AIRWORTHINESS REQUIREMENTS

OVERVIEW

WHAT

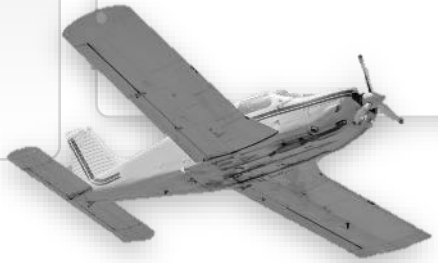
- Airworthiness requirements are the basis for deciding whether an aircraft is worthy of safe flight. They are what must be met to ensure an aircraft is safe and therefore legal to fly.

WHY

- For an airplane to be airworthy, specific documents must be on board and current, inspections must be completed, and instruments must be functioning, otherwise the airplane is un-airworthy, or illegal to fly.

CONTENT

- Airworthiness
  - Without an MEL
  - With an MEL
  - Required Inspections & Documents
  - Airworthiness Certificates
- Obtaining a Special Flight Permit
- Record Keeping
- Preventive Maintenance
- Inoperative Equipment in Flight



INOPERATIVE EQUIPMENT BEFORE FLIGHT

Equipment requirements are designed for everyone's safety

- Eliminates subjective safety decisions

The following procedures are minimum equipment requirements to be legal to fly

- Just because it's legal, doesn't mean it's safe
- If you're not comfortable, don't fly
- Set personal equipment minimums

Methods for Determining Airworthiness

- Without an MEL (most common)
- With an MEL

AIRWORTHINESS
WITHOUT AN MEL

Widely used due to simplicity & minimal paperwork

When inoperative equipment is found prior to flight, decide whether to:

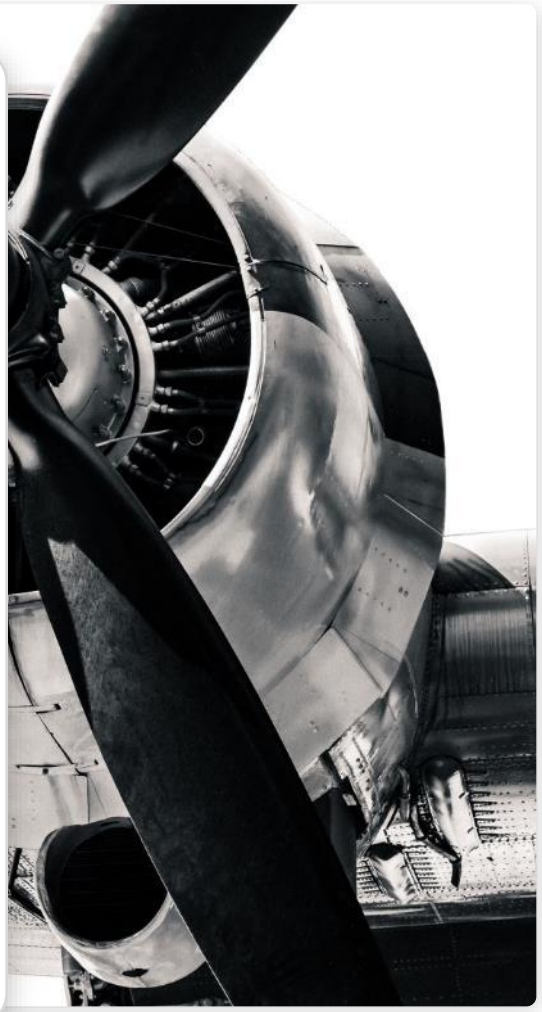
- Cancel the flight, and have the equipment fixed, or
- Continue the flight by deferring inoperative equipment based on FAR 91.213(d)

FAR 91.213(d) – Verify the equipment is not required by any of the following:

- Day & Night VFR required instruments (FAR 91.205)
- Kinds of Equipment List and Equipment List
- Type Certificate
- Airworthiness Directive

If the equipment is not required, it must be

- Deactivated (or removed) and placarded as inoperative
- Any maintenance must be accomplished by certified maintenance personnel



