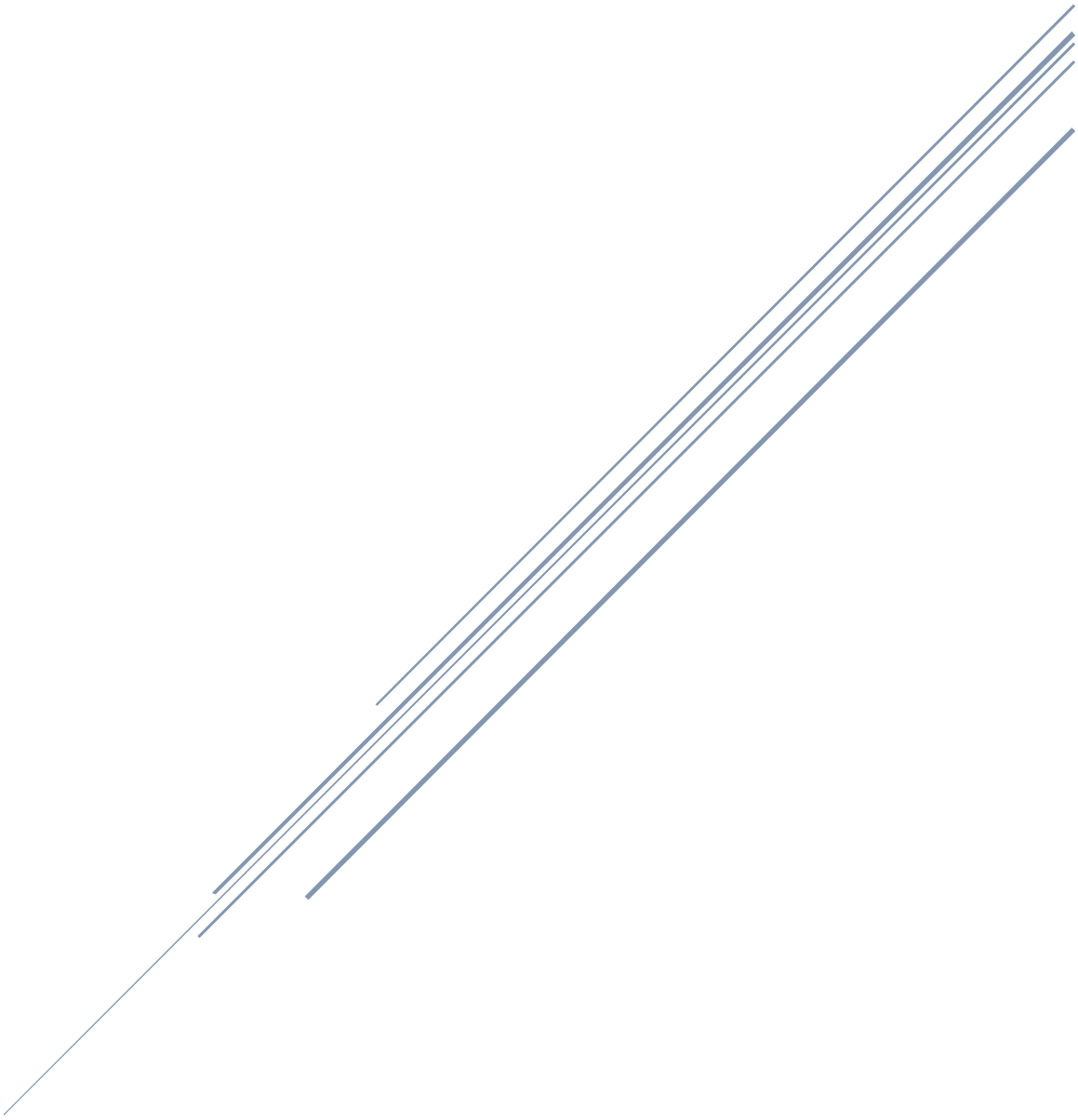
CESSNA 182S MANEUVER GUIDE

Thomas Rainey



Contents

Takeoffs, Landings, and Go-Arounds

Soft-Field Takeoff

- Flaps 20°.
- Keep elevator full aft and keep the airplane rolling.
- Maintain tail low attitude and lift off the ground as soon as practical.
- Level off until speeds builds to 66 kts and then climb at 70 kts.
- At 400’ AGL, retract flaps to 0° and pitch for 80 kts.

