Training aid only, not flight instruction. Review it with your CFI and get their approval before you use it in training or in the airplane. Check every number against the POH and current FAA sources. Last reviewed Nov 7, 2026.

WINTER FLYING IN MICHIGAN

Cherokee 140 · KONZ · November to March

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WHY WINTER IS DIFFERENT

Winter brings some of the smoothest, clearest flying of the year, and a few ways to get hurt that summer never offers. Our Cherokee has a carbureted engine, no anti-ice equipment and no cowl flaps, and KONZ sits where the Detroit River meets Lake Erie. Plan for all of that.

- **The airplane is not approved for flight in icing.** Any visible moisture at or below freezing is a reason to stay on the ground or turn around.
- **Cold engines wear fast.** Most engine wear happens in the first seconds after a cold start, before oil reaches the bearings.
- **The lake makes its own weather.** Lake-effect snow and low cloud can form and move quickly.
- **Days are short.** Sunset at KONZ is before 5:20 pm local in December. Plan to land with daylight to spare.
- **Everything takes longer.** Preheat, frost removal and a slow taxi can add an hour to the day.

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PREHEAT AND COLD STARTS

A cold-soaked engine has thick oil and tight clearances. Preheat it, start it gently, and warm it up before you ask for power.

When to preheat

- **Lycoming guidance:** Lycoming's cold-weather service instructions call for preheat when the engine has cold-soaked at about **10 °F (–12 °C) or below**. Many owners and shops preheat whenever it is below about **20 °F (–7 °C)**. Ask our maintenance shop which threshold they want for our engine, and use the more conservative one.
- **It is cold-soak that matters,** not the air temperature at start time. An airplane that sat out all night at 5 °F (–15 °C) needs preheat even if the afternoon reaches 25 °F (–4 °C).
- **Hangared helps but is not a substitute.** An unheated hangar is close to outside temperature by morning.

How to preheat

- **Heat the whole engine,** not just the oil sump. Heat on the sump alone can warm the oil while the cylinders and crankcase stay cold.
- **Allow time:** a forced-air heater usually needs 30 minutes or more; an installed engine heater is best left on for several hours. Put a cowl cover or blanket over the cowling to hold the heat.
- **Never leave a combustion heater unattended,** and keep it clear of fuel vapor and fabric.
- **Check it worked:** the cylinders and oil sump should feel warm to the touch before you start.

Starting

- **Follow the POH start procedure** (see the Cherokee 140 Transition Guide). Pump ON, mixture full rich, throttle cracked.
- **Don't over-prime, and never prime by pumping the throttle.** Extra fuel washes oil off the cylinder walls and can pool in the intake, where it can start an induction fire. Know the engine-fire-during-start procedure on the flow cards before every winter start.
- **Crank in short bursts:** about 10 seconds at a time, with rests. A cold battery loses power fast, and the starter can overheat.

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- **Watch oil pressure.** It must rise within 30 seconds. Shut down if it doesn't.

Warm-up

- **Idle at about 1,000 RPM,** not lower, so the engine runs smoothly and the plugs stay clean.
- **Wait for the oil temperature to move into the green** before the run-up and before takeoff power. A cold oil temperature with normal pressure is common at first; high pressure on a cold engine is the oil being thick.
- **Lean during warm-up** if the engine runs rough, then go back to full rich for the run-up and takeoff.

Oil and battery

- **Oil grade:** winter oil choice depends on the oil already in the engine and on the shop's guidance. Ask maintenance; don't add a different oil yourself.
- **Battery:** a cold battery has far less cranking power. Keep it charged or on a maintainer when the airplane sits. If the starter turns slowly, stop and recharge or preheat; don't drain it trying.
- **Breather tube:** in very cold weather, condensed moisture can freeze in the crankcase breather and block it. Check it during the preflight.

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FROST, SNOW AND ICE ON THE AIRPLANE

Take off with a clean airplane: no frost, snow or ice on the wings, tail, control surfaces or propeller. Not a little. None.