AIRWORTHINESS
WITHOUT AN MEL

FAR 91.205: Required Equipment for Day/Night VFR

Day VFR: TOMATO FFLAAMES

- **T**achometer for each engine
- **O**il pressure gauge(s)
- **M**anifold pressure gauge*
- **A**irspeed Indicator
- **T**emperature gauge*
- **O**il temperature gauge*
- **F**uel gauge for each tank
- **F**lotation gear*
- **L**anding gear position indicator
- **A**ltimeter
- **A**nti-Collision Lights*
- **M**agnetic Compass
- **E**mergency Locator Transmitter
- **S**afety Belts / Should Harnesses

Night VFR: FLAPS

- **F**uses (if required)
- **L**anding Light (electric)
- **A**nti-Collision Lights
- **P**osition Lights
- **S**ource of electricity for all equipment

*Notes: Manifold Pressure Gauge: Altitude engines; Temp Gauge: liquid-cooled engines; Oil Temp Gauge: Air-cooled engines; Flotation Gear: for hire beyond glide distance; Anti-Collision Lights: Certified after Mar 11, 1996

AIRWORTHINESS
WITHOUT AN MEL

Kinds Of Equipment List

- Chapter 2 of the POH
- Lists manufacturer required equipment based on type of flight

Equipment List

- Usually found in the weight and balance data and/or POH
- Specifies required equipment and equipment approved for installation in the aircraft

AIRWORTHINESS
WITHOUT AN MEL

Type Certificate

- Formal description of the airplane, engine, propeller
- Specifies the type of engine, propeller, number of seats, etc.
- Lists limitations & information required for type certification
- Cannot be changed without a supplemental type certificate
- Found on the FAA TCDS website

AIRWORTHINESS
WITHOUT AN MEL

Airworthiness Directives (AD)

Notifies pilots of unsafe conditions & the required actions

- Like a recall on a car

Two Categories:

- Emergency, requiring immediate compliance prior to further flight
- Less urgent nature requiring compliance in a specified time

Not airworthy if an AD is not complied with by the designated date

- Must maintain record of compliance

Special Airworthiness Information Bulletin (SAIB)

- Info & guidance for safety issues that don't meet AD criteria
- Tool to alert, educate, and make safety recommendations

AIRWORTHINESS
WITHOUT AN MEL

Inoperative Equipment Decision Sequence

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

1. Is the equipment required by the Equipment List or Kinds of Equipment list in the AFM?
   - YES → The aircraft is unairworthy and maintenance is required
   - NO ↓
2. Is the equipment required by the aircraft's type certificate?
   - YES → The aircraft is unairworthy and maintenance is required
   - NO ↓
3. Is the equipment required by an Airworthiness Directive (AD)?
   - YES → The aircraft is unairworthy and maintenance is required
   - NO ↓
4. Is the equipment required by the FAR required Day/Night equipment (above)?
   - YES → The aircraft is unairworthy and maintenance is required
   - NO ↓

The aircraft is airworthy. The inoperative equipment must be removed or deactivated and placarded as inoperative.
The pilot must make the decision that the aircraft is still safe for flight.