PPL ACS: Target speed +10/-5 kts.

CPL ACS: Target speed ±5 kts.

Soft-Field Landing

- 65 kts with full flaps on final.
- Maintain slight amount of power through the soft touchdown.
- Power to idle once on the runway.
- Hold the nose off as long as possible.
- Keep airplane moving and elevator full aft in the rollout (do not use brakes).
- Retract flaps after clearing the runway.

PPL ACS: Target speed +10/-5 kts.

CPL ACS: Target speed ±5 kts.

Short-Field Takeoff

- Flaps 20°.
- Full power, check engine instrument, and then release brakes.
- Maintain slightly tail low attitude.
- Climb at 58 kts until obstacles are cleared (horizon at top of Davtron clock, or halfway through ELT controller if in right seat).
- After clearing obstacle, accelerate to 70 kts.
- At 400’ AGL, retract flaps to 0° and pitch for 80 kts.

PPL ACS: Target speed +10/-5 kts.

CPL ACS: Target speed ±5 kts.

Short-Field Landing

- 60 kts with full flaps on final.
- Aim 200 ft before intended point of landing.
- After touch down, apply brakes heavily with full aft elevator while retracting flaps.

PPL ACS: Target airspeed +10/-5 kts. Touchdown within 200 feet beyond specified point.

CPL ACS: Target airspeed ±5 kts. Touchdown within 100 feet beyond specified point.

Power-Off 180°

- Power to idle abeam the intended point of landing.
- Maintain altitude until reaching best glide of 75 kts.
- Use flaps, geometry, forward slips, propeller control as necessary to land on intended spot.

CPL ACS: Touch down within 200 ft beyond the intended point of landing.

Go-Around (Balked Landing)

- Full power and retract flaps immediately to 20°.
- Pitch for 55 kts. Positive rate, accelerate to 70 kts. Open cowl flaps.
- At 400’ AGL, retract flaps to 0° and pitch for 80 kts.

Fundamentals of Flight

Straight-and-Level Flight

- Set power to 20”/2300 RPM and lean to 10 GPH.
- Fly straight by choosing a reference point out in the distance and flying towards it.
    - Integrate the heading indicator to confirm straight flight.
- Fly level by finding the right distance between the cowling and horizon needed for level flight.
    - Memorize this sight picture for level flight.
    - Integrate the altimeter and VSI to confirm level flight.

PPL ACS: Maintain altitude ±200 ft, heading ±20°, and airspeed ±10 kts.

Level Turns

- Set power to 20”/2300 RPM and lean to 10 GPH.
- Establish bank angle by observing the angle of the horizon through the glareshield.
    - Integrate the attitude indicator, turn coordinator, and heading indicator.
- Fly level by finding the right distance between the cowling and horizon needed for level flight.
    - Memorize this sight picture for turns to the left and right.
    - Integrate the altimeter and VSI to confirm level flight.

PPL ACS: Maintain altitude ±200 ft, maintain a standard rate turn, roll out on assigned heading ±10°, and maintain airspeed ±10 kts.

Straight Climbs and Climbing Turns

- Set climb power (23”/2400 RPM and 15 GPH).
- Determine the sight picture needed for a 90 kt climb.
    - Integrate the attitude indicator and airspeed indicator.
- Use a reference point straight ahead to maintain straight flight or pick out a point to the left or right if practicing climbing turns.
    - Integrate the attitude indicator, turn coordinator, and heading indicator as needed.

Experiment with different power settings to establish specific descent rates and specific power settings.

PPL ACS: Level off at assigned altitude and maintain ±200 ft, heading ±20°, and airspeed ±10 kts.

Straight Descents and Descending Turns

- Set descent power (15”/2400 RPM and 8 GPH).
- Hold pitch level until reaching 90 kts.
- Determine the sight picture needed to maintain a 90 kt descent.
    - Integrate the attitude indicator and airspeed indicator.
- Use a reference point straight ahead to maintain straight flight or pick out a point to the left or right if practicing climbing turns.
    - Integrate the attitude indicator, turn coordinator, and heading indicator as needed.

Experiment with different power settings to establish specific descent rates and specific power settings.

