

# MD-80/-90 specifications

The MD-80 family & MD-90 have followed a simple course of evolution. Specifications for different variants are detailed.

A total of 1,194 MD-80s were built between 1980 and 1999. Only 117 MD-90s were manufactured between 1995 and 2000.

There are five MD-80 variants, while there is just one basic model for the MD-90. The MD-80 was first conceived in 1977 as a development of the DC-9-50, but it is in fact a sub-type of the DC-9, and does not have its own separate type certificate. The MD-80 was developed as a stretch development of the DC-9-50 with a 14-foot longer fuselage that allowed a higher seating capacity. The MD-80's other main changes were an increased wing span and higher thrust development of the JT8D engine: the JT8D-200 series. The MD-80 has a two-class seat capacity of 143. The MD-80 was initially developed with an analogue flightdeck.

## MD-81

The first variant was the MD-81, and was launched by Swissair. The aircraft was powered by the JT8D-209 rated at 18,500lbs thrust. This was the first variant of the JT8D-200 series. The MD-

81's standard specification was a usable fuel capacity of 5,840 US Gallons (USG), and the aircraft had a maximum take-off weight (MTOW) of 140,000lbs. Overall the specifications gave it a range of 1,400nm (*see table, page 11*). Only 80 MD-81s were built, and included aircraft between line numbers 909 and 1,999 built between 1980 and 1999.

These were the MD-81's initial specifications, and various improvements and modifications were later possible. A version with a MTOW of 142,000lbs was developed. This had the same -209 engines, but a longer range of 1,550nm (*see table, page 11*). It also became possible to refit the aircraft with the higher rated JT8D-217 and -219 engines, rated at 20,000lbs and 21,000lbs thrust respectively.

## MD-82

The MD-82 was a higher gross weight development of the -81. The main difference over the -81 was a higher MTOW of 147,000lbs. This increased gross weight was supported by higher rated engines at 20,000lbs thrust. Standard fuel capacity was the same as

the -81's at 5,840 USG, giving the aircraft a range of 1,800nm (*see table, page 11*).

There are three versions of the -217; the -217, -217A and -217C, the latter two having lower specific fuel consumption and so giving the aircraft marginally longer range up to 2,000nm. The -217A and -217C also have a higher flat rating and power the MD-82 with the higher MTOW of 149,500lbs.

Although the MD-82 fleet is dominated by -217-powered aircraft, there are also a few examples powered by the -209 and -219.

Production started in 1981 with line number 997 and continued until 1997 to line number 2,204, with a total of 603 aircraft being completed.

## MD-83

The MD-83 is a higher gross weight and longer range development of the -82. The -83 is powered by the JT8D-219 rated at 21,000lbs thrust. The aircraft has a MTOW of 160,000lbs and is available with several fuel capacities. The first is the standard volume of 5,840USG, but there are three different variants of auxiliary tanks, allowing total fuel volumes of 6,405USG, 6,620USG and 6,970USG. This gives the aircraft a range between 2,100nm and 2,450nm.

Aircraft structure, landing gear, wheels and brakes were all strengthened to cope with the higher gross weight.

Production commenced in 1985 with line number 1,234 and continued until 1999 to line number 2,287 for a total production of 277 units.

## MD-88

As part of the process of modernising the MD-80, McDonnell Douglas (MDC) offered it with a glass electronic flight instrument system (EFIS) display flightdeck together with a windshear warning system.

Besides the EFIS flightdeck, the MD-88 has the same weight, fuel capacity and range characteristics as the MD-82 and -83.

Production of MD-88s started in 1986 with line number 1,338 and continued up to line number 2,187 in 1997 after a total of 158 aircraft were completed. Some MD-88s, however, were not originally manufactured as -88s, but were upgraded MD-82s.



There are five main MD-80 variants. The most popular was the MD-82, with 603 being built. The MD-83/88 has the highest performance, with a range of 2,450nm.

## MD-87

The MD-87 is the only member of the MD-80 family to have a different sized fuselage. The aircraft has a 17-foot shorter fuselage, making it marginally shorter in length than the DC-9-50. The MD-87 has a two-class seat capacity of 117. The variant first entered service in 1987, and was developed as a response to the evolution of aircraft families that Airbus and Boeing began to propose at the time.

The MD-87 was powered by the JT8D-217 rated at 20,000lbs thrust and by the -219 rated at 21,000lbs thrust. The aircraft has several MTOW options, starting at 140,000lbs and increasing up to 149,500lbs. It also has several fuel capacity variants, ranging between 5,840USG and 6,970USG, which give the aircraft a range capability between 2,400nm and 2,850nm (*see table, page 11*).