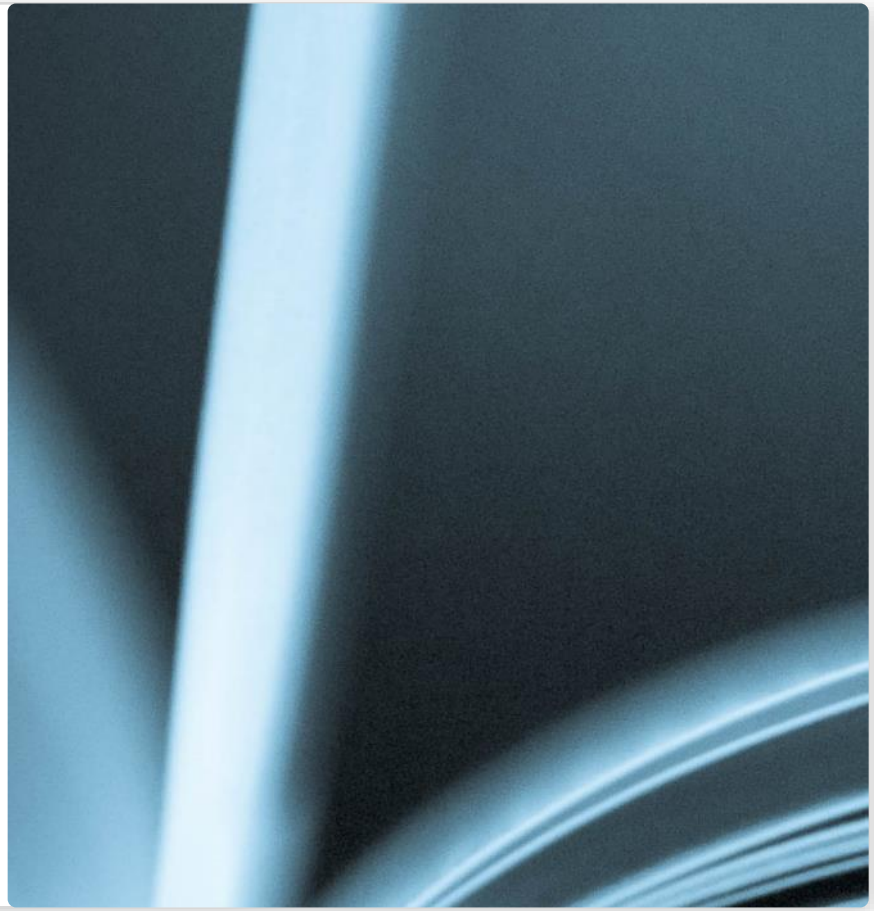
AIRWORTHINESS
WITH AN MEL

MEL: Minimum Equipment List

- Precise listing of required equipment based on the type of flight
- Basically, combines 91.205, Kinds of Equipment List, ADs, & Type Certificate into 1 doc
- Common at airlines, but less common in GA
- Must be requested from the FAA

Required Equipment

- If equipment is inoperative, refer to the MEL to determine if it's required
- If the equipment is not deferrable, it must be repaired prior to flight
- A special flight permit can be obtained if necessary to make repairs



AIRWORTHINESS REQUIRED INSPECTIONS (AV1ATE)

A

Annual

- Aircraft less than 12,500 pounds flown for business or pleasure
- Requires an Airframe & Powerplant mechanic (A&P) with an Inspection Authorization (IA)
- May be substituted for a required 100-hour inspection

V

VOR: Must have been checked in the preceding 30 days (IFR requirement)

1

100 Hour

- Aircraft less than 12,500 pounds (except turbo powered) used for hire/flight instruction
- Requires an A&P at an FAA certified repair station, or done by the manufacturer
- Can exceed 100 hours by no more than 10 hours if enroute to inspection location

A

Altimeter/Pitot Static: FAR 91.411 – Requires inspection in the last 24 months (IFR)

T

Transponder: FAR 91.413 – Must be tested and inspected in the last 24 months

E

ELT: FAR 91.207(d) – If required, must be inspected every 12 calendar months

AIRWORTHINESS
REQUIRED DOCUMENTS (ARROW)