PPL ACS: Level off at assigned altitude and maintain ±200 ft, heading ±20°, and airspeed ±10 kts.

Slow Flight, Stalls, and Spins

Slow Flight

- Recovery ≥ 1,500 ft AGL.
- Flow check (LCGUMPS).
    - Prop Full Forward.
- Power 2000 RPM and add in full flaps at the appropriate speeds.
- Add in power (approx. 18”) to maintain airspeed just above stall warning horn (55 kts).
- If done without flaps, power approx. 15” for 65 kts.
- Recovery.
    - Full Power.
    - Flaps 20°.
    - Flaps up after reaching 70 kts.
- Trim for cruise and flow check configuration.

PPL ACS: Altitude ±100 ft. Specified heading ±10°. Airspeed +10/-0 kts. Specified angle of bank ±10°. Complete maneuvers in slow flight with no stall horn.

CPL ACS: Altitude ±50 ft. Specified heading ±10°. Airspeed +5/-0 kts. Specified angle of bank ±5°. Complete maneuvers in slow flight with no stall horn.

Power-Off Stalls

- Recovery ≥ 1,500 ft AGL.
- Flow Check (LCGUMPS).
    - Prop Full Forward.
- Pick a heading reference point.
- Reduce power to 2000 RPM.
- As speed decreases, add in full flaps.
- Adjust pitch to maintain altitude until speed slows to 65 kts.
- Establish descent at 65 kts.
- Power to idle and pitch up to a V_y attitude.
- Announce indication of stall.
- RECOVERY
    - Lower pitch to break the stall.
    - Add full power.
    - Flaps 20°.
    - Pitch for 70 kts and retract flaps once this speed is reached.
- Trim for cruise and flow check configuration.

PPL ACS: Maintain heading ±10°. If turning stall, maintain specified bank ±10° (not to exceed 20°). Acknowledge stall cues and recover after full stall.

CPL ACS: Maintain heading ±10°. If turning stall, maintain specified bank ±5° (not to exceed 20°). Acknowledge stall cues and recover at first indication of stall or after full stall (however specified by examiner).

Power-On Stalls

- Recovery ≥ 1,500 ft AGL.
- Flow Check (LCGUMPS).
    - Prop full forward.
- Pick a heading reference point.
- Reduce power to 2,000 RPM while adjusting pitch to maintain altitude.
- At 60 KIAS, add climb power (23”/2400 RPM).
- Increase pitch to an attitude which will induce a stall.
- RECOVERY.
    - Lower pitch to break the stall.
    - Pitch to 80 kts to recover to initial altitude.
- Trim for cruise and flow check configuration.

PPL ACS: Maintain heading ±10°. If turning stall, maintain specified bank ±10° (not to exceed 20°). Acknowledge stall cues and recover after full stall.

CPL ACS: Maintain heading ±10°. If turning stall, maintain specified bank ±10° (not to exceed 20°). Acknowledge stall cues and recover at first indication of stall or after full stall (however specified by examiner).

Accelerated Stall

- Recovery ≥ 3,000 ft AGL.
- Flow Check (LCGUMPS) (*do NOT use flaps).*
    - Prop Full Forward and reduce power to 2000 RPM.
- At 71 KIAS (20 kts above stall speed in clean configuration with 45° bank), roll into 45° bank and pull nose up (Fred Houston clarified that the goal is not to maintain altitude—just pull the nose straight up into the 45° bank).
- Smoothly increase back pressure until first indication of stall.
- RECOVERY.
    - Lower pitch just below horizon.
    - Roll out of bank.
    - Apply full power.
    - Climb at 80 KIAS.
- Trim for cruise and flow check configuration.

CPL ACS: Maintain 45° bank. Acknowledge stall indications. Recover at first indication of stall.

Cross-Controlled Stall

- Recovery ≥ 3,000 ft AGL.
- Flow Check (LCGUMPS) (*do NOT use flaps).*
    - Prop Full Forward and reduce power to idle.
- Upon reaching 65 kts (normal glide speed), enter a simulated turn to a runway using 20-30° of bank.
- Use excess rudder in the direction of the turn. Prevent overbanking with opposite aileron.
- Smoothly increase back pressure to keep nose from dropping. At first indication of stall, recover.

