Instrument Regulations Overview

The following is a summary of relevant sections of 14 CFR Parts 61 and 91 as it relates to instrument flying. Use this guide to study the regulations how you see fit. Flashcards can be a great way to ingrain the basics. If you have questions about the regulation itself or how to apply it in the instrument environment, don't hesitate to reach out!

§61.3 Requirements for certificates, ratings, and authorizations.

- No person can act as a required flight crew member unless certified.
- Have a valid medical.
- Have a valid government issued photo ID.

§61.51 Pilot Logbooks

- You must document training time and aeronautical experience to meet requirements for a certificate.
- You must document aeronautical experience to meet recent flight experience for currency.
    - Logging instrument time.
    - You may log instrument time ONLY for the flight time when you operate the aircraft solely by reference to instruments under actual or simulated conditions.
    - You will need to log flight time, location and type of instrument approach and safety pilot or instructor (with signature if flight training has been received)
- You can use certain flight simulators for training and currency.

§61.57 Recent flight experience: Pilot in command

- You cannot act as Pilot in command unless you are current.
    - To carry passengers:
        - Pilot needs 3 takeoff and landings within the preceding 90 days.
        - For night currency pilot needs 3 takeoff and landings at night to a full stop.
- Instrument currency:
    - Within the preceding 6 calendar months of the flight.
        - 6 Instrument approaches.
        - Holding procedures and tasks.
        - Intercepting and tracking courses through navigational systems.
        - Use of certain simulators may be used to maintain Instrument currency.
- Instrument Proficiency check:
        - If you have not been instrument current for more than 6 calendar months you may reestablish instrument currency ONLY by completing an instrument proficiency check.
        - Instrument proficiency checks must consist of at least 3 instrument approaches
        - The instrument proficiency check must be done by an instructor, examiner or someone approved by the Administrator (FAA).
        - The instrument proficiency check is conducted in accordance with the instrument ACS. Who ever is doing the check will have their own standards. Because this is a *proficiency* check, more training may be required to assure a level of competency consistent with ACS standards.

§61.65 Instrument rating requirements

- General
  - Hold a private pilot rating.
  - Be able to read, write, and understand the English language.
  - Receive and log ground training that apply for the instrument.
  - Receive endorsement to take instrument written. (Then pass it)
  - Receive and log flight training.
  - Receive endorsement for practical test. (Then pass it)
- Aeronautical experience for instrument airplane rating
  - 50 hours x-counrty flight as PIC (10 must be in airplane)
  - 40 hours of actual or simulated instrument flight. (15 must be with an authorized instructor)
  - 3 hours of instrument training in last 2 calendar months preceding the practical test.
  - Instrument flight training on x-counrty flight procedures. Including:
    - A flight of 250 nautical miles. Along airways or directed routing by ATC.
      - An Instrument approach at each airport
      - 3 different kinds of approaches with the use of navigation systems.

§61.333 Commercial pilot privileges and limitations

- If you have a commercial pilot certificate with out an instrument rating the carriage of passengers for hire on cross country flights in excess of 50 nautical miles OR at night is prohibited.

§91.3 - PIC Responsibility/Authority.

- PIC has final authority and can deviate from any rule of part 91 in an emergency. If the FAA requests, PIC must send a written explanation of the deviation.

§91.103 - Pre flight action

- The PIC must be familiar with all available information concerning a flight. This includes runway lengths, takeoff and landing distance required, weather reports and forecasts, fuel requirements, ATC delays and available alternates. Many pilots simplify this process using the acronym NWKRAFT.. (Notams, Weather, Known ATC Delays, Runways, Alternates, Fuel, Takeoff and Landing Distance).

§91.109 Flight instruction, Simulated instrument flight and certain flight tests.

- If doing IFR training in an aircraft with a throw over yolk the instructor must have 25 hours of PIC time in make and model of aircraft.
- Safety pilot has must be rated for the aircraft and have adequate vision forward and to each side of the aircraft.

§91.113 - Right of way

- Regardless of weather conditions, pilots have a responsibility to “see and avoid”.
- Aircraft in distress have right-of-way. Right-of-way scenarios are usually on the written exam, so review it.