One small feature of the MD-87 was its 'beaver' tail cone, which was required because of the shortened fuselage. This type of tail cone has since been adapted by operators for use on the MD-81/-82/-83/-88 to lower drag.

Production of MD-87s started in 1987 with line number 1,326 and continued to 1,985 in 1999 for a total of just 76 aircraft.

## MD-90 series

By the mid-1980s MDC was considering further evolution and development possibilities for the MD-80. Pratt & Whitney had both developed unducted fan and ultra-high bypass engines which were flown on MD-80 testbeds. These two engines achieved high fuel efficiency, but plans to use them were eventually dropped since their complexity and consequent high maintenance costs offset the savings made from reduced fuel burn.

MDC was also considering the new V.2500 being developed by International Aero Engines. The MD-90 was conceived in the late 1980s by marrying the MD-80's fuselage with with the V.2500. Delta Airlines placed an initial order for 50 aircraft in 1989. The first variant was the MD-90-30, and in fact had a 5-foot fuselage stretch over the MD-80. This gave the MD-90-30 a two-class seat capacity of 153. The 5-foot stretch allows two additional seat rows of economy seats thereby adding 10 seats.

The MD-90 has a MTOW of 156,000lbs and fuel capacity of 5,840USG, giving the aircraft a range of 2,270nm (*see table, page 11*). It also has a flightdeck based on the MD-88's system, plus use of a flight management system and inertial reference system. The aircraft uses the V.2525-D5 rated at

## MD-80/-90 SERIES

Variant	MD-81	MD-81
MTOW lbs	140,000	142,000
Fuel volume USG	5,840	5,840
Engines	JT8D-209	JT8D-209
Seats (two-class)	143	143
Range-nm	1,400	1,550

Variant	MD-82	MD-82	MD-82/-88
MTOW lbs	147,000	149,500	149,500
Fuel volume USG	5,840	5,840	5,840
Engines	JT8D-217	JT8D-217A	JT8D-217C
Seats (two-class)	143	143	143
Range-nm	1,800	1,950	2,000

Variant	MD-83/88	MD-83/88	MD-83/88	MD-83/88	MD-83/88
MTOW lbs	160,000	160,000	160,000	160,000	160,000
Fuel volume USG	5,840	6,405	6,620	6,970	7,780
Engines	JT8D-219	JT9D-219	JT8D-219	JT8D-219	JT8D-219
Seats (two-class)	143	143	143	143	143
Range-nm	2,100	2,300	2,400	2,500	2,450

Variant	MD-87	MD-87	MD-87	MD-87	MD-87
MTOW lbs	140,000	149,500	149,500	149,500	149,500
Fuel volume USG	5,840	5,840	6,405	6,620	6,970
Engines	JT8D-217C	JT9D-219	JT8D-219	JT8D-219	JT8D-219
Seats (two-class)	117	117	117	117	117
Range-nm	2,400	2,400	2,650	2,700	2,850

Variant	MD-90-30	MD-90-30ER
MTOW lbs	156,000	168,000
Fuel volume USG	5,840	6,405
Engines	V.2525-D5	V.2528-D5
Seats (two-class)	153	153
Range-nm	2,270	2,780

25,000lbs thrust.

MDC had plans to offer an MD-90 family, and proposed a stretch variant (-40 series) and shortened variant (-10 series) to offer models with higher and lower seat capacities. Orders were not received for these. MDC later developed a higher gross weight version of the -30, the -30ER. This had a MTOW of 168,000lbs, fuel capacity of 6,405USG and range of 2,780nm (*see table, page 11*). The MD-90-30ER is powered by the V.2528-D5 rated at 28,600lbs thrust.

Production of the first aircraft was in 1995 with line number 2,098 and continued until 2000 up to line number 4002 for a total production of 117 aircraft.

## Chinese production

In 1985 MDC agreed with Shanghai Aviation Industrial Corporation (SAIC) and China Aviation Supply Corporation (CASC) to produce 25 MD-82s under license in Shanghai, China. The first entered service in 1987.

Various other agreements were reached to build additional MD-82s, and in 1994 an agreement was made to build up to 30 MD-90s. Eventually 37 MD-82s/-83s and 22 MD-90s were built. These are operated by China Southern, China Northern and China Eastern. Some China-built aircraft have since been acquired by Boeing and are operated by Spanair and American Airlines. **AC**