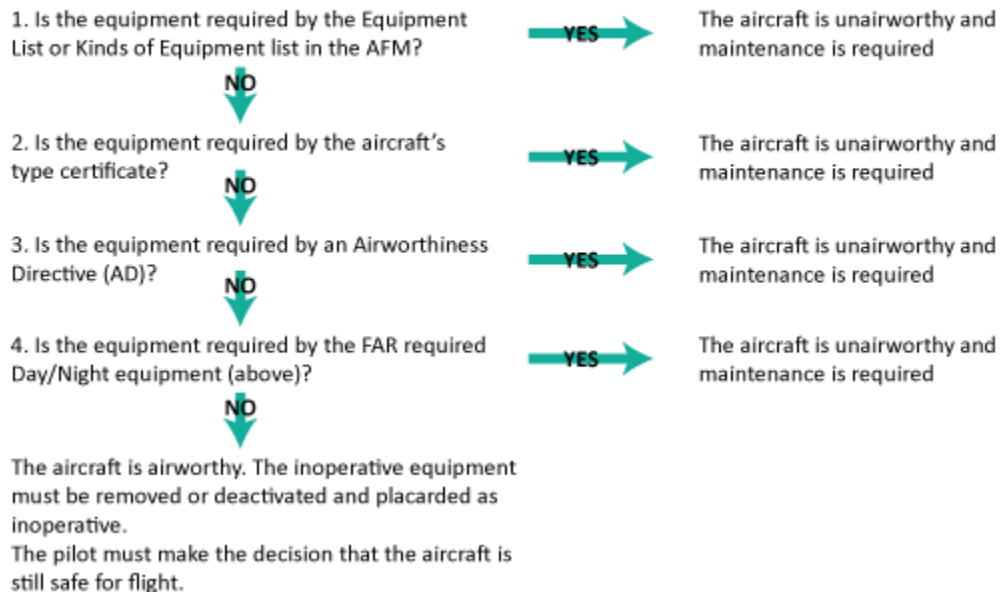
- Landing gear position indicator
 - Altimeter
 - Anti-Collision Lights (if certified after March 11, 1996)
 - Magnetic compass
 - Emergency Locator Transmitter
 - Safety belts/Shoulder Harnesses
- b. Visual-Flight Rules (Night), The following instruments and equipment are required:
- All Instruments and equipment needed for VFR day flight are required, as well as:
 - Remember: FLAPS
 - Fuses (if required)
 - Landing Light (Electric)
 - Anti-Collision Lights
 - Position Lights
 - Source of electricity for all installed electrical and radio equipment
- ii. Kinds of Equipment List and Equipment List
- a. Kinds of Equipment List
- Lists the manufacturer required equipment based on the type of flight (VFR Day, IFR, etc.) intended
 - Located in Chapter 2 of the aircraft POH
- b. Equipment List
- Furnished with the aircraft is an equipment list that specifies all the required equipment approved for installation in the aircraft. The weight and arm of each item is included on the list, and all equipment installed when the aircraft left the factory is checked
 - It is usually found in the weight and balance data
- iii. Type Certificate
- a. Definition
- The Type Certificate Data Sheet (TCDS) is a formal description of the aircraft, engine or propeller. It lists limitations and information required for type certification including airspeed limits, weight limits, thrust limitations, etc.
- b. Can be found on the [FAA TCDS Website](#)
- c. The type certificate will specify things like the type of engine, the propeller, the number of seats in the aircraft, etc.
- Things on the TC cannot be changed without a supplemental type certificate
 - a. You can't just decide to put a turbine engine in your Cessna 172
- iv. Airworthiness Directives (AD)
- a. Definition
- The means used to notify aircraft owners and other interested persons of unsafe conditions and to specify the conditions under which the product may continue to be operated
 - Similar to a recall on a car
- b. ADs may be divided into two categories:
- Those of an emergency nature requiring immediate compliance prior to further flight
 - Those of a less urgent nature requiring compliance within a specific period of time
- c. ADs are regulatory in nature and shall be complied with unless a specific exemption is granted

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- d. It is the aircraft owner/operator's responsibility to ensure compliance with all pertinent ADs
 - If an AD is not complied with by the designated date/time period the aircraft is not airworthy and may not be flown
- e. Compliance Records
 - [14 CFR part 91.417](#) requires a record to be maintained showing the status of applicable ADs.
 - a For ready reference, many aircraft owners have a chronological listing of the pertinent ADs in the back of their aircraft, engine, and propeller maintenance records

Inoperative Equipment Decision Sequence

During the preflight inspection, the pilot recognizes inoperative instruments or equipment.