A **Airworthiness Certificate**

R **Registration Certificate**

R **Radio Operator's License**
- If international

O **Operating Limitations (POH)**

W **Weight and Balance**
- Specific to the aircraft tail number

AIRWORTHINESS

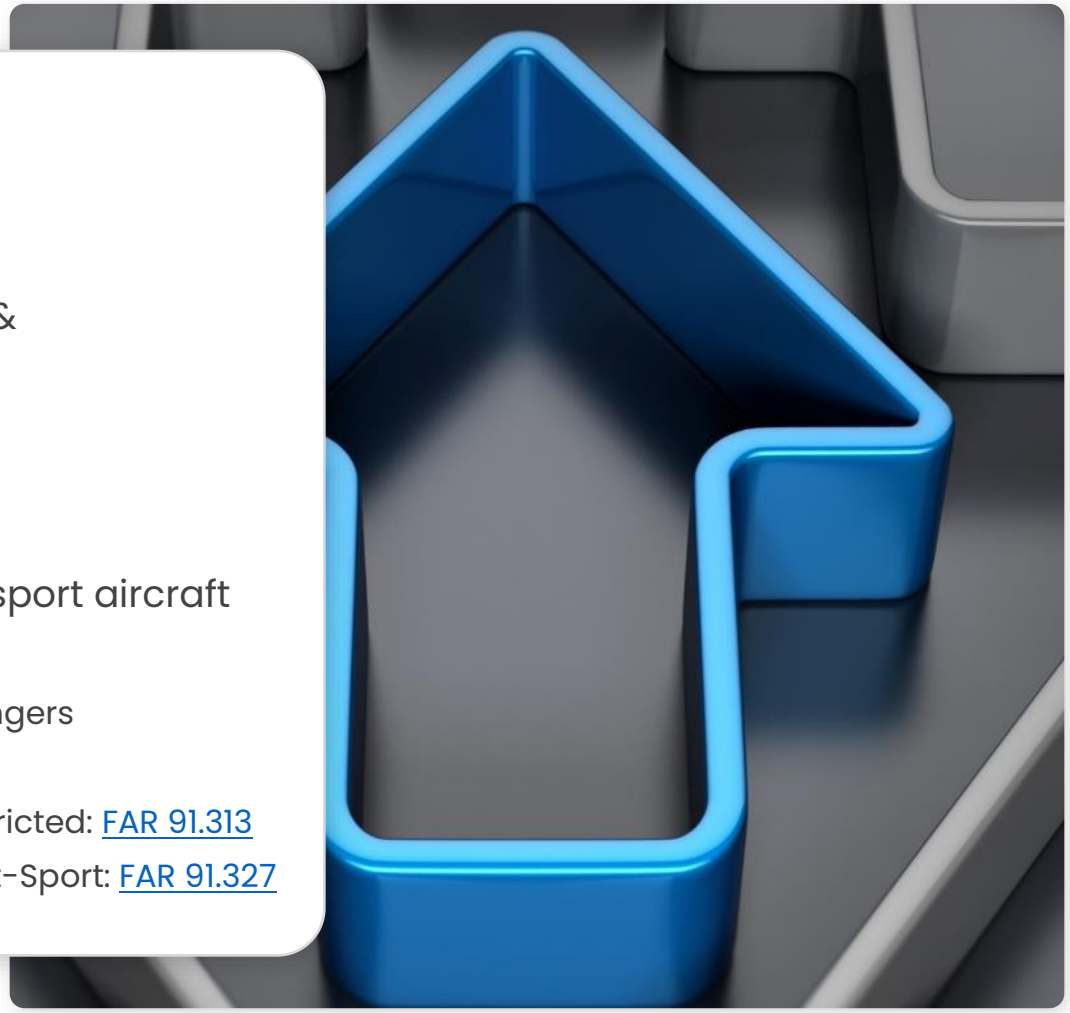
AIRWORTHINESS CERTIFICATES

Standard Airworthiness Certificate

- White
- Normal, acrobatic, commuter or transport categories
- Remains in effect if the aircraft receives required maintenance & is registered in the US

Special Airworthiness Certificate

- Pink
- Primary, experimental, restricted, limited, provisional, and light-sport aircraft
- Limitations
  - Generally, can't be operated for hire & in some cases can't carry passengers
  - May be restricted to operations over sparsely populated areas or water
  - Primary: FAR 91.325
  - Experimental: FAR 91.319
  - Restricted: FAR 91.313
  - Limited: FAR 91.315
  - Provisional: FAR 91.317
  - Light-Sport: FAR 91.327



