

The ball in the slip/skid indicator also indicates slips and skids. When using this instrument for coordination, apply rudder pressure on the side that the ball is offset (step on the ball). Correction for uncoordinated condition should be accomplished by using appropriate rudder and aileron control pressures simultaneously to coordinate the glider.

Steep Turns

Soaring flight requires competence in steep turns. In thermalling flight, small-radius turns are often necessary to keep the glider in or near the core of the thermal updraft where lift is usually strongest and rapid climbs are possible. At any given airspeed, increasing the angle of bank decreases the radius of the turn and increases the rate of turn. The radius of a turn at any given bank angle varies directly with the square of the airspeed at which the turn is made; therefore, the lower the airspeed is, the smaller the turn radius is. To keep the radius of turn small, it is necessary to bank steeply while maintaining an appropriate airspeed, such as minimum sink or best glide speed. The pilot must be aware that as the bank angle increases, the stall speed increases.

Before starting the steep turn, the pilot should ensure that the area is clear of other traffic since the rate of turn is quite rapid. After establishing the appropriate airspeed, the glider should be smoothly rolled into a coordinated steep turn with at least 45° of bank. The pilot should use outside visual reference to establish and maintain the desired bank angle. If the pilot does not add back pressure to maintain the desired airspeed after the bank is established, the glider has a tendency to enter a spiral. To counteract the overbanking tendency caused by the steep turn, the pilot should apply top aileron pressure. Because the top aileron pressure pulls the nose away from the direction of the turn, the pilot also must apply bottom rudder pressure. A coordinated (no slip or skid) steep turn requires back pressure on the elevator for airspeed control, top aileron pressure for bank control, and bottom rudder pressure to streamline the fuselage with the flightpath.

Common errors during steep turns include:

- Failure to clear turn.
- Uncoordinated use of controls.
- Loss of orientation.
- Failure to maintain airspeed within tolerance.
- Unintentional stall or spin.
- Excessive deviation from desired heading during roll-out.

Maneuvering at Minimum Controllable Airspeed

Maneuvering during slow flight demonstrates the flight characteristics and degree of controllability of a glider at

minimum speeds. By definition, the term “flight at minimum controllable airspeed” means a speed at which any further increase in AOA or load factor causes an immediate stall. Pilots must develop an awareness of the particular glider flight characteristics in order to recognize and avoid stalls that may inadvertently occur during the low airspeeds used in takeoffs, climbs, thermaling, and approaches to landing.

The objective of maneuvering at minimum controllable airspeed is to develop the pilot’s sense of feel and ability to use the controls correctly, and to improve proficiency in performing maneuvers that require low airspeeds. Maneuvering at minimum controllable airspeed should be performed using outside visual reference. It is important that pilots form the habit of frequently referencing the pitch attitude of the glider for airspeed control while flying at low speeds.

The maneuver is started from either best glide speed or minimum sink speed. The pitch attitude is smoothly and gradually increased. While the glider is losing airspeed, the position of the nose in relation to the horizon should be noted and should be adjusted as necessary until the minimum controllable airspeed is established. During these changing flight conditions, it is important to retrim the glider, as necessary, to compensate for changes in control pressures. Back pressure that is excessive or too aggressive on the elevator control may result in an abrupt increase in pitch attitude and a rapid decrease in airspeed, which lead to a higher AOA and a possible stall. When the desired pitch attitude and airspeed have been established, it is important to continually cross-check the pitch attitude on the horizon and the airspeed indicator to ensure accurate control is being maintained.

When minimum controllable airspeed is established in straight flight, turns should be practiced to determine the glider’s controllability characteristics at this selected airspeed. During the turns, the pitch attitude may need to be decreased in order to maintain the airspeed. If a steep turn is encountered, and the pitch attitude is not decreased, the increase in load factor may result in a stall. A stall may also occur as a result of abrupt or rough control movements resulting in momentary increases in load factor. Abruptly raising the flaps during minimum controllable airspeed results in sudden loss of lift and possibly causing a stall.

Minimum controllable airspeed should also be practiced with extended spoilers/dive brakes. This provides additional understanding of the changes in pitch attitude caused by the increase in drag from the spoilers/dive brakes.

Actual minimum controllable airspeed depends upon various conditions, such as the gross weight and CG location of the