FLY
AVIATION

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.

NIGHT FLYING

Private pilot · Night operations · Cherokee 140 at KONZ

DEFINITIONS THAT MATTER

Three different "nights" appear in the regulations. Each one turns on a different rule, so learn which is which.

Term	When	What it controls
Night (14 CFR 1.1)	End of evening civil twilight to the beginning of morning civil twilight	Logging night time, night training, night equipment (91.205(c)), night VFR fuel
Sunset to sunrise (91.209)	Official sunset to official sunrise	Position lights must be on
1 hour after sunset to 1 hour before sunrise (61.57(b))	The darkest part of the night	Passenger currency: 3 takeoffs and 3 landings to a full stop in this window, in the last 90 days

- **Civil twilight** ends when the sun is 6° below the horizon. In Michigan that is roughly 30 minutes after sunset. Look it up for the date: it is in most flight-planning apps and on the airport page of many weather sites.
- **Logging night time:** log only the time between the end of evening civil twilight and the beginning of morning civil twilight.
- **Night landings for passenger currency** must be to a **full stop**. Touch-and-goes don't count.

Private pilot night training (61.109(a)(2))

- **3 hours** of night flight training with a CFI.
- Including **one cross-country of more than 100 nm** total distance.
- And **10 takeoffs and 10 landings to a full stop**, each landing involving a flight in the traffic pattern, at an airport.
- Your CFI will also teach night operations as part of the ACS knowledge and risk elements.

Fuel and weather at night

- **VFR fuel (91.151):** enough to reach the first point of intended landing, then fly **45 minutes** at normal cruise. By day it is 30.

- **Class G minimums (91.155)** are tighter at night. At or below 1,200 ft AGL: **3 SM** and **500 below, 1,000 above, 2,000 horizontal** from clouds. The exception: in the traffic pattern within ½ mile of the runway, 1 SM and clear of clouds. Above 1,200 AGL and below 10,000 MSL: 3 SM and the same cloud clearances.
- The full rules are in Regulations for Private Pilots.

NIGHT VISION

Your eyes work differently in the dark. The details are in Aeromedical Factors and Decision-Making; here is what changes in the cockpit.

- **Cones** see color and fine detail but need light. They are packed in the center of your vision.
- **Rods** see in dim light but not color or detail. They sit around the edge of your vision.
- **Night blind spot:** the very center of your vision has almost no rods. At night, an object you stare straight at can disappear.
- **Off-center viewing:** look about 10° to the side of what you want to see. Scan in small steps and pause on each one.
- **Dark adaptation** takes about **30 minutes**. One bright light can undo it in seconds. Avoid bright ramp lights and phone screens before you fly.
- **Red light** protects dark adaptation but washes out red markings on charts. Use dim white light to read the chart, and keep the panel lights as low as you can still read.
- **Oxygen and smoking:** night vision is the first thing to go with mild hypoxia. It starts as low as about 5,000 ft. Smoking makes it worse.

NIGHT ILLUSIONS

At night your eyes have fewer cues, so they fill in the gaps. Expect each of these and cross-check the instruments.

Illusion	What happens	What to do
Autokinesis	A single light you stare at seems to move	Keep your eyes moving. Don't fixate on one light
False horizon	A sloping cloud bank, a lit shoreline or rows of ground lights look like the horizon	Use the attitude indicator to confirm what is level
Featureless terrain (black hole)	Over dark water or unlit land, with only the runway lights ahead, you feel higher than you are and fly a low approach	Fly a normal glidepath with your own numbers. Use a VASI or PAPI if one works
Runway lights	Bright lights look closer, so you feel low. Dim lights look farther, so you feel high	Hold the stabilized approach. Don't chase the picture
Runway width	A narrower runway than you're used to makes you feel high and fly low; a wider one the reverse	Know the runway width before you go

Illusion	What happens	What to do
Flicker vertigo	A light flashing 4 to 20 times a second, such as a strobe in haze or the propeller against a light, can cause nausea or even seizures	Turn off the strobes in clouds or haze. Change the propeller RPM. Look away

THE AIRPLANE: EQUIPMENT AND PREFLIGHT

The regulations add equipment for night flight. Then the preflight adds what makes a dark cockpit workable.

Night equipment (91.205(c)): FLAPS

In addition to the day equipment:

- Fuses: one spare set, or three of each kind, accessible to the pilot, if the airplane uses fuses rather than circuit breakers.
- Landing light: required only if the flight is **for hire**.
- Anticollision lights: an approved red or white anticollision light system.
- Position lights: red left wingtip, green right wingtip, white tail.
- Source of electrical power: an adequate source for all installed electrical and radio equipment.

If any of these is inoperative, you may not fly at night. An inoperative anticollision light may still allow day flight under 91.213(d) and 91.209. Check with your CFI or mechanic.

