OPERATIONS MANUAL
FLT CREW TRAINING

# BOEING-MCDONNELL-DOUGLAS
# MD-80

## TAXI, TAKEOFF, CLIMB, CRUISE, DESCENT & LANDING

**By Warren C. Daniel**
Flight Dynamics Designer
ETOPS773@aol.com

**Disclaimer**

This manual is not provided from, endorsed by, or affiliated with the Boeing Company, Japan Air System, or any other airline in any way.

Any exact similarities between this manual to actually aircraft, procedures, or airline carriers are strictly coincidental.



The procedures contained within are this author's interpretation of generic flight operations. These procedures are not always accurate in all situations.

All diagrams have been recreated to mimic actual procedures or scenarios, however, are not taken from actual materials whatsoever.

This manual is not intended for real world flight.

**This aircraft is intended as an add-on for Microsoft Flight Simulator 2004/2002.**

**Boeing/McDonnell-Douglas**
**MD80**

**Model, VC, 2D Panel Designer**
FS Painter

**Flight Dynamics, Sound, Photoreal Panel Designer**
Warren C. Daniel

Flight model based on the most realistic data possible and actual pilot experiences on MD-80/81/82/83 aircraft.

## PREFACE

This manual serves as a reference for operating procedures and training maneuvers. The flight profiles show the basic recommended configuration during flight.

The maneuvers should normally be accomplished as illustrated. However, due to airport traffic, ATC distance separation requirements, and radar vectoring, modifications may be necessary.

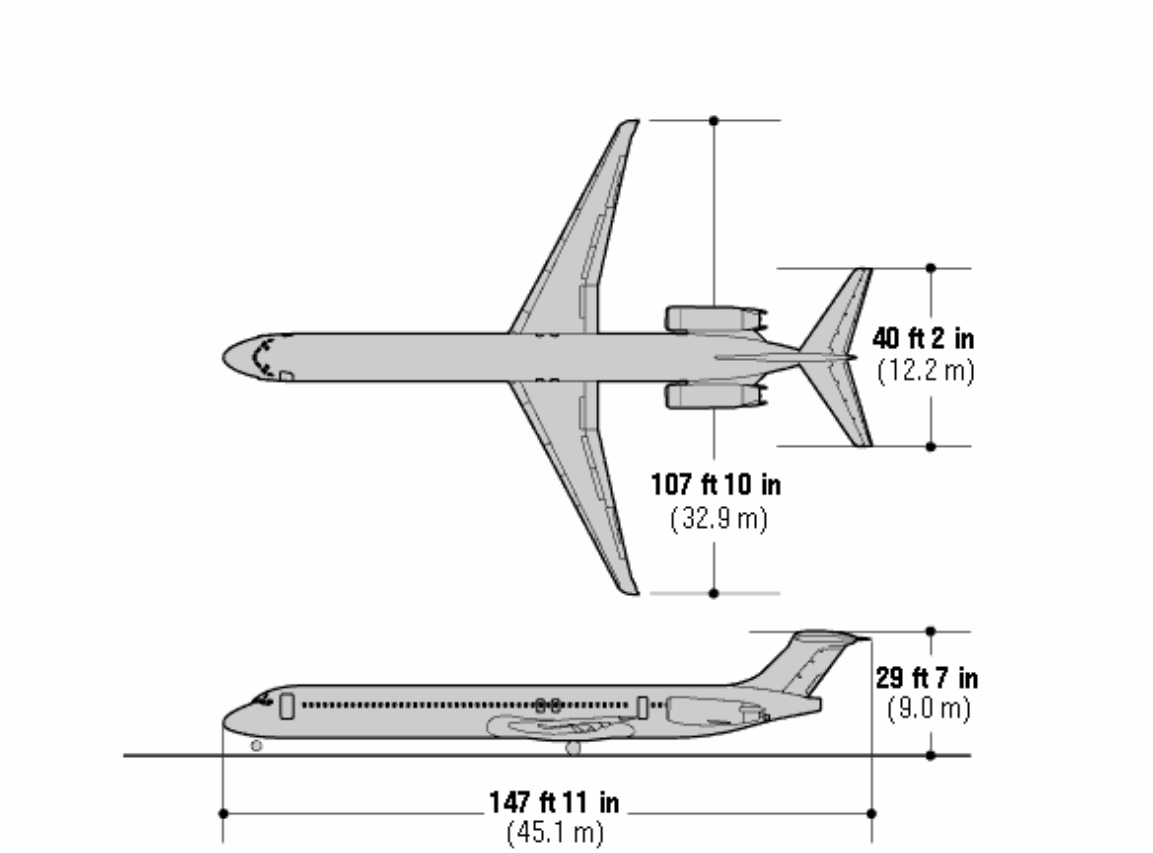
Exercise good judgment.

## PRINCIPLE DIMENSION AND AREAS

## Boeing/McDonnell-Douglas MD80 - Aircraft Reference Manual

Flight Simulator 2002 Professional Edition/Century of Flight FS2004

**MD-80 - Specifications**




**Dimensions:**
Span 107 ft 10 in
Length 147 ft 11 in
Height 29 ft 7in

**Engines:**
JT8D-217A/C x 2
TO Thrust Rating: 21,700 lb

**Weight and Capacities**
MaxTOW: 140,000 lb
ZFW: 107,400 lb
Max Fuel Cap.: 5,840 U.S. gal

**Performance**
Typical Cruise Speed:
M.76 - Normal Cruise
M.78 - High Speed Cruise

**Range:** 1,565 nm
**Fuel Flow:** 3000 pph per engine

Typical 2-class: 152
Typical 1-class: 172
Total Baggage Volume: 1,103 cu ft

## TAXI

1) The nose wheel steering and the engine thrust are used to taxi the airplane.

2) Set takeoff trim depending on weight. Typical **trim position is 7 – 9 degrees**. (See FAQ section.)

3) Set takeoff flap position. **Recommended flap setting is flaps 11**.

4) Make sure you have the necessary clearance when you go near a parked airplane or other structures.

5) When the APU in the taxi airplane or the parked airplane is on you must have a minimum clearance of 50 feet between the APU exhaust port and the adjacent airplane's wingtip (fuel vent).

6) The MD-80 typically has enough power to coast on its own power, with 0% idle at average gross weights. Apply 10 – 20% N1 to roll the aircraft, then, pull thrust back to idle.

7) The taxi speed must not be more than approximately 30 knots. Speeds more than 30 knots added to long taxi distances would cause heat to collect in the tires. **Recommended taxi speed is 20 knots**. Beware of changing GS numbers due to tailwinds during taxi.

