

## V.A. Preflight Inspection

---

References: AC 61-84; FAA-H-8083-3; FAA-H-8083-23; POH/AFM

Objectives	The student should develop knowledge of the elements related to a comprehensive preflight inspection. The student will understand what to look for during each part of the inspection and have the ability to perform the preflight inspection as required by the checklist and the PTS.
Key Elements	<ol style="list-style-type: none"><li>1. DA20 Specific Checklist</li><li>2. Airworthiness and Safe</li><li>3. Fuel Grade and Contamination</li><li>4. Oil Level (4-6 Quarts)</li></ol>
Elements	<ol style="list-style-type: none"><li>1. Reasons for the Preflight Inspection</li><li>2. Checklist</li><li>3. The Preflight Overview</li><li>4. What to Inspect</li><li>5. Detecting Problems</li><li>6. Ice and Frost</li><li>7. Loading and Securing</li><li>8. Determining the Airplane is Safe</li></ol>
Schedule	<ol style="list-style-type: none"><li>1. Discuss Objectives</li><li>2. Review material</li><li>3. Development</li><li>4. Conclusion</li></ol>
Equipment	<ol style="list-style-type: none"><li>1. White board and markers</li><li>2. References</li></ol>
IP's Actions	<ol style="list-style-type: none"><li>1. Discuss lesson objectives</li><li>2. Present Lecture</li><li>3. Ask and Answer Questions</li><li>4. Assign homework</li></ol>
SP's Actions	<ol style="list-style-type: none"><li>1. Participate in discussion</li><li>2. Take notes</li><li>3. Ask and respond to questions</li></ol>
Completion Standards	The student can perform a comprehensive preflight inspection, understanding what to look for at each part of the inspection. The student will be able to determine whether or not the airplane is airworthy and in a condition for safe flight.

**Instructors Notes:**

---

**Introduction:**

**Attention**

Interesting fact or attention grabbing story

Interesting fact or attention grabbing story

We don't want to find a problem with the airplane while we're in the air. For that reason, we go through a relatively thorough preflight on the ground, allowing us to find and fix any problems before we get in the air where things get much more difficult and dangerous.

**Overview**

Review Objectives and Elements/Key ideas

**What**

The preflight inspection is a thorough check of the airplane to ensure airworthiness and safety prior to flight.

**Why**

The accomplishment of safe flight begins with a careful preflight inspection. The preflight inspection determines the airplane is legally airworthy, and that it is in condition for safe flight.

**How:**

**1. Reasons for the Preflight Inspection**

- A. To determine the airplane has no obvious problems before taking off

**2. Checklist**

- A. Each airplane has a specific preflight procedure designed by the manufacturer - Section 4 of the POH
  - i. Using a different checklist will result in missing equipment and confusion
  - ii. **CE** - Failure to use, or the improper use, of a checklist
    - a. Checklists ensure all necessary items for a specific airplane are checked in a logical sequence
    - b. They are not just a crutch for poor memory
- B. Always have the checklist to be used as a reference to ensure everything is checked
- C. **CE** - Hazards which may result from allowing distractions to interrupt a visual inspection
  - i. Distractions may result in missing items on the checklist or not recognizing a discrepancy
  - ii. If distracted, start at the beginning or repeat the preceding two or three items

**3. The Preflight Overview**

- A. The preflight will logically move around the airplane in order to ensure it is in a condition for safe flight
- B. It should begin while approaching the airplane on the ramp
  - i. Make a note of the appearance, looking for obvious problems
    - a. Gear out of alignment, structural distortion, skin damage, dripping fuel/oil leaks, etc.
- C. Upon reaching the airplane, all Tie Downs, Control Locks, and Chocks should be removed

**4. What to Inspect**

- A. Inside the Cockpit
  - i. Airworthiness - Required Documents (AROW)
  - ii. Logbooks – To ensure the required tests and inspections have been completed (\*Not in the cockpit)
    - a. Annual, 100 hr, Static/Transponder/Altimeter (24 mo), ELT (12 mo), ADs are complied with
  - iii. Required equipment for the flight (EX: Mode C transponder in Class B/C Airspace, Instruments)
  - iv. Inspect the items inside the airplane (Instruments, Switches, Mixture, etc., as listed on the checklist)
- B. Outside the Airplane
  - i. Inspect the items outside the airplane (Structure, Controls, Engine, Prop, Gear, Struts, everything)

- ii. Defects are detected by following the checklist and looking for something wrong in each item
- iii. **CE** - Inability to recognize discrepancies to determine airworthiness
  - a. Understand what you are looking at or for, and what is required to be safe/normal