Our Cherokee at night

- **Check what is installed:** position lights, anticollision lights (strobes or beacon), landing and taxi lights, and panel and instrument lighting. Note the switches and the rheostat for the panel lights.
- **Preflight at night:** walk around with a flashlight. Turn each exterior light on and look at it. Check the panel lights work before you start the engine.
- **Two flashlights:** one with a red and a white mode, plus a spare, with fresh batteries. A headlamp leaves your hands free.
- **Know the panel by feel:** fuel selector, fuel pump, mixture, carb heat, flap lever and the light switches. Practice reaching each one with your eyes closed.
- **Fuel and oil:** check the fuel and sump it with a flashlight. Water and contamination are harder to see at night.

AIRPORT LIGHTING AT NIGHT

At a non-towered field after dark, the lights are your main tool for finding and judging the runway. The full guide to lights and signs is in Airport Operations.

- **Rotating beacon:** white and green flashing for a lighted civil land airport.
- **Runway edge lights:** white. Threshold lights are green toward the approach and red toward the far end.
- **Taxiway edge lights:** blue. Taxiway centerlines, where installed, are green.

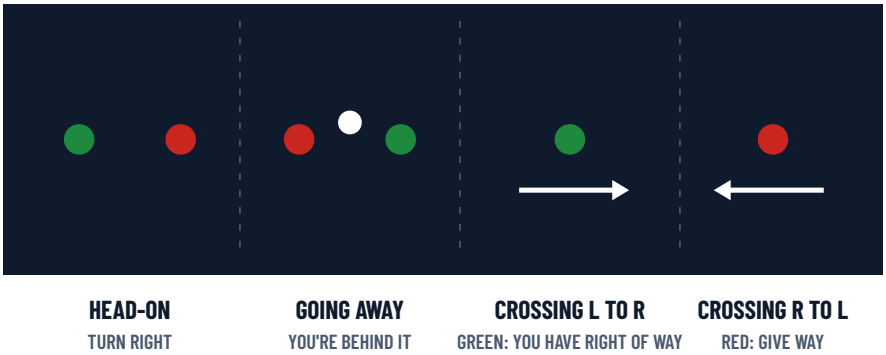
- **Pilot-controlled lighting:** key the mic on the listed frequency. The usual standard is 7 clicks in 5 seconds for high, 5 for medium, 3 for low. Confirm it in the Chart Supplement. The lights typically stay on for 15 minutes; key again on final so they don't time out.
- **PAPI:** two white and two red is on glidepath. More white is high; more red is low.

At KONZ

- Pilot-controlled lighting on the CTAF, **123.0**.
- Only Runway 4/22 is in use. 17/35 is closed.
- Both PAPIs are **reported inoperative**. Plan to fly your own glidepath.
- Runway 22's landing threshold is displaced 428 ft. At night, aim past the green threshold lights, not at the first runway lights you see.
- The field sits by the Detroit River and Lake Erie. Expect approaches over dark water with few visual cues: a classic black-hole setup.
- See the KONZ Airport Guide for more.

READING OTHER AIRCRAFT'S LIGHTS

Position lights tell you which way another aircraft is going. The left wingtip is red, the right wingtip is green and the tail is white.



- **Red and green both visible:** it is pointed at you. Turn right.
- **Only red visible:** you are seeing its left side, so it is crossing from your right. On a converging course, the aircraft on the right has the right of way (91.113). **Red means give way.**
- **Only green visible:** you are seeing its right side, so it is crossing from your left. You have the right of way, but keep watching.
- **White only, or white with red and green:** you are behind it.
- **A light that stays in the same spot on the windshield and grows** is on a collision course. Act now.
- Anticollision strobes and beacons show that an aircraft is there, not which way it is going.

NIGHT FLIGHT PLANNING AND DECISION-MAKING

Night removes options you take for granted by day. Plan to make up for that before you leave the ground.

- **Raise your personal minimums.** Higher ceilings, better visibility, more fuel, and recent night practice. Start with the worksheet in Aeromedical Factors and Decision-Making.
- **Watch the temperature and dew point spread.** When it is small and closing, fog and low clouds form fast after dark, especially near the river and the lake. A spread of 3 °C or less is a warning.
- **Clouds are hard to see.** The first sign is often lights on the ground fading or disappearing. Turn around before it gets worse.
- **Route over lit areas and near airports,** even if it adds miles. Note each airport along the way, with its lighting frequency.
- **Pick a safe altitude.** Fly high enough to clear terrain and towers you can't see, using the sectional's maximum elevation figures. More altitude also means more gliding distance.
- **Moon phase matters.** A full moon gives a usable horizon and shows terrain and water. A moonless night over the lake gives you nothing.
- **Plan an engine-out option for each part of the trip.** At night that is usually an airport or a lit road, not a dark field.
- **File a flight plan or use flight following.** At night, help takes longer to find you.

