

DIAMOND DA20-C1 OPERATING PROCEDURES



HIGH ASPECT FLIGHT TRAINING

Part of WEM Aviation

Summary of Major Changes

Revision 6

Power-Off Stalls, Power-On Stalls, Accelerated Stalls

- Added requirement to “verbally acknowledge cues of the impending stall” to the descriptions of actions required leading up to the recovery from a stall.

Soft Field Takeoff

- Revised description of rotation and pitch attitude description for consistency with FAA Private and Commercial Pilot ACS.

Revision 7

Preflight

- Revised fueling procedures and baffle recommendations to reflect current practice.

TABLE OF CONTENTS

AIRCRAFT LIMITATIONS	4
NOTES.....	5
PREFLIGHT.....	5
TAXI	6
PATTERN PROCEDURES.....	7
NORMAL/CROSSWIND TAKEOFF	7
TRAFFIC PATTERN	8
SOFT FIELD TAKEOFF.....	9
SHORT FIELD TAKEOFF	10
NORMAL/CROSSWIND LANDING.....	11
SOFT FIELD LANDING	12
SHORT FIELD LANDING.....	13
FORWARD SLIP TO A LANDING	14
GO-AROUND	14
PRIVATE FLIGHT MANEUVERS	15
STEEP TURNS.....	16
SLOW FLIGHT	17
POWER-OFF/APPROACH TO LANDING STALL.....	18
POWER-ON/TAKEOFF AND DEPARTURE STALL	19
TURNS AROUND A POINT	20
S-TURNS	21
RECTANGULAR COURSE	22
EMERGENCY PROCEDURES	23
EMERGENCY DESCENT	23
EMERGENCY APPROACH AND LANDING	24
INSTRUMENT PROCEDURES.....	25
INSTRUMENT APPROACH	25
HOLDING PROCEDURES	26
COMMERCIAL FLIGHT MANEUVERS	27
ACCELERATED STALL	28
LAZY EIGHTS.....	29
CHANDELLES	30
STEEP SPIRALS.....	31
EIGHTS ON PYLONS.....	32
POWER OFF 180° ACCURACY LANDING.....	33

AIRCRAFT LIMITATIONS

AIRSPEED

Airspeed	Definition	Marking	Knots
V _{so} *	Stall Speed in Landing Configuration	Bottom of White Arc	36
V _{s1} *	Stall Speed in Clean Configuration	Bottom of Green Arc	44
V _r	Rotation Speed	Not Indicated	44
V _x (Flaps T/O)	Best Angle of Climb Speed	Not Indicated	57
V _x (Flaps CRUISE)	Best Angle of Climb Speed	Not Indicated	60
V _y (Flaps T/O)	Best Rate of Climb Speed	Not Indicated	68
V _y (Flaps CRUISE)	Best Rate of Climb Speed	Not Indicated	75
V _{fe} (Flaps T/O)	Maximum Flaps Extended Speed	Not Indicated	100
V _{fe} (Flaps LDG)	Maximum Flaps Extended Speed	Top of White Arc	78
V _a *	Maneuvering Speed	Not Indicated	106
V _{no}	Maximum Structural Cruising Speed	Top of Green Arc	118
V _{ne}	Never Exceed Speed	Red Line	164
Maximum Glide		Not Indicated	73
Maximum Demonstrated Crosswind Component			20

*Indicated speed at maximum gross weight

WEIGHT

Maximum Ramp Weight	1770 lbs
Maximum Takeoff Weight	1764 lbs
Maximum Landing Weight	1764 lbs
Maximum Weight in Baggage Area	44 lbs

LOAD FACTOR

Maximum Positive Load Factor:	
Flaps Cruise	4.4
Flaps T/O or LDG	2.0
Maximum Negative Load Factor:	
Flaps Cruise	-2.2
Flaps T/O or LDG	0.0

FUEL

Total Fuel Quantity	24.5 gallons
Usable Fuel	24.0 gallons
Unusable Fuel	0.5 gallons

NOTES

1. In the following procedures, phrases to be **verbalized** are indicated in **quotations**.
2. In-flight checklists are to be **performed from memory as a flow** and then **verified using the checklist**. **Boxed items** included in the following procedures and in the emergency checklists are to be **performed from memory**.
3. Completion standards listed in the following procedures are not comprehensive. Reference the appropriate test standard. Differences between Private and Commercial standards are indicated when appropriate.

PREFLIGHT

1. When getting into the aircraft, step only on the exterior step and the floorboard in the cockpit. Do not step directly on the aircraft seat. Use only the handholds located on the back of the instrument panel.
2. The canopy may remain open while conducting the preflight but must be closed and latched prior to starting the engine.
3. Do not place headsets, flight bags, or other items on the wings that may cause scratches to the composite material.
4. The standard fuel load for the Diamond is 24 gallons. However, certain aircraft will be fueled only upon request to be available if needed for weight and balance reasons.
5. Freedom of movement of the flight controls should be checked from inside the cabin by moving the control stick. Do not move the control surfaces by hand.
6. When adjusting the rudder pedals, ensure the adjustment cable is pulled straight-out, not at an upward angle which may cause fraying of the cable.
7. No baffles should be installed above 0 °C. Between 0 °C and -10 °C, only the inlet baffles should be installed. Below -10 °C, both inlet and outlet baffles should be installed. Be sure to consider the potential for changes in temperature during flight when selecting the appropriate baffles to install.