8) Before making a **turn**, decrease the speed of the airplane to a speed of approximately **8 to 12 knots**. Make all turns at a slow taxi speed to prevent tire skids.

9) Do not try to turn the airplane until it has started to move.

10) Make sure you know the taxi turning radius.

11) Monitor the wingtips and the horizontal stabilizer carefully for clearance with buildings, equipment, and other airplanes.

12) When a left or right engine is used to help make a turn, use only the minimum power possible.

13) Do not let the airplane stop during a turn.

14) Do not use the brakes to help during a turn. When you use the brakes during a turn, they will cause the main and nose landing gear tires to wear.

15) When it is possible, complete the taxi in a straight-line roll for a minimum of 10 feet.
NOTE: This will remove the torsional stresses in the landing gear components, and in the tires.

16) Use the Inertial Reference System (IRS) in the ground speed (GS) mode to monitor the taxi speed.

17) If the airplane taxi speed is too fast (with the engines at idle), operate the brakes slowly and smoothly for a short time. NOTE: This will decrease the taxi speed.

18) If the taxi speed increases again, operate the brakes as you did in the step before.

19) Always use the largest radius possible when you turn the airplane. NOTE: This will decrease the side loads on the landing gear, and the tire wear will be decreased.

20) Extra care must be given to turn the aircraft due to the fuselage length and wingspan. A minimum distance from the edge of the pavement must be maintained to reverse the aircraft's direction.

21) Operate the brakes to stop the airplane.

22) Set the parking brake after the airplane has stopped.

## TAKEOFF

1) Restart 2nd engine if on single-engine taxi.

2) Align aircraft with runway centerline.

3) Increase power to approximately 60% N1 for 5 – 10 seconds.

4) Watch engine problems or aircraft alarms.

5) Increase power smoothly to pre-determined N1 speeds based on aircraft takeoff weight, (88% - 105% N1). This can either be done manually or using the autothrottle with the autopilot engaged.

6) At Vr, rotate aircraft 10 degrees upwards. (See Appendix A for speed reference cards.)

7) Hold nose at +10 degrees until positive rate of climb is confirmed, then raise landing gear after V2.

8) Set initial climbout speed to V2+20 KTS.

9) Maintain +2000 fpm climb to 2000 FT @ V2+20. Climb at 250 knots +2500 fpm after 2000 FT to 10,000 FT.

10) At 2000 FT, begin slat retraction. (See speed reference cards.)

11) Increase speed to 200 knots and in accordance with ATC instructions (max 250 KTS below 10,000 FT).

12) For full maneuverability beneath 10,000 FT, slats must be fully retracted with aircraft at minimum safe airspeed.

## CLIMB

1) Once climb thrust or airspeed is set, the autopilot will compensate for environmental condition changes automatically during the climb.

2) It is recommended that the aircraft be flown manually up to 15,000 FT, weather and ATC traffic conditions permitting. However, in high traffic conditions, to easy the workload of the pilot, the autopilot MCP altitude intervention may be engaged above a minimum altitude of 80 FT with the landing gear up.

3) Climb settings use a 10 – 20% derate of thrust up to 10,000 FT, then increases linearly to max thrust at 30,000 FT.

4) For **enroute climb**, climb at a rate of 1800-2500 FPM, pursuant to ATC and traffic conditions. If there are no altitude or airspeed restrictions, accelerate to the recommended speed. The sooner the aircraft can be accelerated to the proper climb speed, the more fuel and time efficient the flight.

5) As **engine and wing icing** may occur during the climb and descent, the engine anti-icing system should be in the AUTO or ON position whenever icing is possible. NOTE: Failure to do so may result in engine stall, overheating, or engine damage.

6) **For normal economy climb**, follow ATC speed restrictions of 250 KTS below 10,000 FT. If permitted by ATC and no speed restriction below 10,000 FT, increase speed to 290 KTS. Above 10,000 FT, climb at 320 KTS or .76 MACH. Climb speed table is as follows:

| **ALTITUDE** | **SPEED** |
|---|---|
| Sea Level to 10,000 FT | 250 KTS |
| Above 10,000 FT | 320 KTS/.76 MACH |

7) **Max climb speed** is 320 knots until reaching .76 MACH at crossover.

8) **For engine out climb**, speed and performance various with gross weight and altitude, however 250 knots at 1000 – 1500 FPM may be used.

9) Set **standard barometer** above airport transition level (depends on local airport geography).

10) **Typical climb profile** is as follows:

- 2500 fpm: below 24,000 FT
- 1800 fpm: FL240 – FL350
- 800 fpm: FL350 – FL370
- 300 fpm: above FL370

## CRUISE

1) **Cruise** at .76 MACH.

2) **Hi-speed** cruise at .78 @ fuel burn penalty.

3) **Typical cruise altitude** 20,000s – low 30,000 FLs.

4) **Fuel burn is** 3000 pph per engine at FL330.

5) **Headwinds** will increase engine power, reduce cruise speed and decrease range.

6) **Tailwinds** will decrease engine power, increase cruise speed and increase range.

7) Follow previously entered FMC waypoints.

8) **Fuel Freeze --** Extended operation at cruise altitude will lower fuel temperature. Fuel cools at a rate of 3 degrees C per hour, with a max of 12 degrees C in extreme conditions. Fuel temperatures tend to follow TAT (total air temperature). To raise fuel temperature/TAT, a combination of factors can be employed:

   - Descend into warmer air.
   - Deviate to warmer air.
   - Increase Mach speed.

   An increase of 0.01 MACH will increase TAT by 0.5 – 0.7 degrees C.

9) **Increased fuel burn** can result from:
   - High TAT
   - Lower cruiser altitude than originally planned.
   - More than 2,000 FT above the optimum calculated altitude.
   - Speed faster or slower than .76 MACH cruise.
   - Strong headwind.
   - Unbalanced fuel.
   - Improper aircraft trim.

10) **Fuel penalties** are:

   - 2000 FT above optimum – 3 percent increase in fuel usage
   - 4000 FT below optimum – 5 percent increase in fuel usage
   - 8000 FT below optimum –12 percent increase in fuel usage
   - M.01 above M.76 – 3 percent increase in fuel usage
   - High speed cruise of M.81 – 19% increased fuel usage

11) In the case of **engine out cruise**, it may be necessary to descend.

12) Trim aircraft for proper elevator alignment.

13) In case of engine out cruise, trim rudder for directional alignment.

14) Deviate from flight plan for weather, turbulence, or traffic as necessary after receiving clearance from ATC.

## DESCENT

1) Descend at pre-determined TOD (Top of Decent)

2) Descend at 274 KT above 10,000 FT. (High speed decent: 320 knots)

3) Use speedbrakes or thrust to minimize vertical path error.