NIGHT TAKEOFFS, LANDINGS AND EMERGENCIES

The procedures are the same as by day. What changes is how much you depend on the instruments.

Takeoff and climb

- Line up on the centerline, landing light on, heading indicator set.
- After liftoff there may be no outside horizon. **Fly the attitude indicator** to a positive climb at Vy, and confirm a climb on the altimeter and VSI.
- Don't turn until you are well clear of the ground and have a clear picture outside.

Approach and landing

- **Fly a normal, stabilized pattern.** Use the same altitudes, speeds and power settings as by day: the Cherokee Flow Cards and pattern sheets still apply.
- **Know where you are on final** by altitude and distance, not by the picture alone. With no working PAPI at KONZ, check altitude against distance from the runway.
- **Landing light:** it helps in the flare but makes the runway rush up. Start the flare when the runway surface becomes clear in the light. Be ready to land without it.
- **Look down the runway** in the flare, not straight ahead into the beam.
- **Go around early** if anything is off: unstable, too high, too fast, or the lights look wrong.

Emergencies at night

- **Electrical failure:** you may lose the panel lights, radios, lights and flaps if they are electric (ours are manual). Have the flashlight ready, reduce the load, and land at the nearest suitable lit airport. The engine keeps running on the magnetos.
- **Engine failure:** pitch for **80 mph best glide** and trim. Turn toward the nearest airport or lights. Run the restart flow. Turn the landing light on at about 500 ft AGL to see the surface. If what you see is bad, turn it off and keep the wings level.
- **Unintended IMC or spatial disorientation: trust the attitude indicator.** Wings level, hold altitude, then make a gentle 180° standard-rate turn on instruments back to where it was clear. Ask ATC for help.
- **Lost:** climb if you can, communicate, confess, comply and conserve. Approach control can often find you on radar.

SELF-CHECK

Tap a question to see the answer.

What is "night" for logging night time and night training?

The time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the Air Almanac (14 CFR 1.1).

When must the position lights be on?

From sunset to sunrise (91.209).

What do you need to carry passengers at night?

3 takeoffs and 3 landings to a full stop, in the last 90 days, between 1 hour after sunset and 1 hour before sunrise, in the same category and class (61.57(b)).

What night training does a private pilot applicant need?

3 hours of night flight training, including one cross-country of more than 100 nm total distance, and 10 takeoffs and 10 landings to a full stop, each with a flight in the traffic pattern (61.109(a)(2)).

What is the VFR fuel reserve at night?

Enough to reach the first point of intended landing and then fly 45 minutes at normal cruise (91.151).

What equipment is added for night VFR flight?

FLAPS: fuses (spare set if fuses are used), landing light (only if for hire), anticollision lights, position lights and a source of electrical power (91.205(c)).

Why can an object disappear when you look straight at it at night?

The center of the eye has cones but almost no rods, which see in dim light. That is the night blind spot. Look about 10° to the side.

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– How long does full dark adaptation take?

About 30 minutes. A bright light can undo it in seconds.

– What is autokinesis?

A single light you stare at in the dark seems to move. Keep your eyes moving and cross-check the instruments.

– On a black-hole approach over dark water, what is the danger?

With no visual cues except the runway lights, you feel higher than you are and tend to fly a low approach. Fly your numbers and use a working VASI or PAPI.

– You see only a red light on another aircraft, and it holds steady on your windshield. What is happening?

You are seeing its left side, so it is crossing from your right on a collision course. It has the right of way. Give way, usually by turning right or behind it.

– You see both red and green lights on another aircraft. What do you do?

It is coming toward you head-on. Turn right.

– How do you turn on the runway lights at KONZ, and what is the standard for high intensity?

Key the mic on the CTAF, 123.0. The standard is 7 clicks in 5 seconds for high; confirm in the Chart Supplement.

– What is a warning sign of clouds ahead at night?

Ground lights fading, becoming fuzzy or disappearing.

– You fly into a cloud at night. What do you do?

Go to the instruments: wings level on the attitude indicator, hold altitude, then make a gentle standard-rate 180° turn back to clear air. Ask ATC for help.

SOURCES

- 14 CFR 1.1 (definition of night), 61.57(b), 61.109(a)(2), 91.113, 91.151, 91.155, 91.205(c), 91.209.
- Airplane Flying Handbook (FAA-H-8083-3), chapter on night operations.
- Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25), aeromedical factors chapter.
- Aeronautical Information Manual, chapter 2 (airport lighting) and chapter 8 (medical facts for pilots).
- Regulations change. Check the current text at eCFR, and confirm airport lighting in the current Chart Supplement.

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.