V.A. Preflight Inspection

Objectives	The student should develop knowledge of the elements related to a comprehensive preflight inspection. The student should know what to look for during each part of the inspection and be able to perform the preflight inspection as required in the necessary ACS.
Key Elements	✈ P28A specific checklist ✈ Airworthiness ✈ Fuel grade and contamination ✈ Oil level
Elements	✈ Checklist ✈ Preflight overview ✈ What to inspect ✈ Detecting problems ✈ Ice and frost ✈ Loading and securing ✈ Determining the airplane is safe
Schedule	1. Discuss objectives 2. Review material 3. Development 4. Conclusion
Equipment	✈ White board ✈ Markers ✈ References
Instructor's Actions	1. Discuss lesson objectives 2. Present lecture 3. Questions 4. Homework
Student's Actions	Participate in discussion Take notes
Completion Standards	The student can perform a comprehensive preflight inspection, knowing what to look for at each part of the inspection, and can determine whether or not the airplane is airworthy and in a condition for safe flight.
References	FAA-H-8083-3B, *Airplane Flying Handbook* (Chapter 2) POH/AFM

Instructor Notes

Introduction

Overview—review objectives and key ideas.
What—a thorough check of the airplane to ensure airworthiness and safety prior to flight.
Why—to determine the airplane is in a condition for a safe flight.

Checklist

Each airplane has a manufacturer-specified preflight procedure—POH Section 4. Using a different checklist can result in missing equipment and confusion. Checklists ensure that all necessary items for a specific airplane are checked in a logical sequence. Always have the checklist to use as a reference.
CE—failure to use or improper use of a checklist.
Don't get distracted during the preflight—you may miss items on the checklist or not recognize a discrepancy. If that happens, start at the beginning!
CE—Hazards which may result from allowing distractions to interrupt a visual inspection.

Preflight overview

Preflight procedures move logically around the airplane in order.
Begin preflight while approaching the airplane on the ramp—note its appearance, look for obvious problems (gear out of alignment, structural distortions, skin damage, dripping fuel, oil leaks), and remove tie downs, control locks, and chocks upon reaching the airplane.

What to inspect

Inside the airplane:

- Check for required documents—AR(R)OW
- Check the logbooks to ensure required tests/inspections have been completed (Annual, 100hr, Static/Transponder/Altimeter, ELT, ADs)
- Required equipment for the flight (instruments, transponder)
- Instruments, switches, mixture (as listed on checklist)

Outside the airplane:

- Inspect all items outside the airplane (structure, controls, engine, propeller, gear, struts, etc.)
- Detect defects by following the checklist and looking for something wrong in each item. Understand what you are looking at/for and what is required for safe/normal operation.

CE—inability to recognize discrepancies to determine airworthiness.

Detecting problems

Visible structural damage

- Dents, cracks, tears that can affect airplane performance
- Leaks, stains—signs of potential problems
- Missing rivets, bolts, etc.

- Nicks, cracks on propeller

Flight controls

- Move freely and correctly, are attached securely and properly
- Flap movement and connection

Fuel

- Quantity—confirm quantity indicated on gauge by a visual inspection and/or fuel stick. Airplane attitude and gauge malfunctions can result in incorrect readings.
- Contamination—100LL (avgas) is blue and has a familiar gasoline scent; Jet-A is clear and has a kerosene scent.
- Using Jet-A in a reciprocating engine will destroy it from detonation (uncontrolled explosive combustion of the fuel/air mixture in the cylinder's combustion chamber).
- Supervise fueling to ensure you get the right type and grade of fuel, and to ensure the fuel caps are in place.
- Do not substitute lower grade of fuel—will result in detonation.
- 80-red; 100LL-blue; 100-green; Jet-A-clear
- Water and other sediment is heavier than fuel and will accumulate in the low points. Usually from condensation in partially filled tanks or bad seals—keep the tanks full to minimize the opportunity for condensation.
- Sediment can arise from dust/dirt entering the tanks.
- Drain fuel from gascolator/tanks and check for color, smell, water, contamination. If you find contaminants, continue draining until they have been removed.

Oil

- Check oil level on oil dip stick to ensure it is at an acceptable amount. The plane will use a small amount on each flight—if a large amount is used, there may be a problem.
- Discoloration can indicate contamination.
- Add the type of oil that is called for in the POH.
- Check for leaks under the airplane, inside the cowling, or on the wheel struts.

CE—failure to ensure servicing with the proper fuel and oil.

Ice and frost

Small amounts of ice and frost can disrupt the airflow over the wing, increasing stall speed and reducing lift—do not fly until you remove the ice/frost. Use a heated hangar, spray deicing compounds, or scrape it off.

Loading and securing

Ensure everything is secure in its place and not moving around—movement could affect the CG and movement of heavy items could damage the aircraft.

CE—failure to ensure proper loading and securing of baggage, cargo, and equipment.

Determining the airplane is safe

Note any discrepancies during the preflight and make sound judgments. The PIC is responsible for determining if the airplane is airworthy and safe; when in doubt, ask someone more experienced.
Don't attempt to fly if you are uncomfortable or not satisfied that 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 main points.

CFI PTS

Objective: 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 airworthy and in 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 a checklist.
b. Hazards which may result from allowing distractions to interrupt a visual inspection.
c. Inability to recognize discrepancies to determine airworthiness.
d. Failure to ensure 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.

PPL ACS

Task	*A. Preflight Assessment*
References	FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-23; POH/AFM; AC 00-6
Objective	To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with preparing for safe flight.
Knowledge	The applicant demonstrates understanding of:
PA.II.A.K1	Pilot self-assessment.
PA.II.A.K2	Determining that the airplane to be used is appropriate and airworthy.
PA.II.A.K3	Airplane preflight inspection including:
PA.II.A.K3a	a. Which items must be inspected
PA.II.A.K3b	b. The reasons for checking each item
PA.II.A.K3c	c. How to detect possible defects
PA.II.A.K3d	d. The associated regulations
PA.II.A.K4	Environmental factors including weather, terrain, route selection, and obstructions.
Risk Management	The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing:
PA.II.A.R1	Pilot.
PA.II.A.R2	Aircraft.
PA.II.A.R3	Environment (e.g., weather, airports, airspace, terrain, obstacles).
PA.II.A.R4	External pressures.
PA.II.A.R5	Aviation security concerns.
Skills	The applicant demonstrates the ability to:
PA.II.A.S1	Inspect the airplane with reference to an appropriate checklist.
PA.II.A.S2	Verify the airplane is in condition for safe flight and conforms to its type design.

CPL ACS

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