

Unit 4 Federal Aviation Regulations

4.1 14 CFR Part 1

1.1 General Definitions

- Night is defined as the time between the end of evening civil twilight and the beginning of morning civil twilight as published in *The Air Almanac*, converted to local time.
 - Recency of experience nighttime is defined as 1 hr after sunset to 1 hr before sunrise. Questions will be asked on both defs!
- A/c categories: broad classifications of aircraft; airplane, rotorcraft, glider, lighter-than-air
- Airplane classes: SEL, MEL, SES, MES (single engine land, sea; multi engine land, sea)
- Rotorcraft classes: helicopter, gyrocopter
- Lighter-than-air classes: airship, balloon.
- ^^ These definitions are for the purposes of certification of airmen. ^^
- For certification of aircraft, the category is based on intended use or operating limitations.
 - Includes transport, normal, utility, limited, restricted, acrobatic, provisional
- Classes as used for the certification of a/c are similar to those used for certification of airmen (airplane, rotorcraft, glider, lighter-than-air)

1.2 Abbreviations and Symbols

- V-speeds!
- V_{FE} - maximum flaps extended speed
- V_{LE} - max landing gear extended speed
- V_{NO} - max structural cruising speed
- V_A - design maneuvering speed
- V_{S0} - stall speed in landing configuration
- V_X - best angle of climb
- V_Y - best rate of climb

4.2 14 CFR Part 21

21.181 Duration of Airworthiness Certificates

- Airworthiness certificate remain in force as long as maintenance and alteration of the a/c are performed per the FARs.

4.3 14 CFR Part 39

39.3 Definition of Airworthiness Directives

- ADs are issued under Part 39 by the FAA to require correction of unsafe conditions found in an airplane, an airplane engine, a propeller, or an appliance

when such conditions exist and are likely to exist or develop in other products of the same design. Since ADs are issued under part 39, they are regulatory and must be complied with unless a specific exemption is granted.

39.9 What if I operate an aircraft or use a product that does not meet the requirements of an AD?

- No person may operate a product to which an AD applies except in accordance with the requirements of the AD. That is, you may operate an airplane that is not in compliance with an AD as long as the operation itself is allowed by the AD.

4.4 14 CFR Part 43

43.3 Persons authorized to perform maintenance, preventive maintenance, rebuilding, and alterations.

- Any person who holds a pilot certificate may perform preventive maintenance on any airplane owned or operated by that pilot that is not used in air carrier services.

43.7 Persons authorized to approve aircraft, airframes, aircraft engines, propellers, appliances, or component parts for return to service after maintenance, preventive maintenance, rebuilding, or alteration.

- To approve the airplane for return to service, after preventive maintenance was done by a pilot, the pilot must hold at least a private pilot certificate.

43.9 Maintenance Records

- After preventive maintenance has been performed, the signature, certificate number, and kind of certificate held by the person approving the work, the date, and a description of the work must be entered in the aircraft maintenance records.

43 Appendix A. Major alterations and repairs and preventive maintenance.

- Preventive maintenance means simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations. Examples include replenishing hydraulic fluid and servicing landing gear wheel bearings.

4.5 14 CFR Part 47

- A dealer's aircraft registration certificate is another form of aircraft registration.
 - It is valid only for flights within the US by the manufacturer or dealer for flight testing or demonstration for sale.
- FAR 47.41(b) requires the removal of the original aircraft registration certificate once the aircraft is sold.
 - The back side of that registration must be filled out with the appropriate information from the sale as well as the new owner's name. The certificate must then be mailed back to the FAA Registry in Oklahoma City.

4.6 14 CFR Part 61

61.3 Requirements for certificates, ratings, and authorizations

- When acting as PIC or as a required pilot flight crewmember, you must have a valid pilot certificate and a current and appropriate medical certificate in your personal possession or readily accessible in the airplane.
- You must present your pilot certificate or medical certificate upon the request of the administrator of the FAA or his or her representative; the NTSB; or any federal, state, or local law enforcement officer.

