BEFORE TAKEOFF — CIGAR

Controls ..... free & correct
Airspeed indicator ..... 0 (or wind speed)
Attitude indicator ..... centered
Altimeter ..... set to ATIS
Turn coordinator ..... level & ball centered
Heading indicator ..... mag. compass
Vertical speed indicator 0
Fuel selector ..... both
Elevator trim ..... takeoff
Mixture ..... full rich
RUN - UP:
- Primer ..... in & locked
- Oil pressure / temp ..... in green, warm
- Brakes ..... apply
- Throttle ..... 1700 RPM
- Suction gauge ..... in green (5 psi)
- Ammeter ..... positive load
- Magnetos ..... 125 drop / 50 diff.
- Carburetor heat ..... 100 drop
- Throttle ..... < 1000 RPM
- Throttle friction ..... tighten

Radios / nav / XPDR ..... set, alt + sqwk
Doors / windows / belts ..... secure

HOLDING SHORT

Fuel selector ..... both
Elevator trim ..... takeoff
Carburetor heat ..... off
Mixture ..... full rich (< 3,000 ft.)
Flaps ..... 0° to 10°
Dep. briefing ..... T.O. abort plan & turn dir.

I WILL LOSE THE ENGINE
I WILL PUSH IMMEDIATELY

ON RUNWAY

Lights ..... strobe & landing on
Camera ..... XPDR alt / H.I. to rwy hdg
Action ..... full throttle > 2300 RPM
TIME ..... NOTE

NORMAL TAKEOFF

Rotate (V_R) ..... 50 - 55 KIAS
Lift-off (V_X) ..... 60 - 65 KIAS
Climb-out (V_Y) ..... 70 - 85 KIAS
Flaps ..... raise at safe altitude

CLIMB

Climb-out (V_Y) ..... 70 - 85 KIAS
Landing light ..... off (as required)
Flight plan ..... open

CRUISE

Throttle ..... 2200-2700 RPM (<75% MCP)
Elevator trim ..... adjust to cruise speed
Fuel selector ..... both
Mixture ..... lean (> 3,000 ft.)
Circuit breakers ..... in
Landing light ..... off (as needed)
Engine instruments ..... in green
Instruments ..... check, H.I. to compass

DESCENT — A MICE ATM

Altimeter ..... set to ATIS
App. briefing ..... complete
Mixture ..... richen
Carburetor heat ..... as required
Instruments ..... check, H.I. to compass

BEFORE LANDING — GUMPFS

Seat belts ..... adjust & secure
Fuel selector ..... both
Landing light ..... on
Carburetor heat ..... on
Mixture ..... rich (below 3,000 ft.)
Flaps ..... as required
DMMS ..... 70 KIAS
Short Final ..... flaps down & 60 - 70 KIAS

GO-AROUND

Throttle ..... full open
Carburetor heat ..... off
Flaps ..... retract to 20°
Airspeed ..... 55 KIAS
Flaps ..... 10° until obstacles cleared

CLEAR OF RUNWAY

Flaps ..... up
Carburetor heat ..... off
Mixture ..... lean for taxi
Elevator trim ..... takeoff
Lights ..... strobe & landing off
Radios / XPDR ..... as required, alt + sqwk

ENGINE SHUTOFF

Lights (except beacon) ..... off
Avionics master switch ..... off
Mixture ..... cut-off
Ignition switch ..... off & remove key
Master switch ..... off
TIME ..... STOP TIMER
Fuel selector ..... left or right
Control lock ..... install
Pitot cover ..... install

FIRE DURING START

CRANKING ..... Continue

ENGINE STARTS:
- Power ..... 1700 RPM a Few Seconds
- Engine ..... Shutdown, Check Damage

ENGINE FAILS TO START:
- Cranking ..... Continue
- Fire Extinguisher ..... Obtain
- Engine ..... Shutdown
- Fire Extinguisher ..... Use

FIRE DURING FLIGHT

- Fuel Selector ..... Off
- Mixture ..... Cut - Off
- Master Switch ..... Off
- Vents / Cabin Air / Heat ..... Off
- Airspeed ..... 100 KIAS

ELECTRICAL FIRE

- Master Switch ..... Off
- All Electrical Switches ..... Off
- Vents / Cabin Air / Heat ..... Off
- Fire Extinguisher ..... Use

If fire appears out, and electrical power is necessary to continue flight:

- Master Switch ..... On
- Circuit Breakers ..... DO NOT RESET
- Elec. Switches ..... ONE AT A TIME, with Delay After Each until Short is Isolated