4) Proper descent planning is necessary to ensure proper speed and altitude at the arrival point. Distance required for descent is 3NM/1000FT. Descent rates are as follows:

| **Intended Speed** | **Decent Rate** | |
|---|---|---|
| | CLEAN | WITH SPEEDBRAKES |
| .76 MACH/274 KTS | 2500 FPM | 5500 FPM |
| 250 KTS | 1400 FPM | 3600 FPM |
| VREF 28 + 80 KTS | 1100 FPM | 2200 FPM |

5) Plan to descend so that aircraft is at approximately 10,000 FT above ground level, 250 KTS, 30 miles from airport.

6) Using speedbrakes will reduce the times and distances by half.

7) Arm speedbrakes and autobraking to position 2 on initial descent.

8) Set airport altimeter below transition level.

9) Avoid using the landing gear for drag above 180-200 KTS to avoid damage to doors or passenger discomfort.

10) **Recommended approach planning**, ATC and airport rules permitting:

- 230 KTS below 10,000 FT, 30 miles from airport.
- 180-190 KTS, 23 miles from airport.
- 170 KTS, 16 – 17 miles from airport.
- VREF, 5 – 7 miles from airport.

11) **In case of rapid descend due to depressurization**, bring aircraft down to a safe altitude as smoothly as possible. Using the autopilot is recommended. Check for structural damage. Avoid high load maneuvering.

12) **Stall recovery** can be accomplished by lowering the aircraft's nose and increasing power at once to gain airspeed. Beware of terrain. Accelerate to VREF 15 + 80 KTS. Do not retract gear until confirmed stall recovery and positive rate of climb. Keep nose at 5 degrees above the horizon or less.

13) If deployed, do not retract slats during the recovery, as it will result in altitude loss.

14) In the event of engine out approach, approach at VREF+5 @ flaps 28.

15) Under normal conditions **land at VREF @ flaps 28.** In the case of short field approach, slow to VREF @ flaps 40 (For Appendix A for reference cards.)

16) The MD-80 is a CATII aircraft, meaning the aircraft is capable of landing on autopilot in conditions where visibility is down to 50ft AGL.

17) **ILS Approach** - During initial maneuvering for the approach, extend flaps to 11 and slow to 180-200kts. When the localizer is alive, extend flaps to 15 and slow to 170kts. At one dot below glideslope intercept, extend the landing gear and flaps to 28. Begin slowing to final approach speed. At the final approach fix, extend flaps to 28 (flaps 40 for short field) and slow to Vref + 5. Be stabilized by 1000 feet above field level. This means, gear down, flaps 28, Vref +5 and engines spooled. Plan to cross the runway threshold at Vref.

18) **Visual Approach** - Similar to the ILS approach. The major difference is that aircraft must be stabilized by 500 feet above field level, as opposed to 1000 feet.

19) When intercepting the glideslope, trim nose up slightly to avoid accessive nose down pitch.

20) Land the aircraft. At average gross weights, at flaps 28 or 40 @ VREF, the MD80 will have a 2 nose up pitch. When landing the aircraft, flare to 3 degrees nose up.

21) Disengage (autopilot autothrottle will disengage) reverse thrust at 80 knots.

22) Disengage autobraking at 60 knots or as necessary.

23) Turn off onto high-speed taxiways at 30 knots or less.

24) Decelerate to 8 – 12 knots for 90 degree turns.

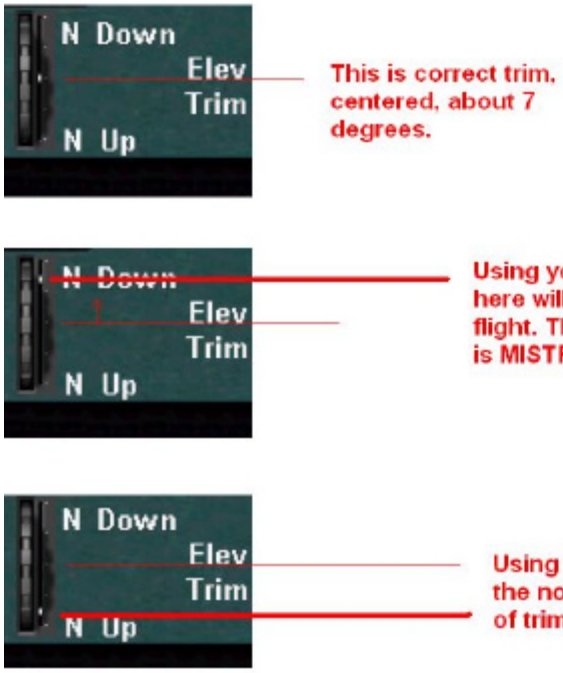
25) Taxi to gate.

## Frequently Asked Questions

**Q) Sometimes the nose bobs, plane is overly sensitive to pitch, or slow response to pitch. What's wrong?**

A) Adjust your trim to takeoff position, typically about 7 degrees. You can see the trim position on the panel:

Below, you can see samples of incorrect and correct trim values:



**Q) When I deploy the spoilers, the plane doesn't seem to slow down as fast. I also seem to drop altitude. Is that normal?**

A) Yes. The MD-80 spoilers are moderately effective. In addition, pilots have commented that using spoilers should result in an additional –500 fpm in altitude dump. This has been built into the FD.

**Q) Why are there 2 panels and 2 FDs?**

A) 1 panel and FD is designed for accurate feel and flight characteristics for experienced sim pilots who want a more realisitc experience. A 2nd panel and FD have been included that is easier to fly for the beginner.

**Photoreal Panel:**

**2D Panel:**

**Q) The engines don't seem overly powerful. Is this right?**

A) Based on the experience of MD-80 pilots, the FD was designed to meet the following targets:

- Takes quite a bit of power to get rolling 40-43%N1, especially when heavy, but once rolling, will coast at idle.
- Takeoff N1 is typically 88%N1 – 92% N1.
- Max climb N1 is 92%N1 – 102%N1.
- /Do no exceed/Max Climb EPR=1.9
- Cruise EGT = 440 - 400 C
- Cruise N1 @ M.76= 80%N1
- Cruise N1 @ M.78= 88-89% N1
- Do not exceed EGT = 550 degrees C
- Approach N1 speed is 80%N1, level flight, gear down, flaps full.
- Approach N1 speed is 66% N1, decent –750 to -850 fpm, final approach, gear down, flaps full

**Q) Sometimes on landing, I do not see the autospoilers pop-up. What's wrong?**

A) In order to activate the roll spoilers on the visual model, in the FD, if the ailerons are triggered during the landing, it will cause the pop-up spoilers to go down on landing. The function is contained in the FD, but may vary on your landing, depending on your amount of aileron input.