- RECOVERY.
    - Lower pitch just below horizon while regaining coordination with rudder.
    - Roll out of bank.
    - Apply full power.
    - Climb at 80 KIAS.
- Trim for cruise and flow check configuration.

Elevator Trim Stall

- Recovery ≥ 1,500 ft AGL.
- Flow Check (LCGUMPS)
    - Prop full forward, reduce power to 2000 RPM, and full flaps.
- Upon reaching 65 kts (normal glide speed), establish a descent and trim.
- Simulate a go-around by adding full power. Allow the aircraft to pitch up and roll left.
- At first indication of stall, recover.
- RECOVERY.
    - Lower pitch just below horizon while regaining coordination with rudder.
    - Roll out of bank.
    - Flaps 20° and pitch for 70 kts. Once reaching 70 kts, flaps 0° and pitch for 80 kts.
- Trim for cruise and flow check configuration.

Secondary Stall

- Demonstrate using either a power-off or power-on stall.
- During recovery, pitch up before fully breaking the initial stall causing the aircraft to stall a second time.
- Recover as normal.

Spin Recovery

- **P**ower to idle.
- **A**ileron neutral.
- **R**udder opposite the spin.
- **E**levator forward to break the stall.

Performance Maneuvers

Steep Turns

- Recovery ≥ 1,500 ft AGL.
- Flow Check (LCGUMPS).
    - 18” MP / 2300 RPM gives 100-105 KIAS.
- Pick visual point and note heading.
- Roll into 50° (Δ indicates 45°bank on Aspen) and increase power to ≈20” to maintain airspeed.
- For left turns, horizon cuts through the gap between the attitude indicator and the Aspen.
    - For right seat, horizon cuts across top right corner of JPI 930.
- For right turns, horizon cuts through the gap between the airspeed indicator and the Aspen.
    - For right seat, horizon cuts across top left corner of JPI 930.
- Reduce power back to 18” when rolling from left turn into right turn.
- Add back the power once established in right turn.
- Lead roll out by half the bank angle and reduce power to 18” as wings level.
- Trim for cruise and flow check configuration.

PPL ACS: altitude ±100 ft, airspeed ±10 kts, bank angle 45° ±5°, heading roll out ±10°.

CPL ACS: altitude ±100 ft, airspeed ±10 kts, bank angle 50° ±5°, heading roll out ±10°.

Steep Spirals

- Climb to approx. 4,500 ft AGL so 3 full spirals can be made with recovery at ≥ 1,500 ft AGL.
- Flow check (LCGUMPS).
    - 18” MP / Prop Full Forward.
- Pick reference point for heading and reference point to circle.
- Abeam reference point, power to idle and pitch for best glide + 10kts (85 KIAS).
- Maintain constant radius around reference point while maintaining airspeed.
- Bank is not to exceed 60° at the steepest point.
- Clear the engine every turn.
- After three turns, level off on initial heading.
- Trim for cruise and flow check configuration.

CPL ACS: Specified airspeed ±10 kts, specified heading on roll out of ±10°, no more than 60° of bank at steepest point in turn.

Chandelles

- Start maneuver ≥ 1,500 ft AGL.
- Flow check (LCGUMPS).
    - 18” MP / Prop Full Forward.
- Choose 90° reference point off wing tip.
- Roll into 30° bank while adding full power and pitching up.
- Continue increasing pitch while maintaining bank until 90° reference point (≈7 secs).
- During the second 90°, maintain pitch while slowly reducing bank.
- At 180° point, wings should be level and aircraft should be about 60 KIAS.

- Maintain speed at MCA momentarily.
- Trim for cruise and flow check configuration.

CPL ACS: Establish 30° bank, simultaneous application of power and pitch, constant rate rollout after 90° point while maintaining pitch attitude, ±10° on roll out heading, maintain speed just above stall for a moment before recovering to cruise attitude.

Lazy Eights

- Start maneuver ≥ 1,500 ft AGL.
- Flow check (LCGUMPS).
    - 18" MP / 2300 RPM.
- Pick 45°, 90°, and 135° reference point.
- Steepest pitch at 45° point with about 15° of bank.
- Reduce pitch slowly to level as the 90° point is reached. Bank should be about 30° with airspeed around 70 KIAS (stall speed is 46 KIAS at this bank angle with flaps up).
- Leaving the 90° reference point, the nose should be slicing through horizon as the airplane reaches its maximum pitch down at the 135° point. At the 135° point, bank should be about 15°.
- Reaching the 180° point, bank should be level with airspeed and altitude the same as the beginning of the maneuver.
- Repeat maneuver in the opposite direction.
- Trim for cruise and flow check configuration.