D. Required Inspections

- i. 14 CFR part 91 places primary responsibility on the owner/operator for maintaining an aircraft in an airworthy condition
 - a. After aircraft inspections have been made and defects repaired, the PIC is responsible for determining whether the aircraft is in condition for safe flight
- ii. Inspections: Remember AV1ATE
 - a. Annual Inspection
 - Any reciprocating-engine powered or single-engine-turbojet/turbo-propeller powered small aircraft (less than 12,500 pounds) flown for business or pleasure and not flown for compensation or hire is required to be inspected at least annually
 - Must be done by an airframe and powerplant mechanic (A&P) who holds an Inspection Authorization (IA)
 - An aircraft overdue for an annual inspection may be operated under a Special Flight Permit for the purpose of flying the aircraft to a location where the inspection can be performed

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- All applicable ADs that are due must be complied with
 - An annual inspection may be substituted for a required 100 hr. inspection
 - b. VOR
 - The VOR must have been checked within the preceding 30 days. A record must be kept in a bound logbook (IFR Requirement)
 - c. 100 Hour Inspection
 - All aircraft under 12,500 lbs. (except for turbo powered), used to carry passengers for hire or, used for flight instruction for hire, must have received a 100-hour inspection
 - The inspection must be performed by an FAA certificated A&P mechanic, and appropriately rated FAA certificated repair station, or by the aircraft manufacturer
 - a No IA necessary (like for the annual)
 - An annual inspection may be substituted for a required 100-hour inspection
 - The 100-hour limit may be exceeded by not more than 10 hours while enroute to reach a place where the inspection can be done
 - a The excess time used must be included in computing the next 100 hours of time in service
 - d. Altimeter/Pitot Static Inspection
 - [FAR 91.411](#) requires that the altimeter, encoding altimeter, and related system be tested and inspected in the preceding 24 months before operated in controlled airspace under instrument flight rules
 - [FAR 91.411](#) - The pitot/static system must be checked within the preceding 24 calendar months. A record must be kept in the aircraft logbook (IFR Requirement)
 - e. Transponder Inspection
 - [FAR 91.413](#) requires that before a transponder can be used under [FAR 91.215\(a\)](#), it shall be tested and inspected within the preceding 24 months
 - f. ELT Inspection
 - [FAR 91.207\(d\)](#) – If operations require an ELT, it must be inspected every 12 calendar months
- E. Required Documents
- i. Remember ARROW
 - a. Airworthiness
 - b. Registration
 - c. Radio Operators License (if international)
 - d. Operating Limitations (POH)
 - e. Weight and Balance (specific to the aircraft tail number)
2. Airworthiness with a MEL
- A. A MEL is a precise listing of instruments, equipment, and procedures that allows an aircraft to be operated with inoperative equipment
 - i. Basically, it combines FAR 91.205, the Kinds of Equipment List, ADs and Type Certificate into one authoritative document
 - ii. Considered to be a supplemental type certificate and therefore becomes the authority to operate that aircraft in a condition other than originally type certificated
 - iii. A MEL must be requested from the FAA
 - iv. The FAA approved MEL includes only those items of equipment which may be inoperative and yet maintain an acceptable level of safety based on conditions and limitations
 - B. Required Equipment