§91.121 - Altimeter settings

- Set the altimeter to a reported altimeter setting within 100 nautical miles of the aircraft, or to the elevation of the departure airport if no altimeter setting is available or no radio is available.
- When establishing 2 way radio communication with ATC they usually give you a new altimeter setting.
- Above 18,000 set the altimeter to 29.92

§91.123 - Compliance with ATC
- PIC may not deviate from an ATC clearance unless:
- A new clearance is obtained
- Emergency (any UNSAFE situation)
- Deviation for a TCAS resolution advisory (equipment is uncommon in training airplanes)
- Pilots may not deviate from an ATC instruction except in an emergency (safety).
- If a pilot is given priority in an emergency, they should submit a report to ATC within 48 hours if requested. Side note: There are no fees, punishments etc for declaring an emergency. When in doubt, declare. Most pilots are scared to declare an emergency for one reason or another. Pilots and passengers, even in airlines, have died because pilots didn't declare an emergency in time.

§91.129 Class D: When operating in class D…
- ATC communications must be established prior to entering the airspace. When departing from the primary airport, communications must be maintained until instructed by ATC. No pilot can operate on a runway or taxiway, or takeoff or land without an appropriate clearance.

§91.130 Class C: When operating in class C…
- When departing from the primary airport, communications must be maintained until instructed by ATC.
- No pilot may operate in or over Class C unless equipped with a Mode C Transponder, or after Jan 1 2020, ADSB.

§91.131 - Class B: When operating in class B…
- A clearance is not required by the ATC facility with jurisdiction for IFR flight.
- A mode C transponder is required, and after 2020, ADSB.

§91.135 - When operating in class A…
- Aircraft must conduct operations under IFR with an ATC clearance (this means pilot and airplane must meet IFR requirements as well).
- A mode C transponder is required and, after 2020 ADS-B.

§91.155 - Basic VFR Weather Minimums
- Class A - N/A
- Class B - 3sm and remain clear of clouds
- Class C - 3sm, 500' below, 1000' above, 2000' horizontal.
- Class D - 3sm, 500' below, 1000' above, 2000' horizontal.
- Class E -
  - Below 10,000: 3sm, 500' below, 1000' above, 2000' horizontal. At or Above 10,000: 5sm, 1,000 below, 1,000 above, 1sm horizontal.
- Class G -

- 1,200 and below from the surface (regardless of MSL): 1sm and clear of clouds. At or above 10,000: 5sm, 1,000 below, 1,000 above, 1sm horizontal
- Otherwise…
- Day: 1sm and clear of clouds
- Night: 3sm, 500' below, 1000' above, 2000' horizontal. You may operate at night with visibility at least 1sm and clear of clouds if within class G and within 1/2sm of the runway. —> You probably shouldn't but you can.
- No-one may operate an aircraft beneath a ceiling under VFR, within the lateral bounds of controlled airspace to the surface unless the ceiling is at least 1,000 feet (unless they have special VFR).
- Nobody may takeoff, land or enter the traffic pattern within the lateral boundaries of surface areas of Class B, C, D or E unless ground visibility is at least 3sm, or flight visibility is at least 3sm.
- Aircraft operating at the base of a class E area are considered to be in the airspace directly below that airspace.

§91.157 - Special VFR Weather minimums.

- Special VFR operations allow for operation with visibility of 1sm within the lateral bounds of controlled airspace to the surface.
- Day Special VFR may be conducted if…
  - Operations are below 10,000 MSL, with ATC clearance, and the aircraft remains clear of clouds.
- Night Special VFR may conducted if the requirements for Day SVFR are met and the pilot and aircraft are certified and equipped for IFR flight. (In which case, just go IFR dummy).

§91.161 Special awareness training required.

- Special Awareness training is required if flying VFR (even if IFR training) wishing 60 nm of the Washington, DC VOR/DME.

§91.167 Fuel requirements for IFR.

- You need enough fuel to complete the flight to intended airport plus:
  - Fly to you alternate if one is required.
  - Fly after that for 45 minutes.

§91.169 IFR flight plan: information required.

- You need to have all the same information that was on your VFR flight plan. Such as aircraft tail number, type of aircraft, your full name, point of departure, point of arrival, proposed route, fuel required, fuel on board, number of people on board.
- You will also need to have an alternate airport. UNLESS the weather at the airport of first intended landing is better then the the 1-2-3 rule.
  - 1-2-3 Rule: For at least **1** hour before and 1 hour after your ETA, the ceiling will be at least **2**,000 feet above the airport and the visibility will be greater then **3** statue miles.