ENGINE POWER LOSS

AVIATE — UNLOAD WING:

- Best Glide Speed ..... 65 KIAS
  (Flaps Down @ 60 KIAS)

BEST PLACE TO LAND:

- Select Field (1.5 NM = 1000 ft.)
- Turn Towards Area
- Select Best Approach w/ WIND
- Use NEAREST w/ VSR < 500 fpm

CHECK LIST — RESTART:

- Fuel Selector ..... On
- Mixture ..... Full Rich
- Carburetor Heat ..... On
- Ignition Switch ..... Both
- Primer ..... In & Locked

DISTRESS CALL:

- Transponder 7700
- Tune ..... Current ATC or 121.5
- Announce ..... Aircraft ID & Position Problem & Intentions

SETUP APPROACH:

- Downwind Abeam ..... 1,500 ft. AGL
- Plan Soft-Field, Power-Off Approach

SECURE AIRCRAFT:

- Fuel Selector ..... Off
- Mixture ..... Cut-off
- Ignition ..... Off
- Flaps ..... As Required
- Master switch ..... Off
- Doors ..... Unlatch Before Touchdown
- Touchdown ..... Slightly Tail Low
- Brakes ..... Apply Heavily

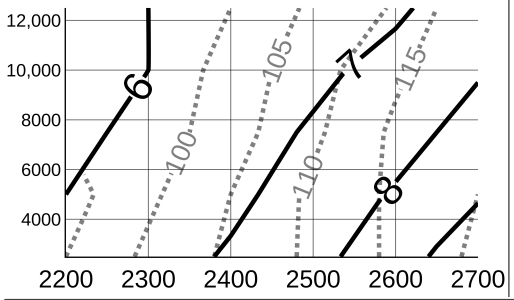
ACRONYMS

CIGAR: Controls, Instruments, Gas, Attitude (Takeoff Trim), Run-up

A MICE ATM: ATIS; Marker beacons (ON+TEST), Identify (set radios + nav); Course (set final or next approach course; Entry type (full or straight-in approach approach? Course reversal? Vectors?); Altitudes (current, FAF, DA/MDA); Time (FAF to MAP); Missed approach procedure briefed.

GUMPFS: Gas; Undercarriage, Mixture, Prop, Flaps, Safety Belts

CRUISE PERFORMANCE



EN ROUTE WEATHER

1800wxbrief (Leidos Flight Service)

- **Input:** Route / flight plan
- **Output:** "Standard Brief," en route METAR, TAF, Winds Aloft

VERIFY EFB & PHONE WEATHER IS UPDATED!!!

AIRCRAFT PERFORMANCE

Performance requirements along route

C172 Performance App

- **Input:** Route leg, weight and balance data, latest METAR for departure and destination, en route altitude, en route temperature, en route headwind/tailwind, and desired cruise power setting (% MCP)
- **Verify:** Weight and balance in limits, winds at departure and destination in limits
- **Output:** V_R, V_X, V_Y, departure wind components, cruise power RPM, estimated fuel used, ETE, destination wind components

MAXIMUM GLIDE

RANGE in NM @ 65 KIAS, FLAPS UP

AGL	Zero Wind	20 kt. Headwind	40 kt. Headwind
10,000	15	11	6.4
9000	13.5	9.9	5.8
8000	12	8.8	5.1
7000	10.5	7.7	4.5
6000	9	6.6	3.9
5000	7.5	5.5	3.2
4000	6	4.4	2.6
3000	4.5	3.3	1.9
2000	3	2.2	1.3
1000	1.5	1.1	0.6

OTHER EMERGENCY

EXCESSIVE RATE OF CHARGE: Turn Both Sides Of Master Switch OFF / Then ON. If Light Comes On Again, Terminate Flight.

INSUFFICIENT RATE OF CHARGE: Nonessential Electric OFF. Terminate Flight.

RADIO OUT: Check Circuit Breakers & VOLUME. Recycle Alternator Switch. If in B, C, or D Airspace, Squawk 7600. Terminate Flight.