CPL ACS: At 180° point, altitude ±100 ft, airspeed ±10 kts, heading ±10°. 30° bank at steepest point.

Ground Reference Maneuvers

Rectangular Course

- Flow Check (LCGUMPS).
    - 18" MP / 2300 RPM.
- Choose reference area.
- Enter 45° to downwind at 800 feet AGL.
- Maintain equal distance from the edges of the reference area.

PPL ACS: Maintain altitude ±100 feet and airspeed ±10 kts.

S-Turns Across a Road

- Flow Check (LCGUMPS).
    - 18" MP / 2300 RPM.
- Choose straight road or reference line perpendicular to the wind.
- Enter downwind at 800 feet AGL.
- Immediately begin the turn after crossing the reference line. Time the rollout after the first semicircle so that wings come level when the plane crosses back over the reference line.
- Ground track should trace out two equal semi-circles.

PPL ACS: Maintain altitude ±100 feet and airspeed ±10 kts.

Turns Around a Point

- Flow Check (LCGUMPS).
    - 18" MP / 2300 RPM.
- Choose prominent point on the ground.
- Enter downwind and abeam the reference point at 800 feet AGL.
- Maintain constant radius for at least two turns around the point.

PPL ACS: Maintain altitude ±100 feet and airspeed ±10 kts.

Eights on Pylons

- Flow check (LCGUMPS).
    - 18" MP / 2300 RPM.
- Determine wind direction.
- Select two reference points perpendicular to wind (they should be about 15 seconds apart).
- Determine pivotal altitude $Pivotal\ Altitude = GS^2/11.3$.
    - 90 kts → 716' AGL 100 kts → 885' AGL 110 kts → 1,071' AGL
- Enter maneuver on a 45° to downwind.
- Abeam the pylon, begin the turn.
    - **The steepest bank angle should not exceed 40°.**
    - Pitch up if pylon gets behind wing.
    - Pitch down if pylon gets in front of wing.
- Fly level for 3-5 seconds on a 45° entry to the next pylon.
- After flying around the second pylon, exit maneuver on the entry heading.
- Trim for cruise and flow check configuration.

Basic Instrument Maneuvers

Straight-and-Level Flight

- Set pitch and power for level flight (20”/2300 RPM).
- Cross-check heading indicator to verify straight flight.
- Cross-check altimeter to verify level flight.

PPL ACS: Maintain altitude ±200 ft, heading ±20°, and airspeed ±10 kts.

Constant Airspeed Climbs

- Set pitch and power for climb at 90 kts (23”/2400 RPM).
- Use the attitude indicator to set pitch to maintain climb at 90 kts.
- Use airspeed indicator to cross-check pitch. Cross-check the VSI and altimeter to verify acceptable climb rate.
- Cross-check heading indicator to verify straight flight.
    - Use turn coordinator and heading indicator if performing a climbing turn.
- Monitor altimeter. Level off at the desired altitude (lead by about 10% of the vertical speed).
- Accelerate to cruise and then complete flow check for level flight.

PPL ACS: Level off at assigned altitude and maintain ±200 ft, heading ±20°, and airspeed ±10 kts.

Constant Airspeed Descents

- Reduce power to (15”/2300 RPM) and allow the aircraft to slow to descent airspeed (90 kts).
- Use the attitude indicator to set pitch to maintain descent at 90 kts.
- Use airspeed indicator to cross-check pitch. Cross-check the VSI and altimeter to verify acceptable descent rate.
- Cross-check heading indicator to verify straight flight.
    - Use turn coordinator and heading indicator if performing a descending turn.
- Monitor altimeter. Level off at the desired altitude (lead by about 10% of the vertical speed). Add back in power and complete flow check for level flight.

PPL ACS: Level off at assigned altitude and maintain ±200 ft, heading ±20°, and airspeed ±10 kts.

