



Winter is Coming: Cold Weather Flying Procedures

As temperatures drop, adopting specific procedures for safe winter flying is essential. These guidelines help enhance safety, reliability, aircraft performance, and minimize engine wear.

Before Flight:

- **Watch for Ice:** Be vigilant for ice buildup on stairs, ramps, buildings, taxiways, and runways.
- **Snow Piles:** During taxi and takeoff, be aware of snow piles near aircraft movement areas.
- **Frostbite:** Protect yourself from frostbite during preflight inspections and refueling. Wear proper winter attire, hats, gloves and a winter jacket.
- **Slipping and Falling:** Exercise caution to avoid slips and falls on icy surfaces, especially when getting in or out of the aircraft.

Aircraft Preflight:



It's a common misconception that a thin layer of frost or ice is harmless, or that snow will blow off during takeoff. This can be a dangerous assumption. Contamination on wing and tail surfaces has contributed to numerous aircraft accidents.

Before takeoff, thoroughly brush all snow off the entire aircraft. Don't rely on snow blowing off during the takeoff roll.

Remember: Frost can sometimes hide beneath a layer of snow. **Always remove it!** We have

TKS available as a deicer, ask line personnel for assistance.

Pay extra attention to aircraft that have been pulled from a warm hangar and left in snowy conditions. The warm aircraft can cause frost or ice to form on its surfaces.

During your pre-flight walk-around, inspect the following areas:

- **Pitot/Static Port:** Ensure it is ice-free and that the Pitot Heat is working.
- **Static Openings:** Ensure it's free of ice.

- **Fuel Vents:** Verify they are not blocked.
- **Engine Intake and breathing tubes:** Inspect for obstructions.
- **Carburetor Air Intake:** Make sure it's clear.
- **Trim Tabs and Flight Controls:** Check for proper movement.
- **Tires and Brakes:** Inspect for wear, damage, and proper inflation.
- **Engine Oil Breather:** Ensure it's not blocked.
- **Stall Warning Horn:** Check for proper operation.
- **Fuel:** Check for water contamination.

Engine Start Procedures:

As a general rule, it's recommended to preheat your engine whenever it's been cold-soaked for two hours or more at temperatures below freezing. Starting a cold engine without preheating can cause significant damage. The colder the temperature, the greater the risk.

Aircraft engines contain various metals, such as aluminum alloys and steel. These metals expand and contract at different rates, which can lead to friction and damage between the crankshaft, cylinders, and pistons. Preheating helps prevent this by ensuring that the engine components warm up evenly, reducing the risk of damage and costly repairs.

Our aircraft are equipped with Reiff multiband 120v, 50-watt cylinder-200-watt oil sump heaters. This system raises cylinder temperatures by 35°F and oil sump temperatures by 60°F over three hours. You can plug the unit directly into any conventional AC outlet using an extension cord with a minimum amperage of 3.3 amps.

When to Preheat:

- **Temperatures below 32°F:** Always preheat the aircraft when the outside temperature is 32°F or below.
- **Overnight Storage:** Aircraft stored in Hangar C will be plugged in overnight. If you arrive late and blankets are available, please cover the aircraft wings to minimize frost accumulation for airplanes tied down on the ramp. Also, inquire about the location and use of overnight electrical outlets.
- **Overnight Cross-Country Trips:** Request to be plugged in or placed in a heated hangar if staying overnight away from KGDK. If your stay is longer than one night, you can leave the aircraft outside but must preheat for at least three hours before engine start.

Cowl Plug Installation:



- **Preheating:** To maintain heat, install cowl plugs (carburetor and engine inlets) before preheating and after engine shutdown to maintain heat.

- **After Preheating:** To prevent tripping hazards, please hang extension cords over the line power outlets and avoid leaving the plugs on the ground.
- **Post-Flight:** If the outside temperature is 50°F or below, install cowl plugs after engine shutdown.

Temperature Guidelines:

- **Minimum Engine Oil Temperature for Cold Start:** 50°F or greater
- **Minimum Engine Oil Temperature for Takeoff:** Green range

Cold Weather Engine Start Procedures

Warrior and Archer:

- **Priming:** If the aircraft hasn't flown within 2 hours, use 6-8 shots of primer.
- **Starter Engagement:** Limit starter engagement to 10 seconds.
- **Propeller Stop:** Allow the propeller to stop completely before reengaging the starter.
- **Multiple Attempts:** If the engine doesn't start after three (3) attempts, wait one minute before trying again.

Arrow, Seneca, Aztec:

- **Priming:** If the aircraft hasn't flown within 2 hours, use 3-5 seconds of priming.
- **Starter Engagement:** Limit starter engagement to 10 seconds.
- **Propeller Stop:** Allow the propeller to stop completely before reengaging the starter.
- **Multiple Attempts:** If the engine doesn't start after three (3) attempts, wait one minute before trying again.

Failure to adhere to these procedures may result in starter overheating, leading to potential damage or failure. To prevent battery damage, do not continue cranking until the battery is completely dead. Excessive cranking can cause the battery to freeze within a short period.

After start:



- **Idle:** After starting the engine, idle at 1000 RPM until the engine oil temperature is in the green range before conducting the Ground Check. This could take 10 minutes or more, be patient.
- **Gradual Throttle Increase:** During Ground Check, slowly increase the throttle and watch the oil pressure gauge.
- **Propeller Maintenance:** Aircraft equipped with a constant speed prop, exercise the governor to prevent oil from congealing in the prop dome.

DO NOT conduct a takeoff until the oil temperature is in the green range.

Last thoughts



- **Descent Power Settings:** To prevent shock cooling, use higher power settings during descent. Consider closing cowl flaps on Seneca and Aztec aircraft.
- **Weather Conditions:** Monitor ceiling and visibility closely. Be aware of potential weather conditions like fog, freezing fog, freezing drizzle, snow, snow showers, blowing snow, drifting snow, ice, sleet, hail, and ground fog.
- **No-Flap Approaches:** If tail stalls are a concern, consider a no-flap approach.
- **Landing Considerations:** Evaluate runway conditions, including RCR (Runway Condition Reading) and braking effectiveness. Compare the landing roll distance to the runway available. Remember that the POH does not provide RCR corrections to landing roll distance.
- **Crosswinds:** Crosswinds can significantly impact directional control on wet or slippery runways. See MacAir SOP's for crosswind and contaminated runway information.
- **Avoid Moisture:** Stay out of visible moisture when temperatures are below freezing.
- **Have an Escape Plan:** Maintain VMC (visual meteorological conditions) at or above the MEA (minimum en-route altitude) when temperatures are below freezing.
- **Establish Personal Minimums:** Adhere to your personal minimums for safe flight.
- **TKS (Deicing Fluid):** Only line personnel or instructor pilots are authorized to apply TKS fluid to the aircraft. Microfiber towels should not be used to wipe down TKS fluid, use paper towels instead.
- **Windshields:** Do not scrape.
- **Cold plugged engine?** Inform line personnel.
- **Coordinate:** For early morning or late evening departures, please coordinate with line personnel in advance. This will ensure the aircraft is properly prepared for your flight.
- **Cancel your flight:** If temperatures are below zero. Should you go flying?