DELTA VIRTUAL AIRLINES

BOEING 777-200ER
AIRCRAFT OPERATING MANUAL

THIRD EDITION

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AIRCRAFT HISTORY AND BACKGROUND

At the beginning of the "Jet Age" in the late 1950s and early 1960s, speed was the paramount consideration between jetliners. Early airliners such as the Boeing 720 could cruise up to Mach 0.90, and the Convair 990 reached speeds up to Mach 0.97. The oil crisis of 1973 accelerated a trend that began with the Boeing 747 – a trend towards larger, more economical airliners.

In the 1980s, airlines started to make extensive use of "big twin" aircraft such as the Boeing 757, 767 and Airbus 300 to deliver large passenger loads without the high operating costs of the multi-engine aircraft they replaced, such as the 727, DC-10 and DC-8. Today, Delta's trans-Atlantic flights are dominated by the Boeing 767, with only a secondary role for the MD-11.

In the late 1980s, Boeing received requests for a new, larger twin-engine airliner to replace older L-1011s, DC-10s and early model 747s. Originally, they started out with a 767 derivative called the 767-X. After initial customer feedback, this derivative design was scrapped in favor of a completely new aircraft that became the 777. This aircraft would have the economics of a large, twin-engine aircraft combined with the range and seating capacity of large, multi-engine airliners.

The airplane is larger than all other twinjet or tri-jet airplanes, yet smaller than the 747 and it brings the twin-engine economic advantage to medium- and long-range markets. The 777 currently is available in five models: 777-200, 777-200ER (extended range), 777-200LR (longer-range), 777-300 and the 777-300ER. The 777s seat from 301 to 368 passengers in a three-class configuration with a range of 5,210 nautical miles (9,649 km) in the 777-200 to 8,810 nautical miles (16,316 km) for the 777-200LR (longer range) model.

The 777 program was launched in October 1990 with an order from United Airlines. In June 1995, United flew its first 777 in revenue service. On June 26th, 1995, the Boeing board of directors authorized production of the 777-300. The first 777-300 was delivered to Cathay Pacific Airways in June 1998. The 777-300 is a high-capacity, stretched version of the newest twin-aisle jet. This newest member of the 777 family is "market-driven" to meet airline demand for a jetliner sized to replace older twin-aisle airplanes, including early versions of the 747. The 777-300 complements the existing range of available 777 models with another set of mission capabilities for the world's carriers and offers an attractive option for progressively lower costs per seat within the 777 family.

The 777-200LR (longer range) and 777-300ER (extended range) airplanes are two longer-range airplanes that Boeing has recently developed. Launched in February 2000, the two airplanes can fly farther and faster than the A340 competition. Airlines will have additional flexibility in serving the non-stop routes that passengers demand.

The Boeing 777 is the first jetliner to be 100 percent digitally designed using three-dimensional computer graphics. Throughout the design process, the airplane was "pre-assembled" on the computer, eliminating the need for a costly, full-scale mock-up. New design and testing initiatives helped ensure the highest possible levels of reliability on the very first 777, compared to what had been possible on previous jetliner introductions. Today's 777 operators enjoy a 99 percent reliability rate, which is unmatched in the industry.

Applying schedules, time of day demands and competitive strength to a Boeing flight selection model, it is estimated that flying 777s instead of A340s would result in a revenue advantage of $18 million per airplane (10 percent net present value) for a typical airline. This advantage results from increased market share due to the higher image an airline would have with the preferred 777 in its fleet. This is equivalent to about $3.4 million per year per airline as a result of having an additional 15 passengers per flight.

Both the 777-200LR and the 777-300ER were entered into service within the past year. The first of the two models is the longest-range aircraft ever to fly in the history of the world. It recently completed the longest ever non-stop flight from Hong Kong to London going the long way around clocking in at just under 23 hours non-stop! The 777-300ER is a versatile long-range aircraft with an increased capacity over the –200ER/LR. It has a range similar to a 747-400, but with much better economics per seat mile.