61.15 Offenses involving alcohol or drugs

- Each person holding a certificate under part 61 shall provide a written report of each motor vehicle action involving alcohol or drugs to the FAA's Security and Hazardous materials safety office no later than 60 days after the motor vehicle action.

61.23 Medical certificates: requirement and duration

- A person must hold
 - A first-class medical when exercising the privileges of an ATP certificate
 - At least second class when exercising CPL privileges
 - At least a third class medical:
 - When exercising PPL, Rec, or Student privileges
 - When exercising CFI privileges if the CFI is the PIC
 - Prior to taking a practical test
- Duration of a medical certificate:
 - A first-class medical expires at the end of the last day of
 - The 12th month after the date of examination for operations requiring an ATP certificate if the person is under age 40
 - The 6th month after the date of examination for ops requiring an ATP if the person is 40 or older
 - The 12th month after the date of examination for ops requiring only a CPL
 - The period specified for a 3rd class medical below for ops requiring only a PPL, Rec, or student cert
 - 2nd class: expires last day of:
 - The 12th month after the date of examination for ops requiring a CPL
 - The period specified for a 3rd class medical below for ops requiring only a PPL, Rec, or student cert
 - 3rd class medical: for ops requiring a PPL, Rec, CFI as PIC, or student cert; expires the last day of
 - The 60th month after the date of examination if the person has not reached his or her 40th birthday on or before the date of the examination (5 years)

- The 24th month after the date of examination if the person is 40 or older (2 years)
- Basic med. Allows a pilot to conduct certain ops using a US driver's license instead of a medical certificate as long as the pilot meets the following conditions:
 - Has held an FAA medical certificate at any time after July 14, 2006; the most recent of which
 - May have been a special issuance medical (a one-time special issuance medical must be obtained for certain cardiovascular, neurological, and mental health conditions)
 - May be expired
 - Cannot have been suspended, revoked, withdrawn, or denied
 - Completes an approved medical education course in the preceding 24 calendar months in accordance with Part 68
 - Receives a comprehensive medical exam from a state licensed physician in the previous 48 months in accordance with Part 68; not necessarily by an AME

61.31 Type rating requirements, additional training, and authorization requirements.

- To act as PIC of a complex airplane, you must receive and log ground and flight training and receive a logbook endorsement.
 - Complex airplanes are defined as those with a retractable landing gear, flaps, and a controllable pitch propeller.
- To act as PIC of a high-performance airplane, you must receive and log ground and flight training; have a logbook endorsement. High-performance have engines greater than 200 hp
- A person may not act as PIC of any of the following without a type rating for each specific aircraft:
 - A large aircraft (over 12,500 lb gross weight)
 - A turbojet-powered airplane
 - Other a/c specified by the FAA through aircraft type certification procedures

61.51 Pilot logbooks

- A rec pilot must carry his/her logbook with the required authorized instructor endorsements on all solo flights
 - That exceed 50 NM from the airport at which training was received,
 - Within airspace that requires communication with ATC,
 - Or conducted between sunset and sunrise, or
 - In an aircraft for which the pilot does not hold an appropriate category or class rating.

61.56 Flight review

- A flight review must have been satisfactorily completed within the previous 24 calendar months to act as PIC of an a/c for which that pilot is rated
 - A flight review consists of 1 hr of flight training by an authorized instructor and 1 hour of ground training.
- Reminder - calendar months: the expiration of the 24 month period for the flight review falls on the last day of the 24th month after the month of the exam date

61.57 Recent Flight Experience: Pilot in Command

- To carry pax, you must have made three landings and three takeoffs within the preceding 90 days.
 - All three landings must be made in a/c of the same category, class, and if a type rating is required, type as the one in which passengers are to be carried.
 - The classes are SES, SEL, MES, MEL
 - For tailwheel, the landings must be full stop landings.
- To carry pax at night, you must make three takeoffs and three full stop landings within the past 90 days in an aircraft as above. Must be 1 hr after sunset and 1 hr before sunrise

61.60 Change of Address

- You must notify the FAA in writing of a change of address; you may not exercise privileges of your pilot certificate after 30 days from moving unless you notified the FAA.