TAXI

1. Flight controls should be positioned considering existing wind conditions.
2. All taxi operations must be conducted with reference to an appropriate airport diagram.
3. During the day, strobe lights should be illuminated for taxi operations. At night, position lights should be illuminated at all times, and strobe lights should be illuminated prior to operating on airport taxiways or runways. Use caution when using strobe lights at night on ramp areas so as not to create a hazard to other aircraft.
4. Before crossing any runway or taxiway, visually check for aircraft that may present a hazard and verbalize, **“Clear Left, Clear Right, Cleared to Cross.”**

PATTERN PROCEDURES

NORMAL/CROSSWIND TAKEOFF

Procedures

1. Perform the *Engine Run-Up* and *Before Takeoff* checklists and review the *Takeoff* checklist prior to crossing the hold short line.
2. The takeoff briefing should include a review of procedures and airspeeds for the takeoff and climb, including initial altitude and on-course heading. The emergency procedures for an engine failure during the takeoff run and engine failure immediately after takeoff should be reviewed.
3. Taxi onto the runway and align the aircraft with the runway centerline. Verify the runway heading agrees with the compass and the flight controls are positioned correctly for the existing wind conditions. Smoothly apply full throttle while maintaining directional control.
4. Verify the tachometer is indicating at least 2000 RPM and the airspeed indicator is increasing. Verbalize, **“Airspeed Alive.”**
5. The elevator should be neutral during the beginning of the takeoff roll. Back pressure should be applied to rotate at 44 knots.
6. Initial climb should be performed at 68 knots up to 400 AGL.
7. Upon reaching 400 AGL, retract the flaps to cruise and accelerate to climb at 75 knots.

Completion Standards

- ✓ Establishes a pitch attitude that will maintain $V_y +10/-5$ knots (Private) or $V_y +/- 5$ knots (Commercial).
- ✓ Maintains directional control and proper wind-drift correction throughout the takeoff and climb.

TRAFFIC PATTERN

If remaining in the pattern:

1. Begin turn to crosswind past the departure end of the runway within 300 feet of pattern altitude.
2. Upon reaching pattern altitude, pitch for level flight and accelerate to 90 knots. Reduce power to maintain 90 knots (approximately 2000 RPM).
3. Proceed with Normal, Short Field, or Soft Field approach and landing procedures, as required.

If departing the pattern:

1. Begin turn on course past the departure end of the runway within 300 feet of pattern altitude, or as directed by Air Traffic Control.
2. At a non-towered airport, depart straight out, or with a 45° turn in the direction of the pattern once reaching pattern altitude. The turn on course may be started once an altitude of 500 feet above pattern altitude is reached.
3. When reaching a distance of at least 3 NM from the departure airport, verify the *Climb* checklist is complete.

SOFT FIELD TAKEOFF

Procedures

(Procedures are identical to that of the Normal Takeoff, except as noted.)

1. Hold full aft elevator while taxiing onto runway.
2. Maintain taxi speed while aligning the airplane with the runway centerline. Do not stop unless required by ATC. Verify the runway heading agrees with the compass and the flight controls are positioned correctly for the existing wind conditions.
3. Smoothly apply full throttle and maintain full aft elevator during initial takeoff roll, using minimal braking.
4. Verify the tachometer is indicating at least 2000 RPM and the airspeed indicator is increasing. Verbalize, **"Airspeed Alive."**
5. As the controls become more effective, release back pressure *as necessary* while maintaining a pitch attitude allowing the wings to support the weight of the aircraft as early as possible. *Back pressure must be released quickly enough to ensure the nose does not rise to a pitch attitude that could result in a tail strike.*
6. Establish and maintain a pitch attitude that will transfer the weight of the airplane from the wheels to the wings as rapidly as possible.
7. Lift off at the lowest possible airspeed and remain in ground effect while accelerating to V_x or V_y , as appropriate.
8. Establish a pitch attitude for V_x or V_y , as appropriate, and maintain selected airspeed during the climb.

Completion Standards

- ✓ Taxies onto the takeoff surface at a speed consistent with safety without stopping.
- ✓ Positions the flight controls for the existing wind conditions and to maximize lift as quickly as possible.
- ✓ Maintains a pitch attitude that will transfer the weight of the airplane to the wings as rapidly as possible.
- ✓ Lifts off at the lowest possible airspeed and remains in ground effect until V_x or V_y .
- ✓ Establishes a pitch attitude for V_x or V_y +10/-5 knots (Private) or +/- 5 knots (Commercial).

SHORT FIELD TAKEOFF

Procedures

(Procedures are identical to that of Normal Takeoff, except as noted.)