Turns to Headings

- Use attitude indicator to establish bank and pitch for the turn.
- Cross check attitude against turn coordinator and adjust bank as needed to maintain a standard rate turn.
- Cross check the altimeter to verify level flight.
- Monitor heading indicator and roll out on desired heading (lead rollout by about half the bank angle).

PPL ACS: Maintain altitude ±200 ft, maintain a standard rate turn, roll out on assigned heading ±10°, and maintain airspeed ±10 kts.

Recovery from Unusual Attitudes

- Nose-high decreasing airspeed.
    - Reduce pitch while adding full power.
    - Level the wings.
- Nose-low increasing airspeed.
    - Reduce power.
    - Level the wing.
    - Carefully bring the nose back to the horizon.

Emergency Maneuvers

Emergency Approach and Landing without Engine Power

- **A**irspeed—pitch for best glide (75 kts at max gross, reduce 1kt per 100 lbs. under max gross).
- **B**est Field—select a suitable landing area.
- **C**hecklist—flow check followed by written checklist if time allows.
    - Mixture—adjust.
    - Fuel selector—verify BOTH and/or switch tanks.
    - Boost pump—ON.
    - Mags—try L/R, BOTH.
    - If no restart, secure the engine.
        - Mixture—CUTOFF.
        - Fuel selector—OFF.
        - Boost pump—OFF.
        - Mags—OFF.
- **D**eclare an emergency—declare an emergency, squawk 7700, and turn on ELT.
- Flaps full when field is made.
- Master switch off.
- Unlatch doors.
- 65 kts on short final—do not stall.

Emergency Descent due to Engine Fire

- Flow Check (LCGUMPS).
    - Prop Full Forward.
    - Cowl Flaps Closed.
- Pitch for 100 kts while entering a 30-45° bank (faster if needed to extinguish fire).
- Engine Fire Checklist.
    - Mixture idle cutoff.
    - Fuel selector off.
    - Boost pump off.
    - Master off.
    - Cabin air and heat off except overhead vents.
- Once the fire is extinguished, pitch for best glide (75 kts) while maneuvering for downwind key position of emergency landing point.
- Abort the emergency landing when prompted by examiner.

PPL ACS: Maintain appropriate airspeed +0/-10 kts and level off at specified altitude ±100 ft. Use bank angles of 30-45° to *maintain positive load factor. Complete appropriate checklist.*

CPL ACS: Maintain appropriate airspeed +0/-10 kts and level off at specified altitude ±100 ft. Use bank angles of 30-45° to *maintain positive load factor. Complete appropriate checklist.*

Reference Speeds

- $V_{s0} = 36\ KIAS$
- $V_{s1} = 43\ KIAS$
- $V_X = 58\ KIAS\ (flaps\ 20°)$
- $V_X = 63\ KIAS\ (flaps\ 0°)$
- $V_Y = 70\ KIAS\ (flaps\ 20°)$
- $V_Y = 80\ KIAS\ (flaps\ 0°)$
- $V_{Best\ Glide} = 75\ KIAS$ (8.7:1) (roughly 3nm for every 2,000 ft)
    - $reduce\ by\ 1\ knot\ per\ 100\ lbs\ under\ gross\ weight.$
- $V_{Best\ Glide} = 70\ KIAS\ (if\ after\ takeoff\ and\ flaps\ at\ 10\ or\ 20.)$
- $V_{Short\ field\ app} = 60\ KIAS$
- $V_{Normal\ app} = 65\ KIAS$
- $V_{Flaps\ up\ app} = 70\ KIAS$
- $V_A = 110\ KIAS\ at\ 3100\ lbs$
- $V_A = 101\ KIAS\ at\ 2600\ lbs$
- $V_A = 88\ KIAS\ at\ 2000\ lbs$
- $V_{FE} = 140\ KIAS\ (flaps\ 10°)$
- $V_{FE} = 120\ KIAS\ (flaps\ 20°)$
- $V_{FE} = 100\ KIAS\ (flaps\ 30°)$
- $V_{NO} = 140\ KIAS$
- $V_{NE} = 175\ KIAS$
- $V_{Window\ Open} = 175\ KIAS$
- *Max. Demonstrated Crosswind: 15 kts.*

For reference, runway stripes are 120 ft long with spaces between stripes of 80 ft; 1000 ft markers are 150 ft long.