**Q) How do I open the passenger door?**

A) Default key is Shift+E

**Q) How do I open the door steps?**

A) You must assign a key for the wing fold feature. Example: if you set the key "w" for wing fold, pressing "w" will open the steps.

**Q) How much fuel do I need? How do I properly fuel plan?**

A) The MD-80 only consumes about 3000 pounds per hour per engine, or about 6000 pounds of fuel total per hour. Assume an average ground speed of 450 knots (no wind), 500 knots (eastbound), or 400 knots (westbound).

**Let's take the example of a flight between Tokyo-Haneda airport and New Chitose.** Total trip distance is 511 miles. Typical cruise altitude for an MD-80 would be in the area of 24,000 ft to about 33,000-35,000 ft.

To calculate the required amount of fuel:

511 miles / 500 knot average GS (westbound) = 1.022 hrs

1.022 hrs * 6000 lbs per hour = 6132 lbs for required fuel.

So to calculate total trip fuel amount:

6132 lbs required fuel
+ 2000 lbs taxi fuel
+ 10,000 lbs reserve/alternate fuel
==========
**18,132 lbs fuel for trip**

Take this 18,132 lbs and split the amount into both the left and right tanks (9066 per tank). As you can see, **you only need 47% fuel** in the left and right tanks, and 0% fuel in the remaining center tanks. That's it. You should be able to takeoff, cruise and land with about 10,000 lbs fuel remaining in your tanks at New Chitose.

**Typically for a domestic trip in Japan, you need only 50% fuel in the left and right tanks, 0% fuel in the center tanks.** This is enough for trips such as Haneda to New Chitose, or Haneda and Naha.

**Your target landing weight should be ZFW + 10,000 lbs fuel (about 117,000 lbs).**

**Your target landing speed should be about 125 knots (flaps 28).**

**Q) Sometimes the strobes are unsyncronized. How do I sync them?**

A) The strobes are designed to mimic the McDonnell Douglas style flash (flash, 1 second pause, flash, 1 second pause, flash). Sometimes over long distances, or due to load on the CPU, the strobes will not be synchronized. Simply toggle the strobe switch twice, or merely press "o" twice.

**Q) It appears that my autopilot numbers are moving in 10 degree increments. How do I fix this?**

A) This is an issue with FS2004. Please download the newest FSUIPC for FS2004.

**Q) Sometimes my battery dies, or I see jerkyness on the instant reply. What's wrong?**

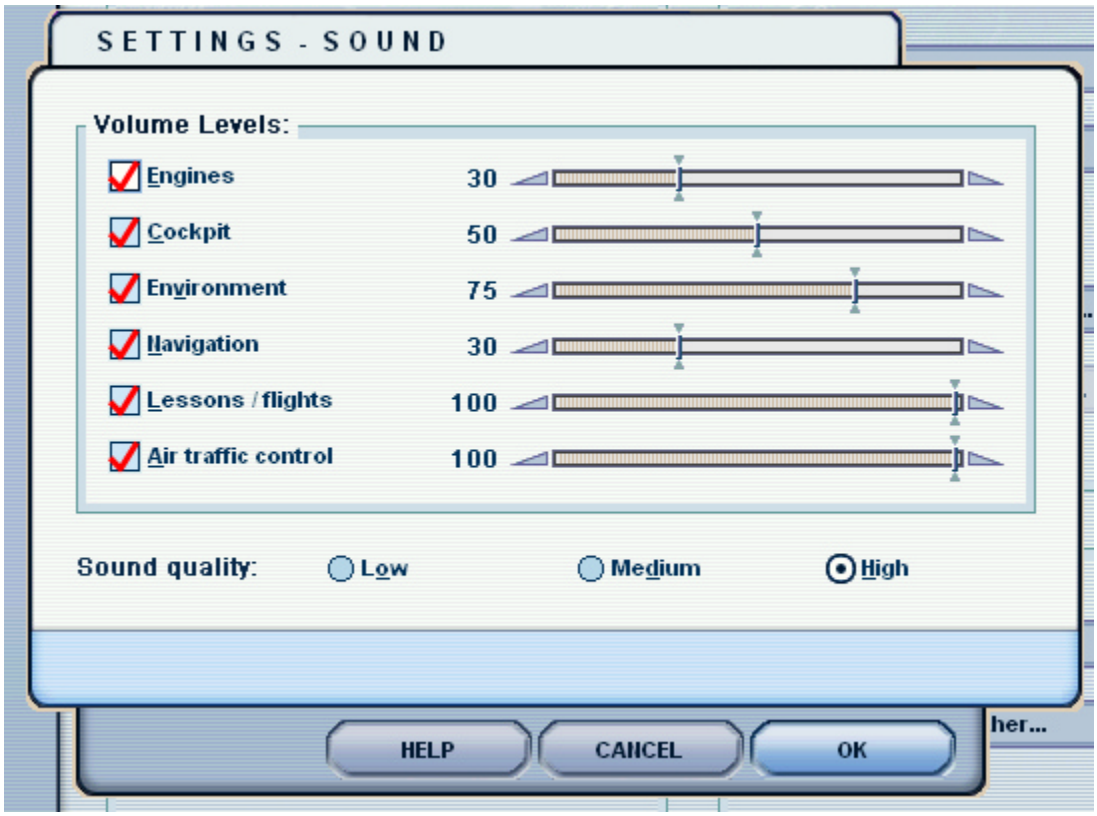
A) The battery dying is a flight simulator problem. Download the newest FSUIPC and check "battery life infinite". Also, some jerkiness in the replay can be due to heavy load on your PC CPU.

**Q) When I was using FS2002, my autopilot gauges looked fine, but when I went to FS2004, I see the numbers stopping in the middle. How do I fix this?**

A) Install the FS2004 panel which is included with this package.

**Q) What are the recommended sound settings?**

A) In the MD80 from the cockpit, the plane is actually quite noisy. You hear the hiss of pressurized air and plenty of bumping and thumping from the runway and taxiway. The pressurized air hiss changes pitch as the engines change speed. Sound is best with external speakers and a subwoofer. **Recommended FS2004 sound settings are:**



**Recommended FS2002 sound settings are:**


**Q) The MD80 has the roll rate similar to a fighter jet, the controls are sensitive, and it doesn't climb well above 35,000 feet. Is this correct?**

A) Yes, when the original DC9 was introduced, pilots had to be re-trained because the airplane is extremely responsive. Many flew the DC9 like a fighter and many passengers became sick. Pilots have said the DC9 and MD80 are very responsive, like a large fighter jet—for manual flight, you should be able to go from level to 35 degrees in only 2- 3 seconds.