1. Taxi onto the runway utilizing maximum available takeoff area. Verify the runway heading agrees with the compass and the flight controls are positioned correctly for the existing wind conditions.
2. Hold the brakes while smoothly applying full throttle and verify the tachometer is indicating at least 2000 RPM.
3. Release the brakes, verify the airspeed indicator is increasing. Verbalize, **“Airspeed Alive.”**
4. Apply back pressure to rotate at 44 knots and to lift off at 52 knots.
5. Pitch for 58 knots until obstacles are cleared, or until reaching an altitude of 50 feet.
6. Pitch for 68 knots and resume normal climb procedures.

Completion Standards

- ✓ Taxies into takeoff position using maximum available takeoff area.
- ✓ Positions the flight controls for the existing wind conditions.
- ✓ Applies brakes while advancing the throttle smoothly to takeoff power.
- ✓ Maintains airspeed +10/-5 knots (Private) or +5/-0 knots (Commercial) until 50 feet above the surface or the obstacle is cleared.
- ✓ After clearing the obstacle, accelerates to and maintains V_y +10/-5 knots (Private) or +/- 5 knots (Commercial).

NORMAL/CROSSWIND LANDING

Procedures

1. Ensure the *Approaching Airport* Checklist is complete and pattern altitude is reached prior to two miles from the airport.
2. Enter the traffic pattern at a 45° angle to the downwind leg, abeam the midpoint of the runway, or as directed by Air Traffic Control.
3. On downwind, adjust power for 90 knots (approximately 2000 RPM).
4. Abeam the touchdown point, reduce throttle as necessary to begin the appropriate descent rate (approximately 1500 RPM), verify airspeed below 100 knots, and extend flaps to T/O. Trim for 80 knots.
5. On base, trim for 70 knots. Verify airspeed below 78 knots, and extend the flaps to LDG.
6. Turn final, trim for 55 knots (not to exceed 60 knots) with wind gust factor applied, and maintain a stable approach as defined below:
 - **Approach speed +/- 5 knots**
 - **Aircraft within the lateral boundaries of the runway**
 - **Glidepath allowing an approach at a normal descent rate using normal maneuvers (no slipping, diving, or excess power required)**
 - **Touchdown to occur within the first third of a specified landing area**
7. At 200 AGL, verify the aircraft meets the above stable approach criteria and verbalize, “**Stable, Continue**” or “**Unstable, Go-around.**”
8. Reduce the power to idle during the flare and touchdown with the airplane aligned with and over the runway centerline.
9. During roll-out, maintain directional control with the rudder. Brakes may be used at airspeeds below 45 knots. Ensure the flight controls are positioned correctly for existing wind conditions.
10. Exit the runway at the first available intersection or as directed by ATC. After clearing the runway and coming to a complete stop, perform the *After Landing* Checklist.

Completion Standards

- ✓ Maintains traffic pattern altitude +/- 100 feet and appropriate airspeed +/- 10 knots.
- ✓ Maintains a stabilized approach at the recommended airspeed +10/-5 knots (Private) or +/- 5 knots (Commercial).
- ✓ Touches down smoothly at the approximate stall speed within 200 feet (Commercial) beyond a specified point with no drift, over and aligned with the centerline.
- ✓ Maintains crosswind correction and directional control throughout the approach and landing.

SOFT FIELD LANDING

Procedures

(Procedures are identical to that of Normal Landing, except as noted.)

1. Turn final, trim for 55 knots (not to exceed 60 knots) with wind gust factor applied, and maintain a stable approach as defined below:
 - **Approach speed +/- 5 knots**
 - **Aircraft within the lateral boundaries of the runway**
 - **Glidepath allowing an approach at a normal descent rate using normal maneuvers (no slipping, diving, or excess power required)**
 - **Touchdown to occur within the first third of a specified landing area**
2. At 200 AGL, verify the aircraft meets the above stable approach criteria and verbalize, **“Stable, Continue”** or **“Unstable, Go-around.”**
3. Flare to hold the airplane above the runway as long as possible, allowing maximum forward speed to dissipate prior to touchdown.
4. Allow the weight of the aircraft to be transferred smoothly from the wings to the wheels. The aircraft should touchdown softly in a nose-high pitch attitude at the lowest airspeed possible.
5. After the main wheels touch down, back elevator pressure should be increased as necessary to hold the nose wheel off the surface. Allow the nose wheel to drop to the runway only after full aft elevator is reached.
6. Maintain full aft elevator during the rollout and taxi. Ensure the flight controls are positioned correctly for existing wind conditions.
7. Use brakes below 45 knots only if necessary and maintain extra power if needed to continue moving on the soft field until clear of runway.

Completion Standards

- ✓ Maintains traffic pattern altitude +/- 100 feet and appropriate airspeed +/- 10 knots.
- ✓ Maintains a stabilized approach at the recommended airspeed +10/-5 knots (Private) or +/- 5 knots (Commercial).
- ✓ Touches down softly at the approximate stall speed with no drift, and with the airplane aligned with the centerline.
- ✓ Maintains crosswind correction and directional control throughout the approach and landing.
- ✓ Maintains proper position of the flight controls and sufficient speed to taxi on the soft surface.

