

McDonnell Douglas MD-80 Limitations

The information provided in this document is to be used during simulated flight only and is not intended to be used in real life. **Attention VA's** - you may post this file on your site for download. Please do not post this information as a web page on your site. **To all others: This information is provided for your personal use only.** Distribution of this information in any form is not permitted without my approval. Distribution of this information in any payware product, CD or otherwise is not permitted.

GENERAL LIMITATIONS

Applicability

The limitations presented in this section are for DC-9 airplane models MD-82 and MD-83. Only those limitations unique to the MD-83 will be identified. Limitations not so identified are applicable to both models.

Flight Maneuvering Load Acceleration Limits (AFM)

Flaps Up: +2.5g to -1.0g

Flaps Down: +2.0g to 0.0g

Operational Limits (AFM)

Runway Slope: +1.7% to -2.0%

Limiting Tailwind Component: 10 kts

Crosswind Values (Takeoff and Landing)

The maximum demonstrated crosswind component is 30 knots and is not an AFM limitation. However, crosswinds at or near 30 knots with higher gusts should be considered operationally unacceptable.

Minimum Takeoff and Landing Altitude (AFM): -1000 ft

Maximum Takeoff and Landing Altitude (AFM): 8500 ft

Takeoff and Landing Temperature Limits (AFM)

Minimum: -65°F (-54°C)

Maximum: +122°F (+50°C)

Maximum Altitude: FL370

MAXIMUM ALLOWABLE AIRSPEEDS

Maximum Operating Speed (V_{mo}/M_{mo}): 340 kts / .84M

Landing Gear Operating (V_{lo}/M_{lo})

Extension: 300 kts / .70M

Retraction: 250 kts / .70M

Landing Gear Extended (V_{le}/M_{le}): 300 kts

Flap Placard Speeds (V_{fe}/M_{fe})

M_{fe}: .57M

FLAP POSITION	LIMITING SPEED
0° - 13°	280 kts
14° - 20°	240 kts
21° - 25°	220 kts
26° - 30°	200 kts 205 kts (MD-83)
31° - 40°	195 kts 200 kts (MD-83)

Slats Extended

SLAT POSITION	LIMITING SPEED
Mid Pos	280 kts / .57M
Full Ext	240 kts / .57M

Turbulence Penetration Speed

The recommended speed for turbulence penetration is 275 to 285 KIAS or Mach .75 to .79, whichever is lower. At 10,000 feet and below, the minimum speed is 250 KIAS or minimum maneuvering, whichever is greater. Do not fly at less than minimum maneuvering speed for existing configuration.

WEIGHTS

Maximum take-off and landing weights may be further limited by airport analysis data. Refer to the airport analysis info for maximum permissible operating weights for specific runways, weather conditions and abnormal airplane configurations. Take-off weight may be further restricted by the Minimum Equipment List (MEL) and/or Configuration Deviation List (CDL). Maximum weights may be further limited by center of gravity limits, fuel load, and fuel density.

WEIGHTS	DC-9-82	DC-9-83
Maximum Ramp Weight	150,500 lbs	161,000 lbs
Maximum Takeoff Weight	149,500 lbs	160,000 lbs
Maximum Landing Weight	130,000 lbs	130,000 lbs
Maximum Zero Fuel Weight	122,000 lbs	122,000 lbs

ANTI-ICE

Icing Conditions

- **Ground and For Takeoff**
 - Icing conditions exist when RAT is 6°C (42°F) or below **AND** visible moisture in any form is present. **OR...**
 - When RAT is 6°C (42°F) or below and the temperature - dew point spread is 3°C (5°F) or less.
 - Icing conditions also exist on the ground and for takeoff when the RAT is 6°C (42°F) or below when operating on ramps, taxiways, or runways where surface snow, standing water, or slush may be ingested by the engines or freeze on the engines, nacelles, or engine sensor probes.
- **In-Flight**
 - Icing conditions exist when RAT is 6°C (42°F) or below **AND** visible moisture in any form is present.

Engine Anti-Ice

- For all takeoff and all ground and flight operations, the engine anti-ice system must be ON when icing conditions exist or are anticipated.

- When penetrating or operating in icing conditions in flight, maintain enough thrust to keep associated ICE PROTECT TEMP LOW light out.

Wing Anti-Ice

- In flight, wing anti-ice should be used in icing conditions or when icing conditions are expected.
- Wing anti-ice is not to be used during take-off. Airport analysis data is based on wing anti-ice OFF until 1000 feet AFL.

Windshield Heat (AFM)

Windshield heat must be on and checked for all flight operations.

AUTOFLIGHT

Minimum Altitude For Use of Autopilot

Enroute, including climb and descent (excluding approaches): 1000 feet AFL

Approaches

- Autolandings: NONE
- ILS Coupled Approaches (other than Autolandings)
 - IFR: 70 feet
 - VFR: 50 feet
- Non-Precision Approaches: 50 feet below MDA

Automatic Landings

Do not conduct an automatic landing if:

- Headwind greater than 25 kts.
- Crosswind greater than 10 kts.
- Tailwind greater than 10 kts.
- Align (ALN) mode is not annunciated on an FMA by 100 feet radio altitude. (AFM)
- Either engine becomes inoperative at an altitude greater than 50 feet above the runway. (AFM)
- Any unusual control position or other abnormal condition exists the the manual flight control system. (AFM)

FLIGHT CONTROLS

Flaps (AFM)

Do not use flap setting between 13 and 15.

Ground Spoilers (AFM)

Do not arm spoiler lever prior to gear extension.

Rudder Power (AFM)

The rudder power must be on for take-off.