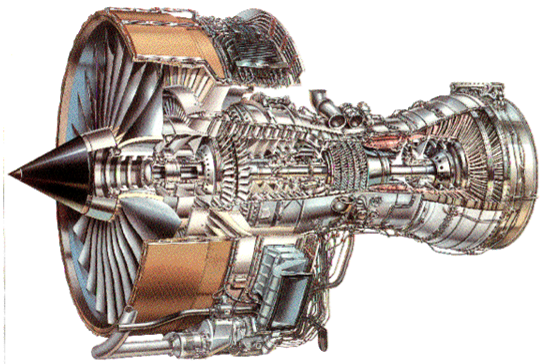
On May 30th, 1995 the 777 became the first airplane in aviation history to earn U.S. Federal Aviation Administration (FAA) approval to fly 180-minute extended range twin-engine operations (ETOPS) at service entry. On May 4, 1998, the 777-300 achieved another historic milestone by becoming the first commercial airplane to receive type certification and 180-ETOPS approval on the same day. On February 15th, 1996 the 777 was named the winner of the prestigious Robert J. Collier Trophy by the U.S. National Aeronautic Association, honoring the 777 as the top aeronautical achievement of 1995.

ENGINE TYPES

The Boeing 777 is available with a choice of three major turbofan engines, from the major global manufacturers. Delta uses the Rolls-Royce Trents, Air France uses the GE's, and Korean uses the Pratt and Whitney's.

ROLLS-ROYCE TRENT 800

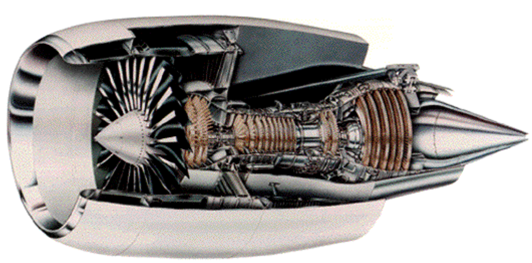
The Trent 800 entered service in April 1996. Built on the foundation of Trent 700 (which entered service in March 1995) experience, the Trent 800 was certified ahead of schedule at 90,000 lb thrust, exceeding its original target of 84,000 lb.



The Trent 800 rapidly established a reputation-for industry leading reliability and the capability of the original design has been demonstrated by continuing thrust growth. Today the Trent 800 is available from 75,000 to 95,000 lb thrust with a common engine standard, the widest range of any engine in its class. Its three-shaft configuration and second-generation hollow titanium wide-chord fan technology also mean that a Trent-powered Boeing 777 weighs up to 8,000 lb less than competitor-powered versions. Low weight and high thrust equates to optimum revenue earning capability. Today, the Trent 800 is the power plant of choice for the 777, with around 44% of the available market.

GENERAL ELECTRIC GE90

Following an extensive technical evaluation, GE Aircraft Engines was specified by The Boeing Company to develop a 115,000 pound-thrust GE90 derivative engine for all longer-range 777-200LR and -300ER derivatives.



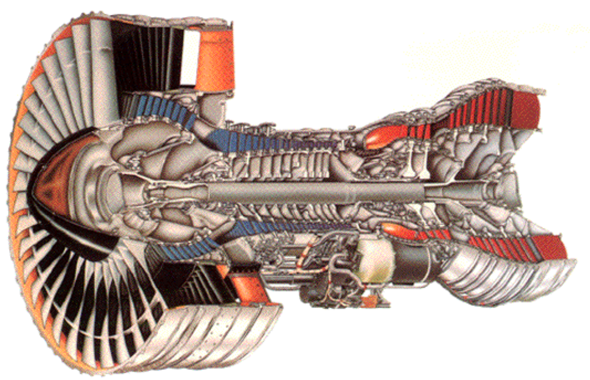
The advanced technologies that were introduced on the original engine in 1995 are incorporated into the GE90-115B engine. This derivative engine represents the successful culmination of our original strategy in the early 1990s to build a new centerline engine for the Boeing 777 aircraft family. Today, the GE90-115B is the world's most powerful jet engine sustaining a record 122,965 lbs of thrust during initial ground testing at GE's outdoor test facility near Peebles, Ohio.

In early 2002, the engine began flight tests on GE's Boeing 747 flying test bed at Mojave, California. It received FAR33 certification (rated at 115,000 lbs of thrust) by the U.S. Federal Aviation Administration and the European Community's Joint Airworthiness Authorities in 2002.

Certification, first delivery, and entry into service of the 777-300ER are set for 2003. Air France, Japan Airlines, All Nippon, EVA, International Lease Finance, and GE Capital Aviation Services have ordered a total of 49 firm 777 longer-range aircraft.