61.69 Glider and unpowered ultralight vehicle towing: experience and training requirements

- Any person may tow a glider if that person has at least a PPL, 100 hr of PIC time in the a/c category, class, and type (if req'd) that the pilot is using to tow a glider; a logbook endorsement from an authorized instructor certifying that the person has received ground and flight training in gliders
- Within the preceding 24 months, made at least three actual or simulated glider tows while accompanied by a qualified pilot or made at least three flights as PIC of a glider towed by an aircraft.

61.113 Private pilot privileges and limitations: Pilot in command

- Private Pilots may not pay less than an equal (pro rata) share of the operating expense of a flight with the passengers (these operating expenses may only involve fuel, oil, airport expenditures, or rental fees)
- PPLs may operate an a/c carrying passengers on business only if the flight is incidental to that business or employment and the pilot is not paid as a pilot.
 - Ex: a CPA who is a private pilot might fly an a/c carrying CPAs to a client. Such flight is incidental to the CPA's professional duties or business.

- A pilot may act as PIC of an a/c used in a passenger-carrying airlift sponsored by a charitable organization for which passengers make donations to the organization if:
 - The responsible FAA flight standards office is notified at least 7 days before the flight
 - The flight is conducted from an adequate public airport
 - The pilot has logged at least 500 hours
 - No aerobatic or formation flights
 - The aircraft is airworthy and holds a standard airworthiness certificate
 - day-VFR only
 - The flight is nonstop; begins and ends at the same airport; is conducted within 25 NM of the airport
- The PIC of an aircraft operating under BasicMed must adhere to the following:
 - The aircraft may not be certificated to carry more than 6 occupants and cannot have a maximum certificated takeoff weight >6,000 lb
 - If the a/c has more than 6 seats, you cannot simply remove seats and be able to fly the a/c.
 - No portion of the flight may be above FL180; conducted outside the US unless authorized by the country in which the flight is conducted, or at an IAS >250kt
 - The pilot must have available in their logbook the completed medical exam checklist and medical education course completion certificate.

SKIP 4.7 Recreational Pilot Related FARs

4.8 14 CFR Part 91: 91.3-91.151

91.3 Responsibility and authority of the PIC

- In emergencies, a pilot may deviate from FARs to the extent needed to maintain the safety of the a/c and passengers
- The PIC of an a/c is directly responsible for, and is the final authority as to, the operation of that aircraft
- A written report of any deviations from FARs should be filed with the FAA upon request.

91.7 Civil Aircraft Airworthiness

- The PIC is responsible for determining that the airplane is airworthy prior to every flight. The PIC shall discontinue the flight when unairworthy conditions (whether electrical, mechanical, or structural) occur.

91.9 Civil Aircraft Flight manual, marking, and placard requirements

- The airworthiness certificate, the FAA registration certificate, and the aircraft flight manual or operating limitations must be aboard.
- Memory aid ARROW:
 - A- airworthiness certificate

- R - registration certificate
- R - radio station license (FCC requirement for international flights)
- O - operating limitations, including
- W - weight and balance data
- The operating limitations of an airplane may be found in the current FAA-approved flight manual, approved manual material, markings, and placards, or any combination thereof.
 - An exception exists in the case of a/c issued an experimental airworthiness certificate or a special light-sport airworthiness certificate. The operating limitations for these are attached to the airworthiness certificate, which is carried onboard the aircraft.

91.15 Dropping objects

- No PIC of a civil a/c may allow any object to be dropped from that aircraft in flight that creates a hazard to persons or property, but dropping is allowed if reasonable precautions are taken to avoid injury or damage.

91.17 Alcohol or drugs

- No alc in blood by weight > .04%; or any alc consumed 8 hrs prior (8 hours bottle to throttle)
- No person may act as crewmember of a civil a/c if using any drug that affects the person's faculties in any way contrary to safety.
- Operating under the influence is grounds for the denial of an application for a certificate, rating, or authorization issued under part 91. Being hungover is still under the influence.
- A pilot may not allow a person obviously under the influence to be carried aboard an a/c except in an emergency or if the person is a medical patient under proper care.