Slats (AFM)

With AUTO SLAT FAIL light on, limit speed to 240 KIAS unless flap/slat handle is in UP/RET position. With AUTO SLAT FAIL light on with slats retracted reduce airspeed to 240 KIAS before extending slats. Slats must be at the mid position (flaps 0-13) or fully extended position (flaps 15 through 24) for take-off.

Speed Brakes

The speed brakes must only be used in the 0 flap configuration, with or without slats extended. (AFM)

Do not extend or retract gear while the speed brakes are deployed. (AFM)

The full aft spoiler lever position is for ground use only.

FUEL

Fuel Quantity, MD-82, Based on 6.7 Lbs/Gal

Left & Right Main Tanks (Each): 9,266 lbs

Center Tank: 20,596 lbs

Total Fuel Load: 39,128 lbs

Fuel Quantity, MD-83, Based on 6.7 Lbs/Gal

Left & Right Main Tanks (Each): 9,266 lbs

Center Tank: 20,596 lbs

Fwd & Aft Aux Tanks (Each): 3,784 lbs

Total Fuel Load: 46,696 lbs

Fuel Management and Loading (AFM)

- For all takeoffs and landings, two pumps must be on in each main tank.
- For all takeoff and landings, all auxiliary tank fuel pumps must be off.
- No more than 8500 lbs of center fuel may be used prior to transferring all aux tank fuel to the center tank.
- Fuel Density Range - 6.3 to 7.1 pounds per gallon.
- Maximum fuel imbalance (main tanks) - 1500 lbs.
- Maximum fuel imbalance (aux tanks) - 400 lbs.

Ballast Fuel

Ballast fuel is non-usable fuel and is added to adjust the aircraft's center of gravity. Fuel may be loaded into the center tank and declared ballast provided:

- Actual ZFW plus ballast fuel does not exceed maximum zero fuel weight.
- A placard stating the amount of ballast fuel is installed next to the center tank pump switches.
- The FUEL QTY indicator for the center tank is operative.

- Useable fuel is not contained in either aux tank (if installed).

Ballast fuel may not be loaded into the aux tanks. Fuel designated as ballast may not be used in flight.

Fuel Distribution Exceptions (AFM)

Fuel may be contained in the center and aux tank (if installed) with wing tanks not full if fuel in the center and aux tanks is included in the computation of ZFW or maximum allowable ZFW is reduced by the amount of fuel in these tanks.

Note: Any amount of fuel may be contained in the center and aux tanks with wing tanks not full provided the weight of the center and aux tank fuel plus the actual ZFW does not exceed 122,000 lbs.

LANDING GEAR

Anti-Skid (AFM)

The anti-skid must be operative for takeoff.

Auto-Brake (AFM)

Do not use auto brakes if either hydraulic system fails.

Brake Temperature

Do not take-off if any brake temperature exceeds 205°C.

Tires

The maximum tire speed is 195 knots.

POWERPLANT

RPM (AFM)

N1: 101.6% Reserve Power; 98.3% (-217), 98.8% (-219) Max Power

N2: 102.5% Reserve Power; 100.9% Max Power

EGT

OPERATING CONDITION	TEMPERATURE °C	TIME
Starting (AFM) (See Note 1) Ground Flight	475 625	Momentary Momentary
Ground Idle / Post Start	590	(See Note 2) Momentary
Takeoff (AFM) Reserve Power	625 630	(See Note 3) 5 Minutes 2 Minutes
Takeoff (AFM) Max Power	590 595	5 Minutes 2 Minutes
Max Continuous (AFM) / Climb	580	Continuous
Max Cruise	540	Continuous

Notes:

1. Starting EGT Limit - If EGT limit is exceeded for any period of time immediately shut down the engine. Record peak EGT and duration of the overtemp. Maintenance action is required.
2. Idle EGT Limit - Once stabilized idle is achieved if EGT limit is exceeded for any period of time immediately shut down the engine. Record peak EGT and duration of the overtemp. Maintenance action is required.
3. The use of takeoff power (Max and/or Reserve) must not exceed 5 minutes.

Automatic Reserve Thrust (ART) System (AFM)

The ART system must be off when using the Takeoff Flex Mode (Standard Power) of the thrust rating system.

Oil Pressure (AFM)

Normal oil pressure is 40-55 PSIG. Oil pressures between 35 and 40 PSIG should be tolerated only for completion of the flight.

Oil Temperature (AFM)

Max Continuous: 135°C

Max for 15 minutes: 136°C - 165°C

Oil Quantity

Minimum oil quantity per engine for dispatch: Flights 4 hours or greater - 12 quarts. Flights under 4 hours - 4 quarts plus 2 quarts per hour per engine.

Approach Idle Control (AFM)

When operating with the Approach Idle Control System failed to the Approach Idle (High) Mode on one or both engines the ART system must be activated prior to taxi for takeoff and prior to taxi after landing.

Reverse Thrust (AFM)

Do not operate thrust reversers in flight. The following applies when the airplane is operated using reverse thrust for power back:

- Do not exceed 1.3 EPR.
- Ramp slope limit range is +1% to -2%.

- Thrust reversers on both engines must be operative.
- Application of brakes while backing is prohibited.
- Power back not authorized on loose dry snow, slush or melting ice. Power back not authorized during periods of heavy rain.

Engine Synchronization (AFM)

The engine synchronizer switch must be in OFF position any time below 1500 feet AGL.

Takeoff Thrust

If the ART system is inoperative and Airport Analysis does not authorize Standard Power (STD), Reserve Power (RSV) must be used for takeoff.

If ART system is inoperative and Airport Analysis authorizes STD power, use STD for take-off.

If ART is operative and Airport Analysis does not authorize STD power, the ART system must be armed and Max Power used for takeoff.