- **Why:** frost no thicker than coarse sandpaper can cut lift sharply and raise drag a lot, which raises stall speed and lengthens the takeoff roll. The FAA's icing guidance (AC 91-74) and the PHAK are clear: remove it all.
- **The rule:** for small Part 91 airplanes there is no single "clean wing" regulation like the one for large aircraft (14 CFR 91.527). The duty comes from your responsibility as pilot in command and the ban on careless or reckless operation (14 CFR 91.13). Treat it as absolute.
- **How to remove it:** move the airplane into a heated hangar, or wait for the sun. Use a soft brush or broom for snow, never an ice scraper on the paint or windshield. Approved deicing fluid works if it is used and removed properly.
- **Watch for refreezing.** Melted snow can run into hinges, control gaps and the empennage and refreeze when you taxi out into the cold. Check that every control moves freely after deicing.
- **Check the hidden places:** fuel vents, the pitot tube, static ports, wheel fairings (packed snow and slush freeze there and lock wheels), the flap tracks and the tail cone.
- **Fuel drains:** water in fuel can freeze in the drains and lines. Sump carefully; if a drain won't flow, it may be frozen, and that is a reason to stop and get help.
- **Moving the airplane:** go slowly on an icy ramp. A towbar on ice is easy to lose control of, and the airplane keeps rolling.

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TAXIING, RUNWAYS AND BRAKING

The airplane slides more and stops less on snow, slush and ice, and the wind pushes it around more easily.

- **Taxi slowly,** with less braking than you think you need. Brake early and gently.
- **Turns:** on ice, the nosewheel may slide straight ahead. Allow plenty of room and slow down before you turn.
- **Run-up:** the airplane can slide forward during the run-up on ice. Point it somewhere safe and be ready to reduce power.
- **Snowbanks:** check wingtip and propeller clearance along the taxiway and runway edges. The low wing of the Cherokee sits closer to the snowbanks than a 172's.
- **Snow-removal equipment** may be on the runway and taxiways at KONZ in winter. Listen on CTAF and look.

Reading runway condition NOTAMs

Runway conditions are reported in **FICON NOTAMs** with a **Runway Condition Code (RwyCC)** for each third of the runway, from 6 (dry) down to 0 (nil braking).

RwyCC	Typical condition	Braking
6	Dry	Normal
5	Frost, wet, or up to 1/8 in. of slush or water	Good
4	Compacted snow at or below about –15 °C (5 °F)	Good to medium
3	Wet snow, dry snow over compacted snow, or compacted snow above –15 °C	Medium
2	Standing water or slush more than 1/8 in.	Medium to poor
1	Ice	Poor
0	Wet ice, water on compacted snow, slush over ice	Nil

- **Any code of 0 means don't use that runway.** Codes of 1 or 2, or a crosswind on a slick runway, are a no-go for us in the Cherokee unless a CFI has set a limit for them.

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- **With 17/35 closed,** KONZ has only one runway. A crosswind on an icy runway has no alternative. Check the backup field's NOTAMs too.

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CARBURETOR ICE

Carb ice is not only a summer problem. Cold, humid air near the lakes can form ice in the carburetor at almost any power setting, and especially at low power.

- **Range:** carb icing is possible from roughly 20 °F to 70 °F (–7 °C to 21 °C) with high humidity, and it is most serious when the temperature and dew point are close together.
- **Very cold, dry air** below about 0 °F (–18 °C) is less likely to cause it, but don't count on that near open water.
- **Signs:** a slow drop in RPM, then roughness.
- **Action:** full carb heat, all or nothing. Expect it to run rougher for a moment as the ice melts. Leave the heat on until the RPM returns, then off.
- **Low power:** use carb heat before reducing power for descent and in the pattern, as briefed with your CFI.

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STRUCTURAL ICING

Our Cherokee has no anti-ice or deice equipment and is not approved for flight in icing. Ice on the wings and tail can make it unable to climb or even hold altitude.

What it takes

- **Visible moisture** (cloud, rain, drizzle, snow that is melting) **plus** an airplane surface at or below **0 °C (32 °F)**.
- The worst icing is often in freezing rain and freezing drizzle, and in the cloud just above the freezing level.