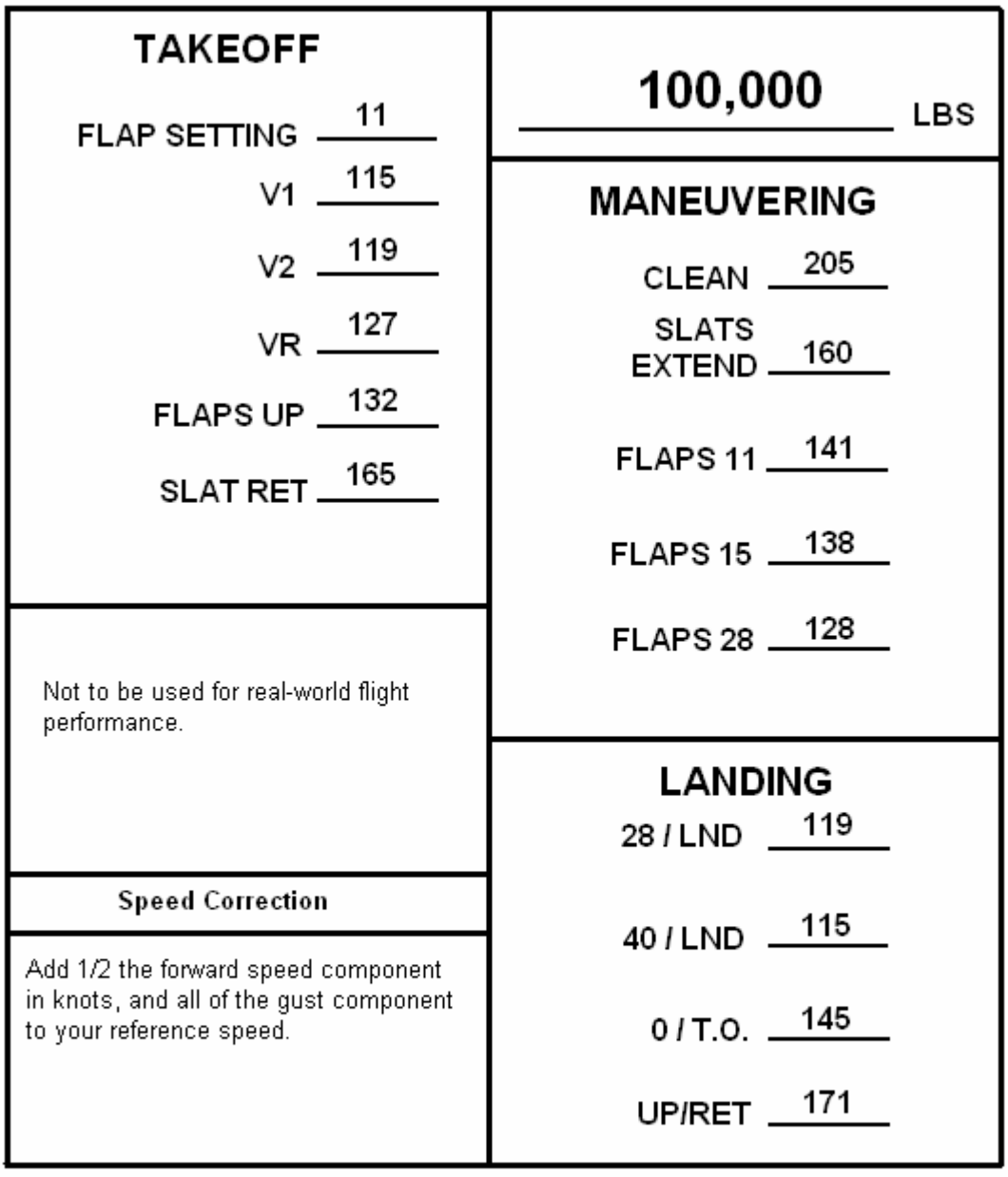
As for climb, you should be able to climb at 6000 ft down low, but because of the tiny wing, the MD80 bleeds out over 30,000 ft. This is why typically the flights are made in the mid-20,000s to about 33,000 feet. You rarely fly higher than 35,000 ft, the airplane does tire out.

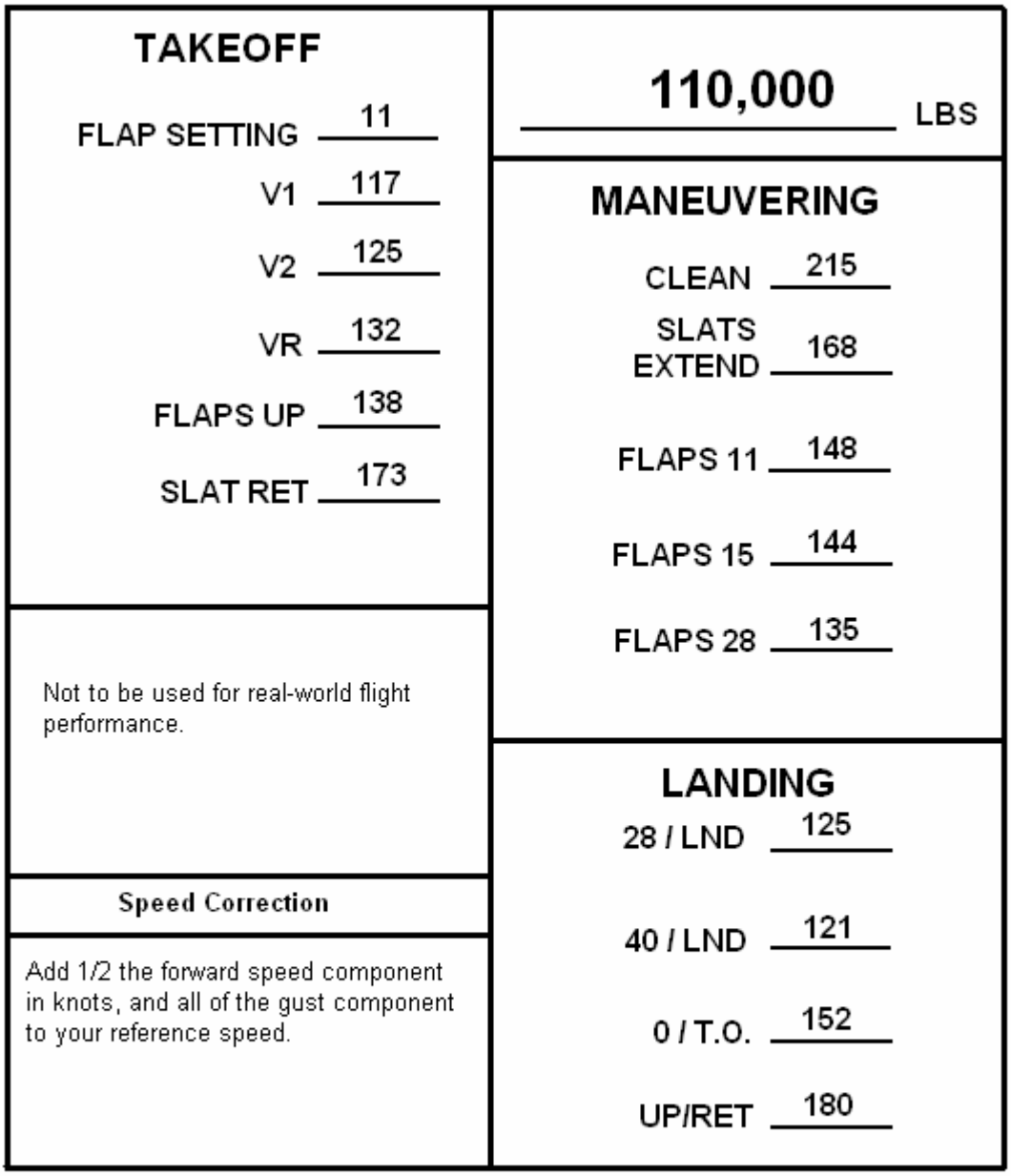
You must to be smooth on the airplane, but it handles very well.