91.103 Preflight action

- Pilots are req'd to familiarize themselves with all available info concerning the flight prior to every flight, and specifically to determine,
 - For any flight, runway lengths at airports of intended use and the a/c takeoff and landing requirements, and
 - If IFR or flights not in the vicinity of the airport,
 - Weather reports and forecasts, fuel requirements, alternatives, traffic delays

91.105 Flight Crewmembers at Stations

- During takeoff and landing, and while en route, each required flight crewmember shall keep their safety belt fastened while at his or her station. Shoulder harnesses must be used during takeoff and landing if available.

91.107 Use of safety belts, shoulder harnesses, and child restraint systems

- Pilots must ensure that all occupants are briefed on seatbelts and shoulder harnesses.
- Pilots must notify all occupants to fasten their safety belts and shoulder harnesses before taxi, takeoff, and landing.
- All passengers of airplanes must wear their safety belt and shoulder harness, if installed, during taxi, takeoffs, and landings. Children under 2 can be held by an adult, and parachutists can use the floor as a seat but must wear a seatbelt.

91.111 Operating near other aircraft

- No formation flights allowed except by prior arrangement with the PIC of each a/c

91.113 Right-of-way rules: except water operations

- Emergency a/c have the right of way over everyone else
- When two a/c are approaching head on, each pilot should turn to the right regardless of category
- When two a/c of diff categories are converging, the right of way depends on that with the least maneuverability. Thus, balloons over gliders over airships over airplanes or rotorcraft.
- When a/c of the same category are converging at approx the same altitude, except head on or nearly so, the a/c to the other's right has the right of way. Ex: if an airplane is approaching from your right side, it has the right of way.
- When two a/c are approaching to land, the a/c at the lower altitude has the right of way. Not to be abused by cutting or overtaking.
- A/c towing or refueling another aircraft has the right of way over all engine-driven aircraft.

91.115 Right-of-way rules: water operations

- When a/c, or an a/c and a vessel are on crossing courses, the a/c or vessel to the other's right has the right of way.

91.117 Aircraft speed

- Speed limit below 10,000 MSL is 250 kt
- Speed limit within B airspace is 250 kt. When flying under B airspace or in VFR corridors through B airspace, the speed limit is 200 kt.
- When at or below 2500 AGL and within 4 NM of the primary airport of a C or D airspace, the speed limit is 200 kt.

91.119 Minimum Safe Altitudes: General

- Over congested areas (cities, towns, settlements, or open-air assemblies) a pilot must maintain 1000 ft abv the highest obstacle within a horizontal radius of 2000 ft of the airplane
- The minimum altitude over other than congested areas is 500 ft AGL. Over open water or sparsely populated areas, an airplane may not be operated closer than 500 ft to any person, vessel, vehicle, or structure.

- Altitude in all areas must be sufficient to permit an emergency landing without undue hazard to persons or property on the surface if a power unit fails.

91.121 Altimeter Settings

- Prior to takeoff, the altimeter should be set to the current local altimeter setting. If the current local altimeter setting is not available, use the departure airport elevation.
- At or abv FL180 altimeter is 29.92

91.123 Compliance with ATC Clearances and Instructions

- When an ATC clearance is obtained, no pilot may deviate from that clearance, except in an emergency, unless an amended clearance is obtained or the deviation is in response to a TCAS advisory. If you feel a rule deviation will occur, advise ATC immediately.
- If you receive priority from ATC in an emergency, you must, upon request, file a detailed report within 48 hrs to the chief of that ATC facility even if no rule has been violated
- During an inflight emergency, the PIC may deviate from FARs to the extent necessary to handle the emergency. The pilot should notify ATC asap and file a report within 48 hours if requested.