Before the flight

- **Freezing level:** find it on the Graphical Forecasts for Aviation and the winds-and-temperatures aloft. If you must fly in or near cloud, the freezing level is a hard line.
- **AIRMET Zulu** covers moderate icing and freezing levels. **SIGMETs** cover severe icing. Either one on your route is a no-go for us.
- **PIREPs:** look for icing reports and cloud tops. No icing PIREP does not mean no icing.
- **Freezing rain or ice pellets** in a forecast or report mean warm air above cold air. Stay on the ground.
- **Day VFR only, well clear of clouds.** Winter VFR weather with ceilings near the cloud-clearance minimums is how pilots end up in icing.

If you pick up ice

1. **Get out now.** Don't wait to see if it builds.
2. **Turn around** toward the air you just flew through, if it was clear.
3. **Descend to warmer air** if the terrain and the airspace allow, or climb only if you know the tops are close and clear.
4. **Carb heat ON**, pitot heat if equipped, defroster on.
5. **Keep the speed up.** Ice raises the stall speed. Fly the approach faster and don't use full flaps if the tail may be iced; a tailplane stall can follow flap extension.
6. **Tell ATC** and land at the nearest suitable airport. File a PIREP.

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LAKE EFFECT AND WINTER WEATHER

Cold air crossing the open water of the Great Lakes picks up moisture and dumps it as snow downwind. Southeast Michigan sees less of it than the west side of the state, but the lakes still shape winter weather around KONZ.

- **Visibility can fall from miles to under a mile in minutes** in a snow band. Bands can be narrow and move fast.
- **Snow showers are hard to see ahead,** especially against an overcast sky or in flat winter light.
- **Low ceilings and fog** form quickly over the river and the lake when the air is moist and the temperature and dew point are close.
- **Watch the trend,** not just the current report. A TAF with TEMPO groups of snow and low visibility is a warning, not a footnote.
- **Have an out.** Know which way the weather is moving and which airports are clear. In winter, pick conservative personal minimums and stick to them.

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COLD AIR: PERFORMANCE AND ALTIMETERS

Cold, dense air helps the airplane climb and take off, but it fools the altimeter.

- **Performance:** cold air means low density altitude. Takeoff rolls are shorter and climbs are stronger. Don't let the good climb tempt you into cloud.
- **Altimeter error:** in air colder than standard, your true altitude is **lower** than the altimeter shows. "From high to low, or hot to cold, look out below."
- **How much:** the error grows with height above the station and with how cold it is. At –20 °C (–4 °F) at the surface, an altimeter can read a few hundred feet high at 2,000–3,000 ft above the field. Give terrain and towers extra room.
- **Cold-temperature restricted airports:** the FAA publishes a list of airports where pilots on instrument approaches must correct their altitudes in extreme cold. It matters mostly for IFR, but it shows how real the error is.
- **Set the altimeter** to the current setting often, from AWOS or ATC. Pressure changes quickly with winter fronts.

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CABIN HEAT AND CARBON MONOXIDE

The Cherokee's cabin heat comes from air warmed around the exhaust muffler. A crack in the muffler or exhaust can let carbon monoxide into the cabin, and you can't see or smell it.

- **Carry a CO detector** that alarms, not just a passive spot card that can be missed. Put it where you can see and hear it.
- **Symptoms:** headache, dizziness, drowsiness, nausea, blurred vision and poor judgment. They can feel like fatigue.
- **If you suspect CO:** cabin heat OFF, fresh-air vents OPEN, open a window if the speed allows, use supplemental oxygen if you have it, and land as soon as possible. Tell ATC.
- **Before winter:** ask maintenance to inspect the exhaust and heat muff. Report any exhaust smell, soot or a detector alarm.

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SURVIVAL GEAR AND OVERWATER FLYING

If you land off-airport in a Michigan winter, you need to survive the cold until help arrives, or walk out.

Dress for the walk home

- **Wear clothes you could stand outside in for hours:** warm boots, hat, gloves and a heavy coat. A cabin at 70 °F (21 °C) is not where you will be after a forced landing.
- **Layers** you can take off in the cabin and put back on.