TWR SIGNALS	ON GROUND	IN FLIGHT
Steady Green	Cleared To Takeoff	Cleared To Land
Flashing Green	Cleared To Taxi	Return For Landing
Steady Red	STOP	Yield & Continue Circling
Flashing Red	Taxi Clear of Landing Area	Airport Unsafe — Do Not Land
Flashing White	Return To Starting Point	–
Alternating Red & Green	Use Extreme Caution	Use Extreme Caution

AIRSPEEDS (KIAS @ GROSS WEIGHT)

	En route climb, sea level.	80 - 90
	At 10,000 ft.	70 - 80
V_S	Stall speed, flaps up.	49
V_{S0}	Stall speed, flaps down.	43

V_Y	Best ROC, sea level.	78
	At 10,000 ft.	68
V_X	Best AOC, sea level.	64
	At 10,000 ft.	62
	Obstacle speed, flaps up.	59
	SF TO w/ obst. & 10° flaps.	55

PREFLIGHT — CABIN

- Pitot cover ..... remove
- Papers (A.R.O.W.) ..... valid
- Control lock ..... remove
- Ignition switch ..... off & keys on dash
- Avionics master & elec. ..... off
- Circuit breakers ..... in
- Master switch ..... on
- Gyros ..... listen for unusual noise
- Fuel gauges ..... note level
- Flaps ..... lower in stages
- Avionics master switch ..... on
- Navigational instruments (IFR):
  - Marker beacons ..... test Hi/Low
  - VOR ..... test
  - GPS ..... database & self test ok
  - Transponder ..... test & set ALT + 1200
- Radios ..... copy ATIS (118.6)
- Avionics master switch ..... off
- Pitot ..... verify cover off
- Pitot heat ..... on, test & off
- Lights (beacon, strobe, nav) ..... all working
- Master switch ..... off
- Merlin ..... mount, attach battery
- EFB (and Phone) ..... mount, attach battery, connect Merlin & reset level, update weather from Internet display taxi diagram
- Windshield ..... clean

PREFLIGHT — NOSE

- Spinner ..... check for security, no cracks
- Propeller ..... check for nicks (max. 1/8")
- Cooling air intake ..... free of restrictions
- Carburetor air filter ..... free of restrictions
- Muffler ..... check for security
- Landing light(s) ..... check condition & clean
- Nose wheel strut ..... inspect & check inflation
- Tire ..... check wear & inflation
- Static source opening ..... check for stoppage

PREFLIGHT — LEFT WING

- Fuel tank ..... check quantity & secure cap
- Tire ..... inspect for wear & inflation
- Brakes ..... inspect for leaks & pad wear
- Pitot tube ..... check intakes (2) clear
- Fuel vent ..... clear
- Tie down ..... remove
- Wingtip ..... check lights, rivet line & shake
- Aileron ..... check hinges, pushrod, counterweights & movement
- Flaps ..... check pushrod & movement
- Fuel drain ..... check fuel quality

PREFLIGHT — EMPENNAGE

- Fuselage ..... no structural damage
- Elevator ..... hinges, links & counterweights
- Rudder ..... hinges, links & counterweights
- Antennae ..... no damage
- Tie down ..... remove

PREFLIGHT — RIGHT WING

- Fuel drain ..... check fuel, paper napkin test
- Flaps ..... hinge, pushrod & movement
- Aileron ..... hinge, pushrod & counterweight
- Wingtip ..... lights, rivet line & shake wing
- Tie down ..... remove
- Tire ..... inspect for wear & inflation
- Brakes ..... inspect for leaks & pad wear
- Fuel tank ..... check quantity & secure cap

PREFLIGHT — NOSE RIGHT

- Oil level ..... no less than 6 quarts
- Fuel strainer ..... check fuel quality
- Airplane ..... free to roll & no bald-spots
- Overall ..... FINAL WALK-AROUND, no openings, no forgotten objects

BEFORE STARTING ENGINE

- Preflight inspection ..... COMPLETE
- Seat & seat belts ..... secure
- Fuel selector ..... both
- Avionics master switch ..... off
- Circuit breakers ..... in
- Brakes ..... test and set

STARTING ENGINE

- Mixture ..... rich
- Carburetor heat ..... off
- Prime ..... as required (3 strokes)
- Primer ..... in & locked
- Throttle ..... open 1/8 inch
- Rotating beacon ..... on
- Master switch ..... on
- Brakes ..... set
- Propeller area ..... "clear"
- Ignition ..... start (30s, 2m intervals)
- Throttle ..... < 1000 RPM
- Oil pressure ..... green in 30 sec, or stop

TIME ..... START TIMER

BEFORE TAXIING

- Mixture ..... lean for taxi
- Flaps ..... retract
- Heading indicator (H.I.) ..... mag. compass
- Avionics master switch ..... on
- Radios/Nav/XPDR ..... on & set, ALT + 1200
- Communications ..... as required
- Brakes ..... test