91.151 Fuel Requirements for flight in VFR conditions

- During the day, FARs require sufficient fuel to fly to the first point of intended landing + 30 additional minutes
- At night, +45 minutes extra

4.9 14 CFR Part 91: 91.159-91.519

91.159 VFR Cruising Altitude or Flight Level

- Special VFR cruising altitudes when abv 3000 AGL and below FL180
 - Altitude prescribed is based on magnetic course, not heading
 - Altitude is in MSL
 - Magnetic courses 0-179, use an odd-thousand foot +500 - 3500, 5500, 7500, etc.
 - Magnetic courses 180-359, use an even-thousand foot +500 - 4500, 6500, etc.
 - "East is odd, west is even odder"

91.203 Civil Aircraft: certifications required

- Must have a US airworthiness certificate displayed in a manner that makes it legible to pax and crew
- A valid US registration issued to the owner of the a/c must be on board

91.207 Emergency locator transponders

- ELT batteries must be replaced or recharged after 1 cumulative hr of use or after 50% of the useful life expires

- ELTs may only be tested on the ground during the first 5 mins of the hour.
Airborne testing not allowed
- ELTs are req'd to be inspected every 12 months for proper installation, battery corrosion, operation of the controls and crash sensor, and the presence of a sufficient signal radiated from its antenna.

91.209 Aircraft Lights

- Airplanes operating between sunset and sunrise must display nav lights, except in Alaska.

91.211 Supplemental oxygen

- All occupants must be provided with oxygen in an airplane operated at cabin pressure altitudes above 15000 MSL.
 - Pilots and crewmembers may not operate an airplane at cabin pressure altitudes above 12500 MSL up to and including 14000 MSL for more than 30 mins without supplemental oxygen
 - Pilots and crewmembers must use supplemental oxygen at cabin pressure altitudes abv 14,000 MSL

91.215 ATC Transponder and Altitude reporting equipment and use

- All aircraft must use an altitude encoding transponder when operating:
 - Within class A airspace
 - Within class B airspace
 - Within 30 NM of a primary class B airport
 - Within and abv class C airspace
 - Abv 10,000 MSL except at and below 2500 AGL
- To enter class B airspace, you must submit a request for a deviation from the controlling ATC facility at least 1 hr before the proposed flight.

91.225 ADS-B Out Equipment and Use

- No person may operate an a/c in the following airspace unless the a/c has the appropriate ADS-B Out equipment:
 - Within class A airspace
 - Within and above class B airspace
 - Within 30 NM of the class B primary airport
 - Within and abv class C airspace
 - At and abv 10,000 MSL except at and below 2500 AGL
 - At and abv 3000 MSL over the gulf of mexico from the US coastline out to 12 NM
- These requirements do not apply to any aircraft not originally certificated with an electrical system or that has not subsequently been certified with such a system installed

- Requests for ATC-authorized deviations from these requirements must be made to the appropriate ATC facility at any time for an a/c with inop ADS-B Out, or at least 1 hr before the proposed operation of an a/c not equipped with ADS-B Out
- A/c operating with ADS-B Out must operate the equipment in the transmit mode at all times unless otherwise authorized by the Administrator in the interest of national defense, security, intelligence, or law enforcement purposes, or directed by ATC for safe ATC functions.

91.227 ADS-B Out Equipment performance requirements

- ADS-B Out is a function of an a/c's onboard avionics that periodically broadcasts the aircraft's state vector (3D position and 3D velocity)
- In class A airspace, 1090 MHz is required
- In ADS-B Out areas outside class A airspace, 1090 MHz or UAT on 978 MHz

91.307 Parachutes and parachuting

- With certain exceptions, each occupant of an aircraft must wear an approved parachute during any intentional maneuver exceeding a 60 degree bank or nose-up or nose-down attitude of 30 degrees.
- Parachutes available for emergency use must be packed within a specific time period based on their material. Exclusively synthetic fiber - repacked by a certificated and appropriately rated parachute rigger within the past 180 days
 - Contains natural fiber - repacked within past 60 days

91.313 Restricted category civil aircraft: operating limitations

- Restricted category civil a/c may not normally be operated over densely populated areas, in congested airways, or near a busy airport where pax transport is conducted

91.319 Aircraft having experimental certificates: operating limitations

- No experimental or restricted a/c over densely populated areas or in congested airways unless authorized by the FAA

91.403 General

- owner/operator of an a/c is primarily responsible for maintaining that a/c in airworthy condition and complying with all ADs
- An operator is a person who uses, or causes to use or authorizes to use, an aircraft for the purpose of air navigation, including the piloting of an aircraft, with or without the right of legal control. Thus the PIC is also responsible for ensuring airworthiness and AD compliance.