A winter survival kit

- Space blanket or sleeping bag, chemical hand warmers, extra hat and gloves.
- Water and high-energy food.
- Flashlight or headlamp with spare batteries. Daylight is short.
- A charged phone and a backup battery. A personal locator beacon is better: it works where phones don't.
- First-aid kit, knife or multitool, fire starter, signal mirror and whistle.
- **File a flight plan or use flight following,** so someone knows to look for you and where.

Flying over Lake Erie and the river in winter

- **Cold water kills fast.** Winter water near KONZ is close to freezing. The "1-10-1" rule: about 1 minute to control your breathing after the cold shock, about 10 minutes of useful movement before your muscles stop working, and about 1 hour before hypothermia makes you unconscious.
- **Stay within gliding distance of land** whenever you can. Climb before crossing open water.
- **If you must cross water,** wear an inflatable life vest (don't just carry it), brief the passengers, and file or use flight following.
- **Ice on the lake is not a runway.** Don't plan on it.

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WINTER PREFLIGHT CHECKLIST

1. **Weather:** freezing level, AIRMET Zulu and SIGMETs, icing and cloud-top PIREPs, snow in the TAFs, the trend, sunset time.
2. **NOTAMs:** FICON runway condition codes at KONZ and your destination and alternate. Snow-removal operations.
3. **Preheat** if the engine is cold-soaked near or below the shop's threshold. Cowl cover on while it heats.
4. **Clean airplane:** all frost, snow and ice off wings, tail, control surfaces and propeller. Controls free after deicing.
5. **Openings clear:** fuel vents, pitot tube, static ports, crankcase breather, wheel fairings, air inlets.
6. **Fuel sumped** at all three points; drains flowing (not frozen); no water.
7. **Battery** strong; CO detector working; survival kit and warm clothes on board.
8. **Start:** POH procedure, no over-priming, oil pressure within 30 seconds.
9. **Warm-up** until the oil temperature is in the green before the run-up and takeoff.
10. **Taxi** slowly, brake gently, watch snowbanks and equipment.
11. **Plan the flight** in daylight, clear of clouds, with an out and a plan for the water.

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SELF-CHECK

– **Below what temperature does Lycoming call for preheat?**
About 10 °F (–12 °C) and below after a cold soak. Many shops use about 20 °F (–7 °C). Use our shop's number and the more conservative one.

– **Why not prime extra on a cold morning?**
Extra fuel washes oil off the cylinder walls and can pool in the intake, risking an induction fire.

– **How much frost is acceptable on the wing for takeoff?**
None. Even a thin layer cuts lift and raises drag and stall speed.

– **What does a Runway Condition Code of 1 mean?**
Ice, with poor braking. Codes of 1 and 2 are a no-go for us unless a CFI has set a limit.

– **What two things does structural icing need?**
Visible moisture and an airplane surface at or below 0 °C (32 °F).

– **In very cold air, is your true altitude higher or lower than the altimeter shows?**
Lower. Give terrain and obstacles extra room.

– **What do you do if you suspect carbon monoxide?**
Cabin heat off, fresh air on, a window open if able, oxygen if available, and land as soon as possible.

– **What is the 1-10-1 rule?**
About 1 minute to control your breathing, 10 minutes of useful movement and 1 hour before unconsciousness in cold water.

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SOURCES

- FAA Advisory Circular 91-74, Pilot Guide: Flight in Icing Conditions.
- FAA Aviation Weather Handbook (FAA-H-8083-28, which replaced AC 00-6 and AC 00-45).
- Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25): carburetor ice, icing, altimeter errors.
- Aeronautical Information Manual: Chapter 7 (weather and the FICON/RwyCC system, cold-temperature altimeter corrections) and Chapter 8 (carbon monoxide).
- Lycoming service instructions and Key Reprints on cold-weather operation and preheat.
- 14 CFR 91.13 and 91.527.
- **Follow the POH and our maintenance shop's guidance.** Where this page and the POH or the shop disagree, they win.

Training aid only, not flight instruction. The POH in the airplane and its placards win: check every number against them, and fly with your CFI.

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