§91.171 VOR equipment check for IFR.

- No person may operate an aircraft under IFR using a VOR unless it has been checked within the last **30** and found to be within standards.
- Dual VOR check needs to be within 4 degrees of each other.
- VOT and ground checks needs to be within +/- 4 degrees.

- Airborne check needs to be within +/- 6 degrees.
- After testing the VOR it must be signed off. That will include: Date, place, bearing error, and signature of who is signing it off.

§91.173 ATC clearances and flight plan required.

- You cannot operate under IFR unless you have:
  - Filed a IFR flight plan.
  - Received and appropriate ATC clearance.

§91.175 Taking off and landing under IFR.

- When landing at an airport requires an instrument approach that instrument approach must be standard instrument approach procedure prescribed in part 97. It must be approved you cannot make up your own approach for IFR flight.
- You cannot operate below the MDA or continue the approach below the DA.DH unless:
  - The flight visibility is not less than prescribed on the approach.
  - Except fro Cat II or III at least one visual reference for intended runway is distinctly visible to pilot.
    - Approach light system. Except you cannot descend below 100 feet above touchdown zone elevating unless you can see the red terminating bars or the side row bars are viable.
    - Threshold markings and lights, runway end identifier lights, glide slope indicator, touchdown zone /markings and lights, the runway, runway markings and lights.
- You can not land unless visibility is greater than prescribed on the approach.
- You must “Go” missed approach when get to MAP and do not have visual, IF you loose visual while bellow DA/DH or MDA.
- Taking off: under part 91 you can take off in zero zero. That means zero visibility and zero ceiling. Just for reference some commercial weather requirements are: aircraft with 1 engine is 1sm visibility and aircraft with 2 1/2 mile visibility.

§91.177 Minimum ALT for IFR operations.

- Except for take off and landing you cannot operate below minimum altitudes. (Part 95 and 97 of the FARs)
- If there is no alt prescribed the in mountainous areas then as alt of 2,000 feet above the highest obstacle with 4 NM of the course to be flown. If in non mountainous then 1,000 feet above the tightest obstacle.
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§91.179 IFR aircraft should cruise:

- In controlled airspace at alt assigned by ATC.
- On a magnetic course of 0-179 degrees at odd-thousands (3000, 5000, etc)
- On a magnetic course of 180-359 degrees at even-thousands (4000, 6000, etc)
- When at flight level 180 (18,000 MSL) or greater maintain altitude assigned. They will typically still be even going west and odd going east.
- If flying VFR on top fly at a VFR cruising alt. even/ odd thousand plus 500 feet.

§91.181 Course to be flown

- Fly on your cleared route along the center of that airway.
- Still maneuver well clear of traffic.

- Don’t forget you can always request heading changes or course changes with ATC while in flight.

§91.183 IFR communications.
- Pilot must maintain contact with the appropriate ATC.
- Must report time and alt of passing each designated reporting point, or points ATC has asked you to report.
- You must report any: un-forecasted weather conditions, ANY other information relating to safety of flight.

§91.185 Loss of 2 way radio communications.
- If communication has been lost in VFR conditions. Stay VFR and land as soon as practicable and contact to ATC.
- If communication has been lost in IFR conditions continue the flight. But you must comply with 2 areas. Route and Alt. Route you can use the pneumonic AVE F (its the safest street to travel on) and Alt use the highest of MEA.
  - **A**ssigned by ATC
  - **V**ectored by ATC
  - **E**xpected
  - **F**iled
  - **M**inimum alt
  - **E**xpected
  - **A**ssigned

§91.187 Malfunction reports.
- PIC needs to report any malfunctions of navigational, approach, or communication equipment that happens during flight.
  - Need to advise equipment affected, the degree of how it effects you. And what type of assistance desired from ATC.

§91.203 - Aircraft require an operating certificate and registration certificate (or application for registration).