91.405 Maintenance required

- Each owner/operator of an a/c shall ensure that maintenance personnel make the appropriate entries in a/c maintenance records indicating the a/c has been approved for return to service.

91.407 Operation after maintenance, preventive maintenance, rebuilding, or alteration

- When a/c alterations or repairs change the flight characteristics, the a/c must be test flown and approved for return to service prior to carrying pax. The pilot test flying the a/c must be at least a PPL and rated for the type of a/c being tested

91.409 Inspections

- Annuals expire the last day of the 12th calendar month after the previous annual
- All a/c used for compensation or hire, incl flight instruction, must be inspected on a 100-hr basis in addition to the annual. 100 hr inspections are due every 100 hr from the prior due time, regardless of when the inspection was actually performed.

91.413 ATC Transponder tests and inspections

- No person may use an ATC transponder unless it has been tested and inspected within the preceding 24 calendar months

91.417 Maintenance records

- An airplane cannot be flown unless it has been given an annual within the preceding 12 calendar months. The annual expires after 1 year, on the last day of the month of issuance.

91.421 Rebuilt engine maintenance records

- A new maintenance record, without previous operating history, may be used for an a/c engine rebuilt by the manufacturer or by an agency approved by the manufacturer

91.519 Passenger Briefing

- The PIC is responsible for ensuring that all pax have been orally briefed prior to takeoff. The areas that constitute this briefing are:
 - Smoking
 - Use of safety belts and shoulder harnesses
 - Location and means of opening the passenger entry door and emergency exits
 - Location of survival equipment
 - Ditching procedures and the use of flotation equipment, and
 - Normal and emergency use of oxygen equipment if installed in the a/c.

4.10 NTSB Part 830

830.5 Immediate Notification

- Even when no injuries occur, accidents resulting in substantial damage must be reported to the NTSB immediately.
- Following must also be reported immediately:
 - Inability of any required crewmember to perform normal flight duties because of inflight injury or illness
 - Inflight fire
 - Flight control system malfunction or failure
 - An overdue airplane that is believed to be involved in an accident

- An airplane collision in flight
- Turbine (jet) engine failures

830.10 Preservation of aircraft wreckage, mail, cargo, and records

- Prior to the time the board or its authorized representative takes custody of a/c wreckage, mail, or cargo, such wreckage, mail, or cargo may not be disturbed or moved except to remove persons injured or trapped, protect the wreckage from further damage, or protect the public from injury

830.15 Reports and Statements to be filed

- The operator of an a/c shall file a report on Board Form 6120.1/2 within 10 days after an accident. A report must be filed within 7 days if an overdue a/c is still missing
- A report on an incident for which immediate notification is required shall be filed only when requested by an authorized representative of the NTSB.

Unit 4 Quiz (skipped 28 questions for RPA) 161/170 = 95%

Missed Questions 9

1. Categories are broad classifications; classes are more specific. Categories, with respect to the certification of airmen, include airplane, rotorcraft, glider, lighter-than-air

2. Classes, with respect to the certification of airmen, include SEL/SES, MEL/MES.

11. V_x gives the best angle of climb, which is the greatest gain in altitude over the shortest distance.

~~41. Rec-pilot question~~

47. If recency of experience requirements for night flight are not met and official sunset is 1830, the latest time pax may be carried is 1929, since recency of night requirements are 1 hour after sunset and 1 hr before sunrise.

50. Night recency of experience requirements include the same category and class of a/c to be used, but not necessarily the type because it is only if required.

55. In order to act as PIC of a glider towing a/c, you must log 100 hours of PIC time in the a/c category, class, and type, if required, that the pilot is using to tow a glider.

111. Safety belts are required by passengers during taxi, takeoff, and landing. They are not *required* during the entire flight.

119. What action is required when two aircraft of the same category converge, but not head-on? The a/c on the left gives way since the other aircraft is on their right

173. After an alteration or repair that substantially affects flight characteristics, it must be test flown before it is operated with pax.