SPECIAL FLIGHT PERMIT

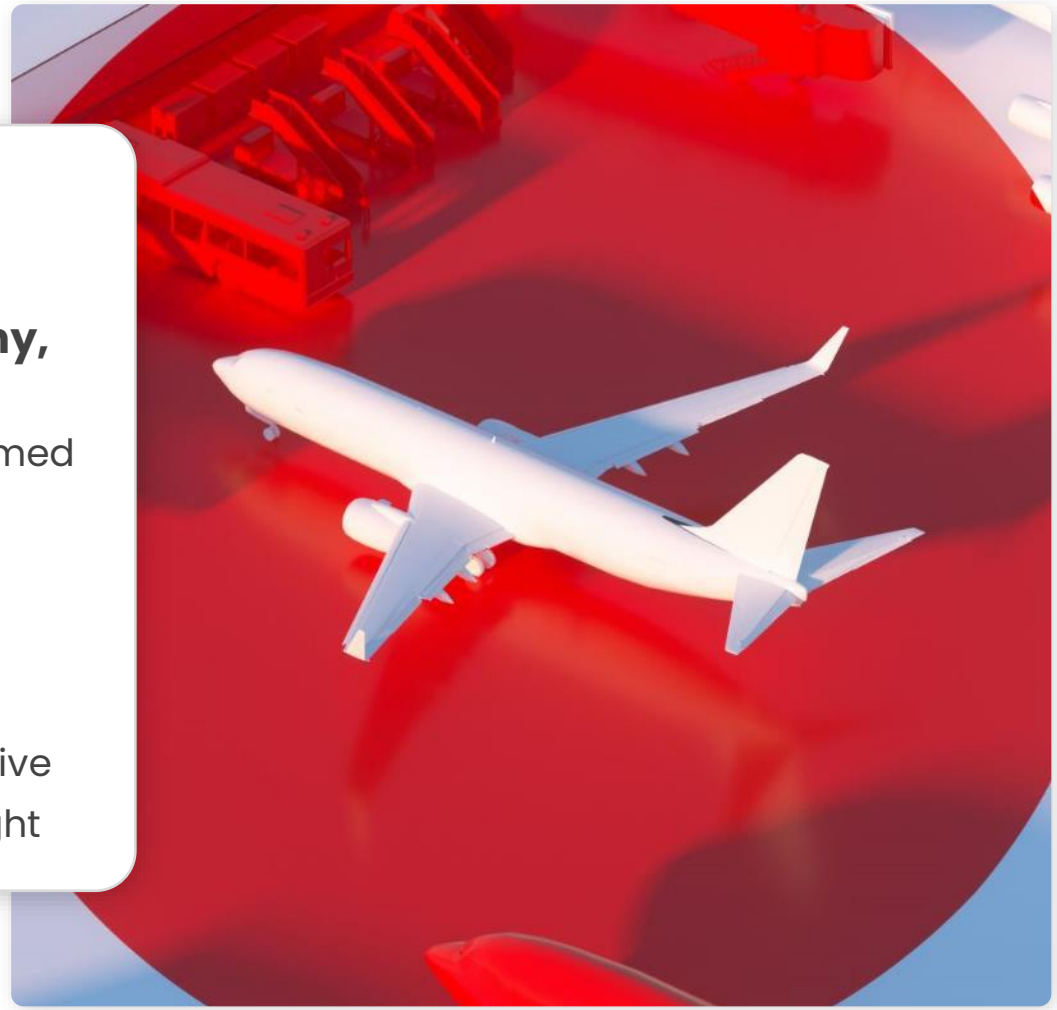
FAR 21.197: Special Flight Permit

Authorization for an aircraft that is not currently airworthy, but is safe for a specific flight

- Flying to an airport where repairs or maintenance can be performed
- Delivering or exporting an aircraft
- Conducting customer demonstration flights

Obtaining a Special Flight Permit

- Contact the local FSDO or Designated Airworthiness Representative
- FAR 21.199: Must submit a statement to the FAA describing the flight



RECORD KEEPING
(FAR 91.417)

Required inspections are in the aircraft and engine logbooks

100-Hour, Annual Inspection must be kept for 1 year or until the work is repeated

Records containing the following must be retained and transferred with the aircraft if sold:

- Total time in service (airframe, engine, propeller, rotor)
- Status of life-limited parts & time since last required overhaul
- Current inspection status of the airplane
- Status of any ADs
- Copies of forms for major alternations

RECORD KEEPING
(FAR 91.417)

Removing/Installing Equipment not on the Equipment List

- AMT must update the weight & balance for the new empty weight and CG, as well as the equipment list

Repairs and Alterations

- Major: Approved on Form 337 by a certified repair station, A&P with an IA, or a designated rep (14 CFR Part 43)
- Minor: Approved with an entry in the maintenance records by an A&P or certified repair station

PREVENTIVE MAINTENANCE (AC 43-12)

Who can perform Preventive Maintenance?

- FAR 43.3(g): Holder of a Part 61 pilot certificate
- Part 43 Appendix A(c)(30): At least a private pilot & registered owner

What is Preventive Maintenance?