SHORT FIELD LANDING

Procedures

(Procedures are identical to that of Normal Landing, except as noted.)

1. On final, trim for 55 knots. Adjust power as necessary to ensure obstacles are cleared and touchdown will occur at the specified point.
2. Maintain a stable approach as defined below:
 - **Approach speed +/- 5 knots**
 - **Aircraft within the lateral boundaries of the runway**
 - **Glidepath allowing an approach at a normal descent rate using normal maneuvers (no slipping, diving, or excess power required)**
 - **Touchdown to occur within the first third of a specified landing area**
3. At 200 AGL, verify the aircraft meets the above stable approach criteria and verbalize, **“Stable, Continue”** or **“Unstable, Go-around.”**
4. Touchdown with idle power at minimum controllable airspeed with minimum float.
5. Apply maximum aerodynamic braking. Wheel brakes may be applied below 45 knots to stop in the shortest distance consistent with safety. Ensure the flight controls are positioned correctly for the existing wind conditions.

Completion Standards

- ✓ Maintains traffic pattern altitude +/- 100 feet and appropriate airspeed +/- 10 knots.
- ✓ Maintains a stabilized approach at the recommended airspeed +10/-5 knots (Private) or +/- 5 knots (Commercial).
- ✓ Touches down smoothly at minimum controllable airspeed, at or within 200 feet (Private) or 100 feet (Commercial) beyond a specified point, with no side drift, minimum float, and with the aircraft aligned with and over the centerline.
- ✓ Maintains crosswind correction and directional control throughout the approach and landing.
- ✓ Applies brakes to stop in the shortest distance consistent with safety.

FORWARD SLIP TO A LANDING

Procedures

(Procedures are identical to that of Normal Landing, except as noted.)

1. Adjust pattern to ensure the aircraft is at a sufficient altitude on final to allow for the forward slip.
2. On final, reduce power to idle, apply aileron into the wind, full opposite rudder, and trim for 55 knots (not to exceed 60 knots).
3. Maintain the forward slip, demonstrating maximum descent rate, until the normal glidepath is reached.
4. If necessary, correlate crosswind with direction of forward slip and transition to side slip for landing.
5. Transition smoothly from the forward slip to a normal approach attitude, and continue with a normal landing.

Completion Standards

- ✓ Touches down within 400 feet beyond a specified point with no drift, and with the airplane aligned with and over the centerline.

GO-AROUND

1. Apply full power, retract the flaps to T/O, and pitch for 58 knots.
2. Once a positive rate of climb is established and all obstacles have been cleared, transition to V_y .
3. Retract flaps to Cruise once an altitude of 400 AGL is reached, and proceed with normal climb procedures.

PRIVATE FLIGHT MANEUVERS

1. While traveling to the practice areas, configure the aircraft for cruise flight at a power setting according to the Cruise Performance Table in the POH, and complete the *Cruise* checklist.
2. Prior to beginning maneuvers, perform the following *Maneuver Flow*:

Engine Gauges.....	Normal
Mixture.....	Full Rich
Throttle	As required for 90 knots (Approximately 2000 RPM)
Flaps	Cruise
Fuel Pump	On

3. Ensure the area is clear of traffic by executing at least 180 degrees of clearing turns (one 180° turn or two 90° turns).
4. Make a position report on the Parks Traffic frequency.
5. Perform the maneuver as described in this section.
6. Upon completion of the maneuver, reduce throttle to maintain 90 knots and resume straight and level flight.

STEEP TURNS

Procedures

1. Ensure *Maneuver Flow* and clearing turns have been completed.
2. Select ground reference point and note heading, altitude, and airspeed to be maintained.
3. Roll into a 45° bank (50° for commercial) using coordinated aileron and rudder.
4. Add back pressure as necessary to maintain altitude and power as necessary to maintain 90 knots.
5. Maintain a constant airspeed, altitude, and bank angle throughout a 360° turn.
6. Lead roll-out by approximately one-half the bank angle (20° to 25°) to ensure turn is completed on entry heading. Reduce pitch and power as necessary to maintain airspeed and altitude.
7. Perform a 360° turn in opposite direction as described above.

Completion Standards

- ✓ Establishes a safe airspeed not to exceed V_a .
- ✓ Maintains the entry altitude +/- 100 feet, airspeed +/- 10 knots, and bank +/- 5°.
- ✓ Rolls out on the entry heading +/- 10°.

SLOW FLIGHT

Entry Procedures

1. Ensure *Maneuver Flow* and clearing turns have been completed.
2. Select an entry altitude that will allow maneuver to be completed no lower than 1500 AGL, and note the heading and altitude to be maintained.
3. Reduce power to 1200 RPM.
4. Verify airspeed below 100 knots and extend flaps to T/O (if specified).
5. Verify airspeed below 78 knots and extend flaps to Landing (if specified).
6. Maintain level flight and slow to an airspeed of approximately 50 to 55 knots, just above any buffet or stall warning.
7. Increase power as necessary to maintain altitude and apply rudder and aileron as necessary to maintain coordinated flight at a constant heading.
8. Adjust pitch and trim as necessary to maintain airspeed.
9. Perform turns, climbs, and descents as specified.