## 5. Detecting Problems

- A. Visible Structural Damage
  - i. Check for dents, cracks, tears which can affect airplane performance
    - a. The Diamond aircraft cannot be flown if a dent is found because of their construction
  - ii. Check for leaks/stains as they are signs of potential problems
  - iii. Look for missing rivets/bolts/etc.
  - iv. Inspect the propeller for nicks/cracks
- B. Flight Controls
  - i. Ensure the flight controls move freely/correctly and are attached securely/properly
  - ii. Inspect the balance weights
  - iii. Check the flap movement and connection, etc.
- C. Fuel Quantity and Contamination
  - i. Quantity - Confirm the fuel quantity indicated on the gauge by a visual inspection (DA20: Fuel stick)
    - a. Airplane attitude, gauge malfunctions, etc. can result in incorrect readings
  - ii. Contamination
    - a. Type, Grade of Fuel – Critical to safe flight
      - Looking for 100LL (AVGAS) – Blue with a familiar gasoline scent
      - Jet-A is clear, has a kerosene scent, and disastrous effects when in reciprocating engines
        - a. The engine will be destroyed from detonation
          - 1. Detonation - The uncontrolled explosive combustion of the fuel/air mixture in the cylinder's combustion chamber
        - b. Refueling trucks are marked with JET-A placards
      - Supervise fueling to ensure the right type, and grade of fuel and the fuel caps are in place
      - Never substitute a lower grade of fuel for a required higher grade (Detonation will result)
        - a. 80 is Red; 100LL is Blue; 100 is Green; Jet Fuel is Clear
    - b. Water and Other Sediment – Usually from condensation in partially filled tanks or bad seals
      - a. Water is heavier than fuel and therefore accumulates in the low points
      - b. Prevented by minimizing the opportunity for condensation – keep the tanks full
      - Sediment can arise from dust/dirt entering the tanks
    - c. Checking the Grade and Removing the Water and Other Contamination
      - Drain the fuel from the gascolator/tank sumps checking for color, smell, water, and contamination
        - a. If water/contaminants are found continue draining until they have been removed
- D. Oil Quantity and Contamination
  - i. Check the oil level on the oil dip stick to ensure it is at an acceptable amount (4-6 quarts)
    - a. The plane will use a small amount each flight, if a large amount is used there may be a problem
  - ii. Contamination can be detected by any discoloration
- E. **CE** - Failure to ensure servicing with the proper fuel and oil
  - i. Always drain a sample of fuel and ensure the correct fuel is being put into the airplane
  - ii. When adding oil, ensure it is the type called for in the POH
- F. Leaks (Fuel, Oil, Hydraulic)
  - i. Check to see there are no leaks under the airplane, inside the cowling, or on the wheel struts
    - a. The fuel vent may appear to be a leak, but it's purpose is to allow air into the tank or vent excess fuel depending on pressure differences

**6. Ice and Frost**

- A. Small amounts of ice/frost can disrupt the airflow over the wing, increasing stall speed and reducing lift
- B. Do not fly unless the ice/frost is removed from the airfoils
  - i. Heated hangar, spraying deicing compounds, scraping it off

**7. Loading and Securing (Baggage, Equipment, Cargo)**

- A. Ensure everything is in its place and secure, you do not want items flying around in flight (turbulence)
  - i. CG could be affected if items are moving during flight
  - ii. Movement of heavy items could damage the aircraft
- B. **CE** - Failure to ensure proper loading and securing of baggage, cargo, and equipment

**8. Determining the Airplane is Safe**

- A. Note any discrepancies during the preflight and make sound judgments
  - i. The PIC is responsible for determining the airplane is airworthy and safe
    - a. If you have doubt, ask someone with more experience
  - ii. Don't attempt a flight if you are uncomfortable or not completely satisfied the airplane is safe

**Common Errors:**

- Failure to use or the improper use of a checklist
- Hazards which may result from allowing distractions to interrupt a visual inspection
- Inability to recognize discrepancies to determine airworthiness
- Failure to ensure servicing with the proper fuel and oil
- Failure to ensure proper loading and securing of baggage, cargo, and equipment

**Conclusion:**

Brief review of the main points

A safe flight begins with a thorough preflight as prescribed in the airplane's POH. This preflight inspection ensures the airplane is both airworthy and safe for flight.

**PTS Requirements:**

To determine that the applicant:

1. Exhibits instructional knowledge of the elements of a preflight inspection, as applicable to the airplane used for the practical test, by describing:
  - a. Reasons for the preflight inspection, items that should be inspected, and how defects are detected.
  - b. Importance of using the appropriate checklist.
  - c. How to determine fuel and oil quantity and contamination.
  - d. Detection of fuel, oil, and hydraulic leaks.
  - e. Inspection of the oxygen system, including supply and proper operation (if applicable).
  - f. Inspection of the flight controls and water rudder (if applicable).
  - g. Detection of visible structural damage.
  - h. Removal of tie-downs, control locks, and wheel chocks.
  - i. Removal of ice and frost.
  - j. Importance of the proper loading and securing of baggage, cargo, and equipment.
  - k. Use of sound judgment in determining whether the airplane is in an airworthy condition for safe flight.
2. Exhibits instructional knowledge of common errors related to a preflight inspection by describing:
  - a. Failure to use or the improper use of checklist.
  - b. Hazards which may result from allowing distractions to interrupt a visual inspection.
  - c. Inability to recognize discrepancies to determine airworthiness.

## V.A. Preflight Inspection

- d. Failure to assure servicing with the proper fuel and oil.
  - e. Failure to ensure proper loading and securing of baggage, cargo, and equipment.
3. Demonstrates and simultaneously explains a preflight inspection from an instructional standpoint.