# APPENDIX A

## Speed reference cards

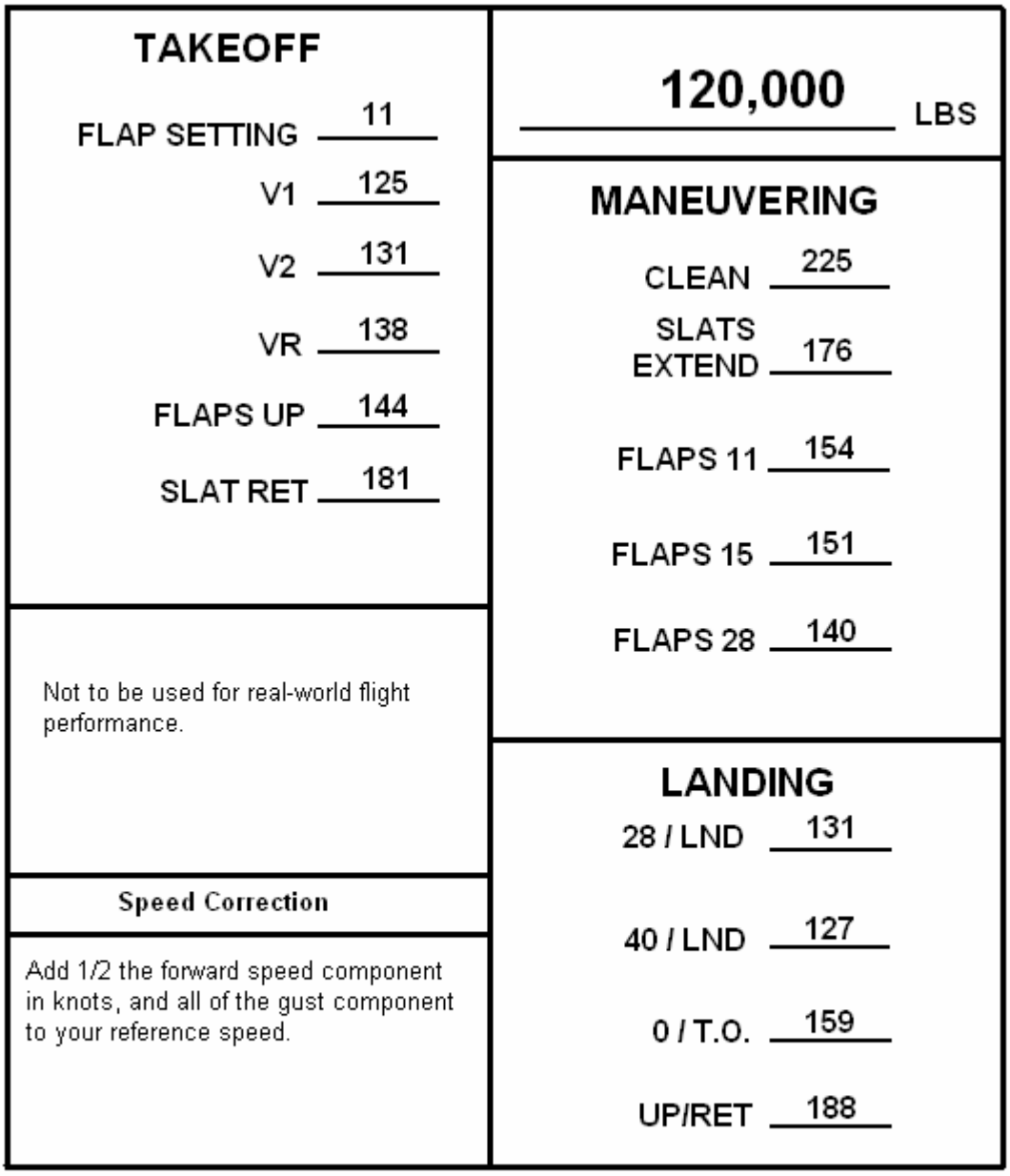
**<Note:> These speed cards are simplified and do not take into account SL or temp changes. Not to be used for real-world navigation.**