Recovery Procedures

1. Smoothly apply full power.
2. Decrease pitch as necessary to maintain altitude as airspeed increases.
3. Retract flaps in increments, if necessary.
4. Accelerate to cruise airspeed while maintaining altitude and heading.

Completion Standards

- ✓ Selects altitude that will allow maneuver to be completed no lower than 1500 feet AGL.
- ✓ Maintains an airspeed at which any further increase in angle of attack, increase in load factor, or reduction in power, would result in a stall warning (e.g., aircraft buffet, stall horn, etc.).
- ✓ Maintains specified altitude +/- 100 feet (Private) or +/- 50 feet (Commercial), specified heading +/- 10°, and airspeed +10/-0 knots (Private) or +5/-0 knots (Commercial).

POWER-OFF/APPROACH TO LANDING STALL

Entry Procedures

1. Ensure *Maneuver Flow* and clearing turns have been completed.
2. Select entry altitude that will allow maneuver to be completed no lower than 1500 AGL.
3. Reduce power to 1200 RPM.
4. Verify airspeed below 100 knots and extend flaps to T/O (if specified).
5. Verify airspeed below 78 knots and extend flaps to Landing (if specified).
6. Slow to final approach speed of 55 knots (65 knots with flaps retracted).
7. Establish a momentary stabilized descent to simulate approach to landing.
8. If performing a turning stall, establish a turn of up to 20° of bank.
9. Reduce power to idle and smoothly increase pitch (reducing airspeed at approximately 1 knot per second) to an attitude that will induce a stall.
10. Maintain heading or bank angle (if turning).
11. Verbally acknowledge cues of the impending stall.
12. Recover after a fully developed (Private) stall occurs *or* at the first indication (Commercial) of an impending stall (e.g., aircraft buffet, stall horn, etc.)

Recovery Procedures

1. Reduce the angle of attack, add full power, and level the wings (if necessary), while maintaining coordination with the rudder.
2. Immediately retract flaps to T/O (if necessary).
3. Establish a climb at V_x or V_y.
4. Retract flaps to Cruise after reaching climb airspeed and verifying a positive rate of climb.
5. Return to specified altitude, heading, and airspeed.

Completion Standards

- ✓ Selects altitude to allow completion of maneuver no lower than 1500 feet AGL.
- ✓ Maintains specified heading +/-10° if in straight flight.
- ✓ Maintains a specified angle of bank not to exceed 20° if in turning flight.
- ✓ Recognizes and recovers promptly with a minimum loss of altitude appropriate for the airplane.

POWER-ON/TAKEOFF AND DEPARTURE STALL

Entry Procedures

1. Ensure *Maneuver Flow* and clearing turns have been completed.
2. Select entry altitude that will allow maneuver to be completed no lower than 1500 AGL.
3. Reduce power to 1200 RPM.
4. Verify airspeed below 100 knots and extend flaps to T/O.
5. Maintain level flight while slowing to lift-off speed of 52 knots.
6. If performing a turning stall, establish a turn of up to 20° of bank.
7. Smoothly apply full power and increase pitch (reducing airspeed at approximately 1 knot per second) to an attitude that will induce a stall.
8. Maintain heading or bank angle (if turning).
9. Verbally acknowledge cues of the impending stall.
10. Recover after a fully developed (Private) stall occurs *or* at the first indication (Commercial) of an impending stall (e.g., aircraft buffet, stall horn, etc.)

Recovery Procedures

1. Reduce the angle of attack, and level the wings (if necessary), while maintaining coordination with the rudder.
2. Establish a climb at V_x or V_y.
3. Retract flaps to Cruise after reaching climb airspeed and verifying a positive rate of climb.
4. Return to specified altitude, heading, and airspeed.

Completion Standards

- ✓ Selects altitude to allow completion of maneuver no lower than 1500 feet AGL.
- ✓ Maintains specified heading +/-10° if in straight flight while inducing the stall.
- ✓ Maintains a specified angle of bank not to exceed 20° if in turning flight.
- ✓ Recognizes and recovers promptly with a minimum loss of altitude appropriate for the airplane.

URNS AROUND A POINT

Procedures

1. Ensure *Maneuver Flow* has been completed and the aircraft is at an altitude allowing the maneuver to be entered at 600 – 1000 AGL.
2. Select a suitable point in an area free of obstacles with an emergency landing field within gliding distance.
3. Perform clearing turns, positioning the aircraft downwind at an appropriate distance from the point at 90 knots.
4. Enter a turn around the selected point, varying bank angle as necessary to maintain a constant distance from the point:
 - a. When headed downwind, bank angle will be steepest due to the increased groundspeed.
 - b. As the turn is continued to an upwind heading, bank angle will need to be gradually decreased.
 - c. As the aircraft returns to the original downwind heading, bank angle will need to be gradually increased.
 - d. Ensure bank angle does not exceed 45° at any point.
5. Continue the maneuver to complete two or more complete circles around the point.