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- i. If equipment or an instrument is found to be broken the pilot would refer directly to the MEL as to whether it is required for the type of flight
 - ii. Ex: If the position lights were discovered inoperative prior to a daytime flight, the pilot would make an entry in the maintenance record
 - a. The item is then either repaired or deferred in accordance with the MEL
 - If the MEL states that position lights are not necessary for a daytime flight then the aircraft is airworthy, the pilot would follow the instructions in the MEL regarding the position lights (e.g., pull the circuit breaker/do not use the lights, etc.) and the flight may continue
 - If it were a night flight and the MEL requires the position lights then the aircraft is not airworthy and the flight may not continue until repairs are made
 - iii. Should a component fail that is not listed in the MEL as deferrable (tachometer, flaps, stall warning device, etc.) then repairs are required to be performed prior to departure
 - iv. If maintenance parts are not available at your location, a special flight permit can be obtained
- C. Required Inspections
- i. Same as above
- D. Required Documents
- i. Same as above
- 3. Obtaining a Special Flight Permit**
- A. [FAR 21.197](#): A Special Flight Permit is an authorization that may be issued for an aircraft that may not currently meet applicable airworthiness requirements, but is safe for a specific flight
- B. Issued for the following reasons:
- i. Flying an aircraft to a base where repairs, alterations or maintenance are to be performed
 - ii. Delivering or exporting an aircraft
 - iii. Production flight testing new production aircraft
 - iv. Evacuating aircraft from areas of impending danger
 - v. Conducting customer demonstration flights
 - vi. To allow the operation of an overweight aircraft for flight beyond its normal range where adequate landing facilities or fuel is not available.
- C. Obtaining a Special Flight Permit
- i. If a special flight permit is needed, assistance and the necessary forms may be obtained from the local FSDO or Designated Airworthiness Representative (DAR)
 - ii. [FAR 21.199](#): an applicant for a special flight permit must submit a statement in a form and manner prescribed by the FAA, indicating:
 - a. The purpose of the flight
 - b. The proposed itinerary
 - c. The crew required to operate the aircraft and its equipment, e.g., pilot, co-pilot, navigator, etc.
 - d. The ways, if any, in which the aircraft does not comply with the applicable airworthiness requirement
 - e. Any restriction the applicant considers necessary for safe operation of the aircraft
 - f. Any other information considered necessary by the FAA for the purpose of prescribing operating limitations
 - iii. [FAA Special Flight Permit Instructions](#)
 - a. These instructions are specific to the Allentown District Office. Adjust as necessary.
 - iv. [Form 8130-6](#)
 - v. [FAA Special Flight Permit Regs & Policies](#)

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4. Appropriate Record Keeping (FAR 91.417)

- A. The 100-Hour/Annual inspection as well as the inspections required for instruments and equipment necessary for legal VFR/IFR flight are located in the aircraft and engine logbooks
- B. Removing/Installing equipment not on the Equipment List
 - i. The AMT must change the weight and balance record to indicate the new empty weight and empty weight center of gravity (EWCG), and the equipment list is revised to show which equipment is actually installed
- C. Repairs and Alterations
 - i. Major
 - a. 14 CFR part 43, Appendix A: Major alterations shall be approved for return to service on FAA Form 337, Major Repairs and Major Alterations, by an appropriately rated certificated repair station, an FAA certificated A&P mechanic holding an Inspection Authorization, or a representative of the Administrator
 - ii. Minor
 - a. May be approved for return to service with a proper entry in the maintenance records by an FAA certificated A&P mechanic or an appropriately certificated repair station

Conclusion:

Brief review of each main point

The requirements and precautions mandated by the FAA are necessary to ensure the aircraft is in a safe condition for flight not only for legal reasons, but also for the safety of those onboard.

PTS Requirements:

To determine that the applicant exhibits instructional knowledge of the elements related to required airworthiness by describing:

1. Required instruments and equipment for day/night VFR.
2. Procedures and limitations for determining airworthiness of the airplane with inoperative instruments and equipment with and without a minimum equipment list (MEL).
3. Requirements and procedures for obtaining a special flight permit.
4. Airworthiness directives, compliance records, maintenance/inspection requirements, and appropriate records.
5. Procedures for deferring maintenance on aircraft without an approved MEL.