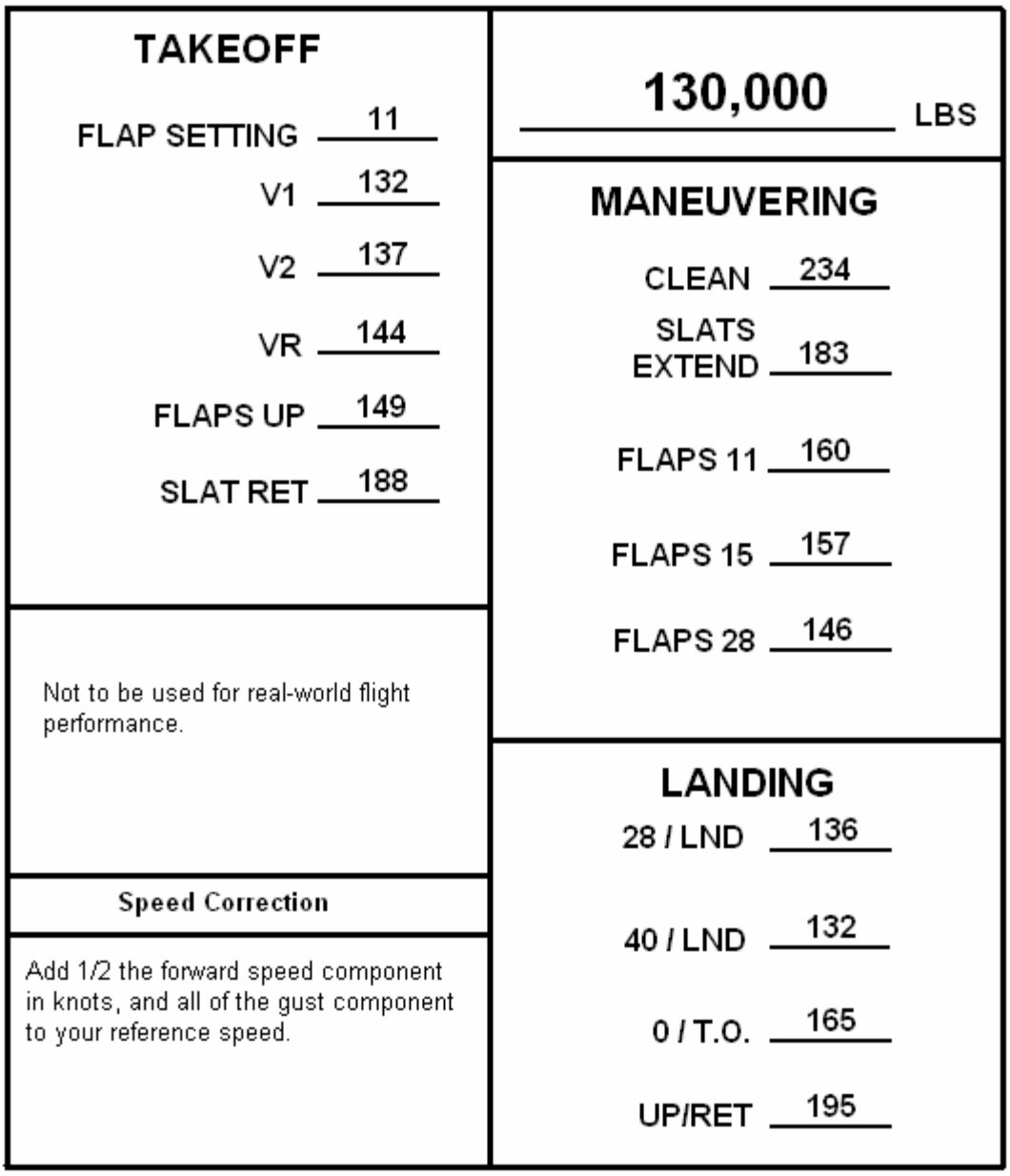

**Boeing / McDonnell Douglas**

MD-80 JT8D-217A/ -217C




**Boeing / McDonnell Douglas**

MD-80 JT8D-217A/ -217C



## TAKEOFF

| | |
|---|---|
| FLAP SETTING | 11 |
| V1 | 138 |
| V2 | 143 |
| VR | 150 |
| FLAPS UP | 155 |
| SLAT RET | 195 |

Not to be used for real-world flight performance.

**Speed Correction**

Add 1/2 the forward speed component in knots, and all of the gust component to your reference speed.

**140,000** LBS

## MANEUVERING

| | |
|---|---|
| CLEAN | 215 |
| SLATS EXTEND | 168 |
| FLAPS 11 | 148 |
| FLAPS 15 | 144 |
| FLAPS 28 | 135 |

## LANDING

| | |
|---|---|
| 28 / LND | 125 |
| 40 / LND | 121 |
| 0 / T.O. | 152 |
| UP/RET | 180 |

**Boeing / McDonnell Douglas**

MD-80 JT8D-217A/ -217C

# APPENDIX B

## MD80 Checklist

**<Note:> Not to be used for real-world navigation.**

**BEFORE ENGINE START:**

**PARKING BRAKE.....SET**
**ENSURE BRAKES ARE SET**

**FUEL QUANTITY/BALANCE.....CHECKED**
**CHECK THAT FUEL MEETS AMOUNT REQUIRED FOR FLIGHT AND IS BALANCED PROPERLY**

**CABIN SIGNS.....SET**
**SEATBELT SIGN AND NO SMOKING SIGNS ON**

**FLIGHT INSTRUMENTS/BUGS.....SET**
**CHECK FOR PROPER ALTIMETER SETTING, NO FAILURE FLAGS AND AIRSPEED BUGGED FOR PROPER TAKEOFF V-SPEEDS. ALTITUDE ALERT SET FOR DEPARTURE CLEARANCE**

**NAV RADIOS/FMS.....SET**
**RADIOS ARE SET UP FOR DEPARTURE ROUTE AND PROPER FLIGHT PLAN/DEPARTURE ENTERED INTO FMS**

**BLEEDS/AIRCONDITIONING.....SET**
**ENGINE/APU BLEEDS OPEN AND AIR COND. PACKS SHUT OFF FOR ENGINE START**

**EXTERIOR LIGHTS.....SET**
**NAV LIGHTS ON, BEACON LIGHTS ON**

**AFTER START:**

**PITOT HEAT.....ON**
**PITOT HEAT CHECKED ON**

**WINDOW HEAT.....ON**
**WINDOW HEAT CHECKED ON**

**ANTI-ICE.....AS REQD**
**SELECT ENGINE ON IF ICING CONDITIONS EXIST**

**BLEEDS/AIRCONDITIONING.....SET**
**ENGINE BLEEDS OPEN, APU BLEED CLOSE**
**AIRCONDITIONING PACKS ON AND ON ENGINE BLEEDS**

**ELECTICAL PANEL.....SET**
**ELECTRICAL PANEL SET TO GENERATORS**

**APU.....OFF**
**AFTER 2 MINUTE COOL DOWN PERIOD**
**SELECT APU OFF**

**TAXI:**

**BRAKES.....CHECKED**
**SOFTLY TEST BRAKES**

**FLAPS/SLATS.....SET**
**ENSURE FLAPS AND SLATS ARE SET AT PROPER TAKEOFF SETTING**

**FLIGHT CONTROLS.....CHECKED**
**COMPLETE FULL LEFT/RIGHT AILERON CHECK, FULL TRAVEL ELEVATOR CHECK AND FULL LEFT/RIGHT RUDDER DEFLECTION**