Completion Standards

- ✓ Divides attention between aircraft control and ground track while maintaining coordinated flight.
- ✓ Applies adequate wind-drift correction to track a constant radius around the selected reference point.
- ✓ Maintains entry altitude +/- 100 feet and airspeed +/- 10 knots.

S-TURNS

Procedures

1. Ensure *Maneuver Flow* has been completed and the aircraft is at an altitude allowing the maneuver to be entered at 600 – 1000 AGL.
2. Select a suitable ground reference line oriented perpendicular to the wind in an area free of obstacles with an emergency landing field within gliding distance.
3. Perform clearing turns, positioning the aircraft downwind at 90 knots.
4. When directly over and perpendicular to the reference line, begin a 180° turn.
5. Initial bank angle will be steep due to the increased groundspeed, but should be gradually decreased throughout the first 180° turn as groundspeed decreases.
6. Adjust bank angle so the turn is completed and the wings are level at the moment the road is reached.
7. At the moment the road is crossed again, begin a turn in the opposite direction, adjusting bank throughout the turn to achieve a semicircle of equal radius.
8. For the second 180° turn, the reduced groundspeed will require a shallower bank initially. As groundspeed increases as the turn progresses, bank angle must be gradually increased.

Completion Standards

- ✓ Divides attention between aircraft control and ground track while maintaining coordinated flight.
- ✓ Applies adequate wind-drift correction to track a constant radius turn on each side of the selected reference line.
- ✓ Reverses turn direction directly over the selected reference line.
- ✓ Maintains altitude +/- 100 feet and airspeed +/- 10 knots

RECTANGULAR COURSE

Procedures

1. Ensure *Maneuver Flow* has been completed and the aircraft is at an altitude allowing the maneuver to be entered at 600 – 1000 AGL.
2. Select a square or rectangular field in an area free of obstacles with an emergency landing site within gliding distance.
3. Perform clearing turns, positioning the aircraft to approach the field 45° to the downwind at 90 knots.
4. Fly the aircraft parallel to the field boundary, approximately ¼ to ½ mile away from the field.
5. All turns should be started when the aircraft is abeam the field boundary. Adjust the bank angle during the turn to ensure the aircraft is the same distance from the next field boundary at the completion of the turn.
6. Bank angle in turns will be dependent on groundspeed, with the steepest bank required on downwind headings, and the shallowest bank required on upwind headings.
7. At the completion of each of the turns, the proper crab angle must be established into the wind to ensure the aircraft maintains a constant distance from the field boundary.

Completion Standards

- ✓ Divides attention between aircraft control and ground track while maintaining coordinated flight.
- ✓ Applies adequate wind-drift correction during straight and turning flight to maintain a constant ground track around the rectangular reference area.
- ✓ Maintains altitude +/- 100 feet and airspeed +/- 10 knots.

EMERGENCY PROCEDURES

EMERGENCY DESCENT

Procedures

1. Ensure *Maneuver Flow* and clearing turns have been completed. Set the throttle to 2400 RPM to initiate the maneuver at a normal cruise airspeed.
2. Reduce power to idle and establish a bank of 30° - 45°.
3. Pitch for 118 knots.
4. Recover by returning the wings to level, pitching for level flight, and adding power to cruise setting. Lead the level off by approximately 10% of the descent rate.

Completion Standards

- ✓ Maintains positive load factors during the descent.
- ✓ Maintains appropriate airspeed +0/-10 knots, and levels off at specified altitude +/-100 feet.

EMERGENCY APPROACH AND LANDING

Troubleshooting

1. Pitch for best glide airspeed of 73 knots.
2. Identify suitable landing site and turn to an appropriate heading to successfully make the field.
3. Perform *Engine Troubleshooting Flow*:

Engine Gauges.....	Check
Fuel Shutoff Valve	Open
Mixture.....	Full Rich
Throttle	$\frac{3}{4}$ -Inch Open
Alternate Air	Open
Fuel Pump.....	On
Ignition Switch.....	Cycle
Fuel Prime	On

4. Altitude permitting, verify the *Engine Failure in Flight* checklist has been completed.

Securing

1. If engine does not restart, set transponder to 7700 and declare emergency on 121.5 or other appropriate frequency.
2. Perform *Engine Securing Flow*:

Fuel Prime	Off
Ignition Switch.....	Off
Fuel Pump	Off
Mixture.....	Idle Cut-Off
Fuel Shutoff Valve	Closed

3. Ensure all loose items are secure, set flaps as needed for landing, and turn Master Switch off.
4. Altitude permitting, verify the *Emergency Landing with Engine Off* checklist has been completed.

Completion Standards

- ✓ Establishes and maintains the recommended best-glide airspeed +/- 10 knots.
- ✓ Selects a suitable landing area.
- ✓ Plans and follows a flight pattern to the selected landing area considering altitude, wind, terrain, and obstructions.