§91.205 - Required equipment.
- Outlines the required equipment for VFR day, night, and IFR flight. We outline this using the acronym ATOMATOFLAMES (day), FLAPS (night) and GRABCARD (IFR)
- In addition this section requires:
  - For small civil airplanes certificated after March 11, 1996, an anti-collision light system is required (before 1996 it is only required at night).
  - If operating for hire and beyond power off gliding distance from shore, approved flotation gear (life vests) are required for each occupant.
  - An approved restraint system for all occupants 2 years of age and older
  - A shoulder harness for each front seat if the airplane was manufactured after July 18, 1978
  - A shoulder harness for all seats if the airplane was manufactured after Dec 12, 1986

§91.207 - Stipulates the requirement for emergency locator transmitters (ELTs).

- ELT batteries must be replaced or recharged if used for more than 1 cumulative hour, when 50% of the useful life of the battery has been reached (which shall be clearly marked on the outside of the transmitter).
- ELTs must be inspected every 12 calendar months.
- Flights may be conducted without ELTs if they are:
- Ferrying it somewhere to repair (if repairs cannot be made at its current location) or install an ELT. No person other than required crew members may be carried.
- ELTs are NOT need for—
  - Aircraft doing training operations entirely within a 50nm distance from the airport
  - Flight operations required for design and testing.
  - Cropdusting
  - Aircraft equipped to carry only one person
  - If the ELT is removed for inspection, repair, modification or replacement and the aircraft records include specific phrasing and specific placards are in view of the pilot. In this case, the aircraft can be operated for up to 90 days.

§91.211 Supplemental oxygen.

- Supplemental oxygen is required for flight crew above 12,500' pressure altitude when operating at that altitude for more than 30 minutes.
- Above 14,000, the minimum flight crew is required to use oxygen during the whole time at that altitude.
- Above 15,000 oxygen is required to be available for each occupant.

§91.213 Inoperative Equipment.

- This section specifies the procedures for MELs and flying with inoperative equipment. If equipment is inoperative, can we fly? If it is approved an MEL, then yes. Likely we won't have an MEL. In that case…
  - Is it required by type certification?
  - Is it required by the aircraft's equipment list (POH) or Kinds of Operation Equipment List?
  - Is it required by 91.205 IFR (if applicable)? (ATOMATOFLAMES/FLAPS+GRABCRAD)
  - Is it required by Airworthiness Directive?
  - Is it required for the type of navigation you need for your flight plan?
  - If the answer to ALL of those questions is no, then we can go. But first we'll have to remove or deactivate the equipment, placard it as inoperative or removed and make a note in the maintenance logbook. Think about it this way — imagine another pilot was going to take it flying after, but you won't see them. They need to know what is broken and what you have done. This is technically true even in your own airplane.

§91.215 - Mode C Transponders with ADSB are required in:

- Class A, B and C airspaces
- Above class B and C airspace
- Within mode C veils
- At and above 10,000' unless at or below 2500' AGL
- Crossing the ADIZ line

§91.409 - Annual and 100-hr inspections.

- Annual Inspection every 12 calendar months. (signed off by IA)

- 100 hour inspection every 100 hours of tachometer time, if the airplane is for hire (A&P or IA)
- Annual and 100 hour compliance is not required if operating under a special flight permit.
- Inspections in General: We use A1TAPE or AVIATE to remember these. These will be on your written test and oral. Memorize them.
  - **A**nnual Inspection every 12 calendar months.
  - **1**00 hour inspection every 100 hours of tachometer time, if the airplane is for hire
  - **T**ransponder every 24 calendar months
  - **A**irworthiness Directives. (ADs)
  - **P**itot-Static every 24 calendar months (IFR, controlled airspace only)
  - **E**LT (1 hr cumulative use, 50% battery life or every 12 calendar months)

§91.411 - Pitot Static Test.

- Required at least every 24 calendar months. Logbook entries for pitot-static tests will reference this number.

§91.413 - Transponder Test.

- Required at least every 24 calendar months. Logbook entries for transponder tests reference this number.

§91.417 - Maintenance Records.

- Records must be kept for each aircraft including the airframe, engine and propeller and must include: date of work completion, work performed, signature of person approving a return to service, among several other items. That signature is a critical component. If It is an annual inspection there must be a I.A. next to the signature. This means the mechanic has Inspection Authority and is authorized to sign off a annual inspection.

§97.3 Symbols and terms used in procedures.

- Approach category.
  - A- 0 - 90 knots
  - B- 91 - 120 knots
  - C- 121 - 140 knots
  - D- 141 - 165 knots
  - E- Greater than 165 knots