**TAKEOFF BRIEFING.....COMPLETE**
**BRIEF ON FOLLOWING ITEMS:**
**TAKEOFF TYPE- ROLLING OR STATIC**
**TAKEOFF RUNWAY**
**ABORT CONSIDERATIONS**
**AIRBORNE EMERGENCY CONSIDERATIONS AND RETURN TO FIELD CONSIDERATIONS**
**V-SPEEDS**
**DEPARTURE PROCEDURE/ROUTE**
**NAV RADIOS AND TRANSPONDER CODE**
**ALTITUDE LIMIT**
**ANTI-ICE AND WEATHER FACTORS**

**BEFORE TAKEOFF:**

**CABIN CREW.....NOTIFIED**
**ON CYCLE OF NO SMOKING SIGN(2 CHIMES)**

**TRANSPONDER.....ON**
**ENSURE TRANSPONDER IS ON AND PROPER CODE IS SET**

**BLEEDS/AIRCONDITIONING.....SET**
**SELECT AIR CONDITIONING PACKS TO PROPER SETTING BASED ON TAKEOFF PERFORMANCE**

**EXTERIOR LIGHTS.....ON**
**LANDING LIGHTS AND STROBE LIGHTS ON**

**PARKING BRAKE.....OFF**
**ENSURE PARKING BRAKE IS RELEASED**

**AFTER TAKEOFF:**

**LANDING GEAR.....UP/LTS OUT**
**ENSURE LANDING GEAR IS RETRACTED AND IN TRANSIT LIGHTS ARE OUT**

**CLIMB POWER.....SET**
**SET CLIMB POWER**

**FLAPS/SLATS.....UP**
**AFTER MINIMUM SPEEDS, ENSURE FLAPS AND SLATS ARE RETRACTED**

**BLEEDS/AIRCONDITIONING.....SET**
**ENSURE AIRCONDITIONING PACKS ARE ON**

**ANTI-ICE.....AS REQD**
**ENSURE ENGINE AND WING ANTI-ICE ON IF ICING CONDITIONS ARE PRESENT**

**ABOVE 10,000FT:**

**STERILE COCKPIT.....CHIME**
**ONE CHIME OF NO SMOKING SIGN**

**LANDING LIGHTS.....OFF**

**ABOVE 18,000FT:**

**ALTIMETERS.....RESET**
**RESET ALTIMETERS TO 29.92**

**CRUISE:**

**CRUISE POWER.....SET**
**SET POWER TO CRUISE SETTING**

**CABIN SIGNS.....AS REQD**
**SEATBELT SIGN AT CAPTAINS DISCRETION**

**BELOW 18,000FT:**

**ALTIMETERS.....RESET**
**RESET ALTIMETERS TO LANDING FIELD ALTIMETER SETTING**

**DESCENT:**

**CABIN SIGNS.....ON**
**SEATBELT AND NO SMOKING SIGNS ON**

**ANTI-ICE.....AS REQD**
**SELECT ENGINE AND WING ANTI-ICE ON**
**IF ICING CONDITIONS ARE PRESENT OR**
**WILL BE ENCOUNTERED**

**FLIGHT INSTRUMENTS/BUGS.....SET**
**SET AIRSPEED BUG TO LANDING VREF**
**CHECK ALTIMETERS ARE SET TO LANDING**
**ATIMETER SETTING**

**NAV RADIOS/FMS.....SET**
**SET RADIOS FOR LANDING RUNWAY OR**
**APPROACH. SET ARRIVAL PROCEDURE AND**
**APPROACH IN FMS**

**APPROACH BRIEFING.....COMPLETE**
**APPROACH BRIEFING SHOULD INCLUDE:**
**APPROACH TYPE AND LANDING RUNWAY**
**FREQUENCIES**
**FINAL APPROACH COURSE**
**MINIMUM ALTITUDES**
**VREF SPEEDS**
**MISSED APPROACH PROCEDURES**
**ANY SPECIAL CONSIDERATIONS-ICE/WET**
**RUNWAY ETC...**

**BELOW 10,000FT:**

**STERILE COCKPIT.....CHIME**
**ONE CHIME OF NO SMOKING SIGN**

**BEFORE LANDING:**

**CABIN CREW.....NOTIFY**
**ONE CYCLE OF NO SMOKING SIGN(2 CHIMES)**

**LANDING GEAR.....DOWN/GREEN**
**CHECK LANDING GEAR IS EXTENDED AND ALL GREEN LIGHTS ARE ILLUMINATED WITH NO RED/UNSAFE LIGHTS SHOWING**

**FLAPS/SLATS.....SET**
**CHECK LANDING FLAPS ARE SET IN FINAL LANDING CONFIGURATION**

**SPEEDBRAKES.....ARM**
**ENSURE SPEEDBRAKES ARE ARMED FOR AUTODEPLOY**

**AUTOBRAKES.....SET**
**IF NEEDED, SET AUTOBRAKES TO PROPER SETTING FOR RUNWAY CONDITION/LENGTH**

**AFTER LANDING:**

**EXTERIOR LIGHTS.....SET**
**LANDING LIGHTS, WING AND STROBE LIGHTS OFF**

**PITOT HEAT.....OFF**

**WINDOW HEAT.....OFF**

**ANTI-ICE.....AS REQD**
**WING HEAT OFF, ENGINE ANTI-ICE ON IF ICING CONDITIONS ARE PRESENT**

**FLAPS.....UP**
**RETRACT FLAPS/SLATS**

**SPEEDBRAKES.....RETRACTED**
**RETRACT AND STOW SPEEDBRAKES**

**TRANSPONDER.....STBY**
**PLACE TRANSPONDER TO STANDBY**

**APU.....START**
**START APU FOR GROUND USE**

**BLEEDS/AIRCONDITIONING.....SET**
**BLEEDS AND PACKS CONFIGURED FOR GROUND USE**

**PARKING/SHUTDOWN:**

**PARKING BRAKE.....SET**
**SET PARKING BRAKES**

**ELECTRICAL PANEL.....SET**
**SET ELECTRICAL PANEL TO APU OR GROUND POWER**

**BLEEDS/AIRCONDITIONING.....SET**
**SET PACKS TO APU/EXTERNAL AIR AND CLOSE ENGINE BLEEDS**

**ANTI-ICE.....OFF**
**CLOSE ENGINE ANTI-ICE VALVES**

**START LEVERS.....CUTOFF**
**PLACE ALL START LEVERS TO CUTOFF AND WATCH FOR INDICATIONS OF ENGINE SHUTDOWN**

**CABIN SIGNS.....SET**
**SEAT BELT SIGN OFF**

**EXTERIOR LIGHTS.....SET**
**BEACON AND TAXI LIGHTS OFF, NAV LIGHTS ON**

**BLEEDS/AIRCONDITONING……..OFF**