- FAR 1.1: Simple or minor preservation operations & replacement of small standard parts not involving complex assembly operations
- Part 43 Appendix A(c)(30): Exhaustive list of authorized maintenance

Be honest with your ability to perform the work satisfactorily & safely

PREVENTIVE MAINTENANCE (AC 43-12)

Performance Rules

- FAR 43.13: Basically, requires quality work and parts

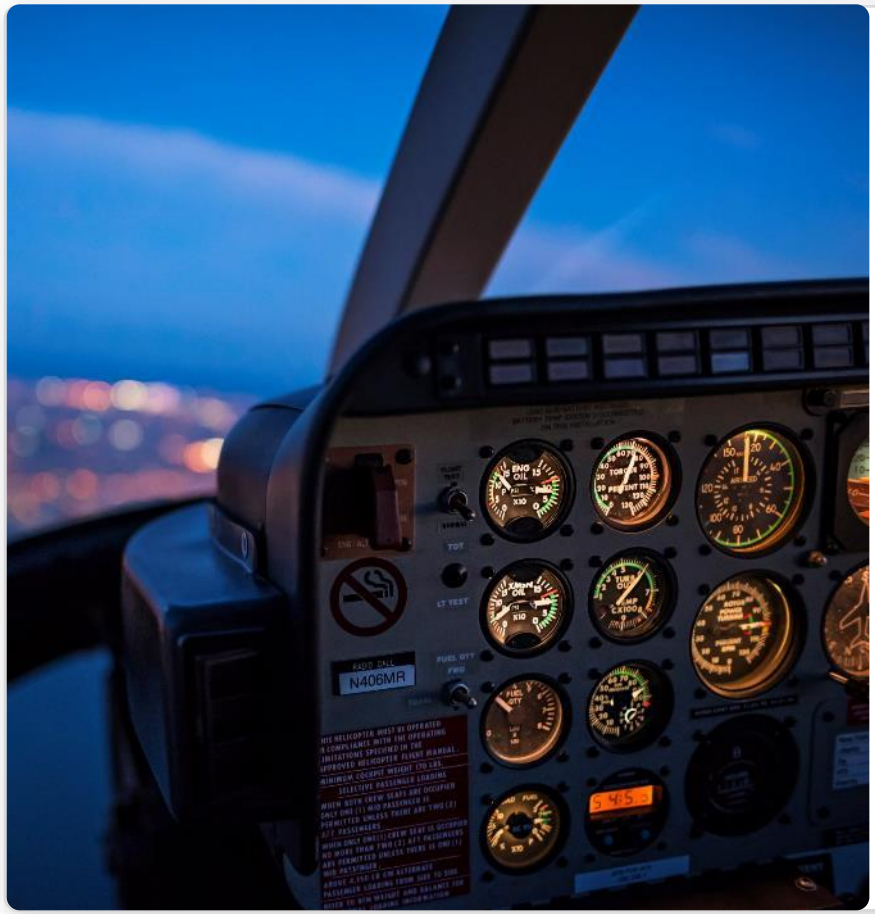
Maintenance Records

- FAR 43.9(a): Any work done requires a logbook entry
  - Description, completion date, signature, certificate #, kind of certificate

Return to Service

- FAR 43.7(f): At least a private pilot may approve a return to service

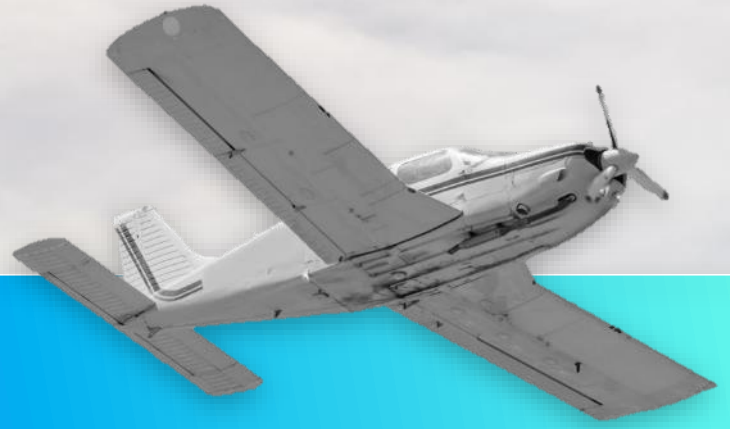
INOPERATIVE EQUIPMENT IN FLIGHT



Maintenance deferrals discussed here are not used for inflight discrepancies

POH procedures take precedence

Combine with risk assessment & mitigation techniques to assist in decision making



QUESTIONS?