INSTRUMENT PROCEDURES

INSTRUMENT APPROACH

Procedures

1. Prior to reaching 3 NM from the Final Approach Fix, the following tasks should be completed:
 - Obtain ATIS/ASOS (if available)
 - Tune and identify all navigation aids
 - Tune all appropriate communication frequencies
 - Load approach into GPS
 - Enable the Marker Beacons on the audio panel (if appropriate)
 - Brief the approach procedure, including the estimated descent rate and procedures for the transition to the visual environment.
 - Complete the *Approaching Airport* Checklist
2. Once established on a published segment of the approach, set power as needed to maintain 90 knots (approximately 2000 RPM).
3. Within 2.0 NM of the Final Approach Fix (Non-Precision Approach) or 2.0 NM of glideslope intercept (Precision approach), extend flaps to T/O and slow to 80 knots.
4. Immediately prior to crossing the Final Approach Fix (Non-precision approach), or intercepting the glideslope (Precision approach), extend flaps to LDG and slow to 70 knots.
5. Upon crossing the Final Approach Fix or intercepting the glideslope, reduce power to maintain a 70 knot descent. For a non-precision approach, rate of descent should be approximately 750 FPM and should not exceed 1,000 FPM.

Completion Standards

- ✓ Prior to beginning the final approach segment, maintains altitude +/- 100 feet, airspeed +/- 10 knots, and heading within 10°.
- ✓ While on the final approach segment of a non-precision approach, allows no more than a ¼ - scale deflection of the CDI, and maintains desired approach airspeed +/- 10 knots.
- ✓ While on the final approach segment of a precision approach, allows no more than a ¼ - scale deflection of either the glideslope or localizer, and maintains desired approach airspeed +/- 10 knots.
- ✓ Maintains the MDA on a non-precision approach, +100/-0 feet.

HOLDING PROCEDURES

Procedures

1. When the aircraft is 3 minutes or less from the holding fix (within approximately 5 NM), begin reducing airspeed so as to reach the desired holding speed of 90 knots prior to arriving at the holding fix.
2. Report to ATC the time and altitude at which the aircraft reaches the holding fix, and report to ATC when leaving the holding fix.

Completion Standards

- ✓ Maintains airspeed +/- 10 knots, altitude +/- 100 feet, and heading within 10°.
- ✓ Tracks the selected course within a $\frac{3}{4}$ - scale deflection of the CDI.
- ✓ Uses proper wind correction procedures to arrive over the fix as close as possible to the desired time.

COMMERCIAL FLIGHT MANEUVERS

All pilots shall observe the following practices while performing maneuvers:

1. While traveling to the practice areas, configure the aircraft for cruise flight at a power setting according to the Cruise Performance Table in the POH, and complete the *Cruise* checklist.
2. Prior to beginning maneuvers, perform the following *Maneuver Flow*:

Engine Gauges.....	Normal
Mixture.....	Full Rich
Throttle	As required for 90 knots (Approximately 2000 RPM)
Flaps	Cruise
Fuel Pump	On

3. Ensure the area is clear of traffic by executing at least 180 degrees of clearing turns (one 180° turn or two 90° turns).
4. Make a position report on the Parks Traffic frequency.
5. Perform the maneuver as described in this section.
6. Upon completion of the maneuver, reduce throttle to maintain 90 knots and resume straight and level flight.

ACCELERATED STALL

Entry Procedures

1. Ensure *Maneuver Flow* and clearing turns have been completed.
2. Select entry altitude that will allow the maneuver to be completed no lower than 3000 AGL.
3. Verify the flaps are retracted and reduce power to 1200 RPM.
4. Maintain level flight while slowing to 64 knots ($V_s + 20$ knots).
5. Transition to an angle of bank of approximately 45°.
6. Maintain coordinated flight while increasing back elevator pressure steadily and firmly (reducing airspeed by approximately 3 to 5 knots per second) to induce an impending stall indication (e.g., aircraft buffet, stall horn, etc.).
7. Verbally acknowledge the cues and then recover promptly at the first indication of an impending stall (e.g., aircraft buffet, stall horn, etc.).

Recovery Procedures

1. Reduce the angle of attack, add full power, and level the wings while maintaining coordination with the rudder.
2. Return to straight-and-level flight attitude.
3. Return to specified altitude, heading, and airspeed.

Completion Standards

- ✓ Selects altitude to allow completion of maneuver no lower than 3000 feet AGL.
- ✓ Recognizes and recovers promptly with a minimum loss of altitude appropriate for the airplane.

LAZY EIGHTS

Procedures

1. Ensure *Maneuver Flow* and clearing turns have been completed.
2. Select an entry altitude that will allow the maneuver to be performed no lower than 1500 AGL.
3. Select at least a 90° reference point, and note entry heading and altitude. Trim for 90 knots.
4. While maintaining coordinated flight, simultaneously and continuously adjust both pitch and bank to achieve the following:
 - a. 45° Point – Maximum pitch-up attitude, Approximately 15° bank
 - b. 90° Point – Level pitch attitude, Approximately 30° bank, Airspeed 5 – 10 knots above stall speed
 - c. 135° Point – Maximum pitch-down attitude, Approximately 15° bank
 - d. 180° Point – Level pitch and bank attitude
5. The aircraft should have returned to the entry altitude and airspeed, 180° from the entry heading.
6. Complete maneuver in opposite direction.

Completion Standards

- ✓ Achieves a constant change of pitch and bank.
- ✓ Arrives at each 180° point +/- 100 feet of entry altitude, +/- 10 knots of entry airspeed, and +/- 10° of heading.

CHANDELLES

Procedures

1. Ensure *Maneuver Flow* and clearing turns have been completed.
2. Select an entry altitude that will allow the maneuver to be performed no lower than 1500 AGL.
3. Select a 90° reference point, and note entry heading.
4. Establish a bank angle of approximately 30°.
5. Simultaneously apply full power and begin increasing pitch attitude while maintaining coordinated flight.
6. Maintain a constant bank angle and constantly increase pitch during the first 90° of turn.
7. Upon reaching the 90° point, maintain a constant pitch attitude and begin a constant rate roll-out from the 90° point to the 180° point.
8. Complete roll-out at the 180° point, just above stall speed, and momentarily maintain that airspeed, avoiding a stall.
9. Gradually decrease pitch and accelerate to cruise airspeed while maintaining altitude.

Completion Standards

- ✓ Maintains a smooth, coordinated climbing turn to the 90° point, with a constant bank.
- ✓ Begins a coordinated, constant-rate roll out at the 90° point, maintaining power and a constant pitch attitude.
- ✓ Completes roll-out at 180° point +/- 10°.
- ✓ Resumes straight-and-level flight with minimum loss of altitude.

STEEP SPIRALS

Procedures

1. Ensure *Maneuver Flow* has been completed and the aircraft is at an altitude allowing the completion of at least three 360° turns.
2. Select a suitable point. Perform clearing turns, ensuring the aircraft is in a position to enter the maneuver downwind at the completion of the turns.
3. Decrease throttle to idle and begin reducing airspeed so the aircraft is established in a glide at 73 knots when abeam the selected point.
4. Execute a descending spiral, maintaining a constant distance from the selected point by varying bank angle.
5. Bank angle will need to be shallowest when heading into the wind, and steepest when heading downwind. Adjust pitch as necessary to maintain airspeed.
6. When heading into the wind, clear the engine by briefly increasing the throttle to a normal cruise setting.
7. After completing at least three 360° spirals, roll out on a specified heading or object, no lower than 1500 AGL.

Caution:

Do not combine this maneuver with the POWER OFF 180° ACCURACY LANDING unless the aircraft is in a position where a landing on a suitable paved runway can be performed.

Completion Standards

- ✓ Divides attention between aircraft control and ground track, while maintaining coordinated flight.
- ✓ Applies wind-drift correction to track a constant radius circle around selected reference point with bank not to exceed 60° at the steepest point.
- ✓ Maintains airspeed +/-10 knots and rolls out toward object or specified heading +/- 10°.

EIGHTS ON PYLONS

Procedures

1. Ensure *Maneuver Flow* has been completed and the aircraft is at the calculated approximate pivotal altitude.
2. Select two pylons on the ground along a line oriented perpendicular to the wind.
3. Perform clearing turns, ensuring the aircraft is positioned to enter the maneuver at approximately 45° to the downwind at the completion of the clearing turns.
4. When abeam the first pylon, bank the aircraft, placing the pilot's line of sight on the pylon.
5. Maintain the line of sight on the pylon by adjusting bank and altitude, using rudder only to maintain coordination.
6. As the aircraft turns toward an upwind heading, groundspeed and pivotal altitude will decrease.
7. As the turn is continued to a downwind heading, groundspeed and pivotal altitude will increase.
8. Roll out on a heading that will allow the aircraft to proceed in straight-and-level flight for approximately 3 to 5 seconds between the pylons.
9. Complete the maneuver in the opposite direction around the second pylon.

Completion Standards

- ✓ Divides attention between accurate coordinated airplane control and outside visual references.
- ✓ Selects pylons that will permit straight-and-level flight between the pylons.
- ✓ Enters the maneuver at the appropriate altitude and airspeed and at a bank angle of approximately 30° to 40° at the steepest point.
- ✓ Holds pylon using appropriate pivotal altitude avoiding slips and skids.

POWER OFF 180° ACCURACY LANDING

Procedures

(Procedures are identical to that of Normal Landing, except as noted.)

1. On downwind leg, adjust power for 90 knots (approximately 2000 RPM).
2. Abeam the intended touchdown point, reduce power to idle and trim for 73 knots.
3. Turns, flaps, and airspeed are at the discretion of the pilot in order to touch down at the specified point.
4. If necessary, correlate crosswind with direction of forward slip and transition to side slip for landing.

Completion Standards

- ✓ Positions the airplane on downwind leg parallel to the runway not more than 1000 AGL.
- ✓ Touches down in a normal landing attitude at or within 200 feet beyond a specified touchdown point.