PRATT & WHITNEY PW4090

The PW4000 112-inch fan engine is the second derivative model in the PW4000 engine family. The PW4084, certified at 86,760 pounds thrust, was the launch engine for Boeing's 777 super twinjet. It entered service in June 1995 with United Airlines, already qualified for 180-minute ETOPS (Extended-range Twin-engine Operations) — an industry first. It is also the first engine to operate with approval for 207-minute ETOPS. The PW4090, certified at 91,790 pounds of thrust, entered service on the Boeing 777-200ER airplane in March 1997. The most recent model, the PW4098, was certified in July 1998. The PW4098, at 99,040 pounds of thrust, is available for 777-200ER and 777-300 models.



The engine has many advanced, service-proven technologies to enhance operational performance and durability. These include the industry's most advanced single-crystal superalloy materials, powdered metal disks, TALON (Technology for Advanced Low NOx) combustor technology (PW4098), and an improved Full-Authority Digital Electronic Control (FADEC). These features contribute to the engine's excellent environmental performance, which meets with margin all current and anticipated noise and emissions regulations.

The PW4000 112-inch fan engine retains the excellent accessibility and component modularity of other PW4000 family members to reduce maintenance time and cost. For transportability, the engine can be shipped in a 747F as a complete engine. Also, the fan case is easily separated from the engine's core for split shipment without disturbing the bearing compartments.

The PW4000 112-inch fan engine is the reliability, experience and ETOPS leader for 777 aircraft, providing the best customer value.

FLIGHT DECK

In response to airline preference, the layout of the 777 flight deck is in a horizontal format similar to that of other recent Boeing aircraft, such as the 757, 767 and the 747-400. Flight deck features include the following:

Principal flight, navigation and engine information is presented on six large display screens incorporating advanced liquid-crystal display technology. The new displays save space, weigh less, require less power and generate less heat, which contributes to greater reliability and a longer service life. They do not require the heavy, complex air conditioning apparatus needed to cool equipment on current flight decks. The flat panel displays remain clearly visible in all conditions, even direct sunlight.

Three multi-purpose control display units (CDU) provide data display and entry capabilities for flight management functions. These units are the primary interface with an integrated Airplane Information Management System (AIMS). The CDUs have color displays, again in response to market preferences. Adding color allows pilots to assimilate the information more quickly.

Integrated Airplane Information Management System (AIMS) provides flight and maintenance crews all pertinent information concerning the overall condition of the airplane, its maintenance requirements and its key operating functions, including flight, thrust and communications management.

A "fly-by-wire" flight control saves weight and simplifies factory assembly compared to conventional mechanical systems relying on steel cables, and requires fewer spares and less maintenance in airline service.

A Boeing-patented two-way digital data bus, ARINC 629, has been adopted as a new industry standard. It permits airplane systems and associated computers to communicate with one another through a common wire path (a twisted pair of wires) instead of through separate one-way wire connections. This further simplifies assembly and saves weight, while increasing reliability through a reduction in the amount of wires and connectors. There are 11 of these ARINC 629 pathways in the 777.

Enhanced Ground Proximity Warning System (EGPWS) is standard equipment. The EGPWS displays potentially threatening terrain and gives an audible alert up to a minute in advance of possible terrain conflict, compared with 10 to 15 seconds for previous systems. It incorporates a proprietary digital terrain map, which it continuously compares to airplane position data from the navigation system.

The 777-300 flight deck includes a Ground Maneuver Camera System (GMCS), designed to assist the pilot in ground maneuvering the 777-300 with camera views of the nose gear and main gear areas. The images are displayed at the Multi-Functional Display positions in the flight deck in a three-way split format.

AIRCRAFT SPECIFICATIONS

AIRCRAFT DIMENSIONS

- Length: 242 ft 4 in
- Cabin Width: 19 ft 3 in
- Height: 60 ft 8 in
- Wing Span: 199 ft 11 in
- Wing Area: 4,605 ft^2

DESIGN WEIGHTS

- Max Take Off Weight: (MTOW) 634,000 lbs
- Max Landing Weight: (MLW) 450,000 lbs
- Max Zero Fuel Weight: (MZFW) 429,000 lbs
- Fuel Capacity: 297,789 lbs
- Operating Empty Weight: (OEW) 299,000 lbs

CAPACITY

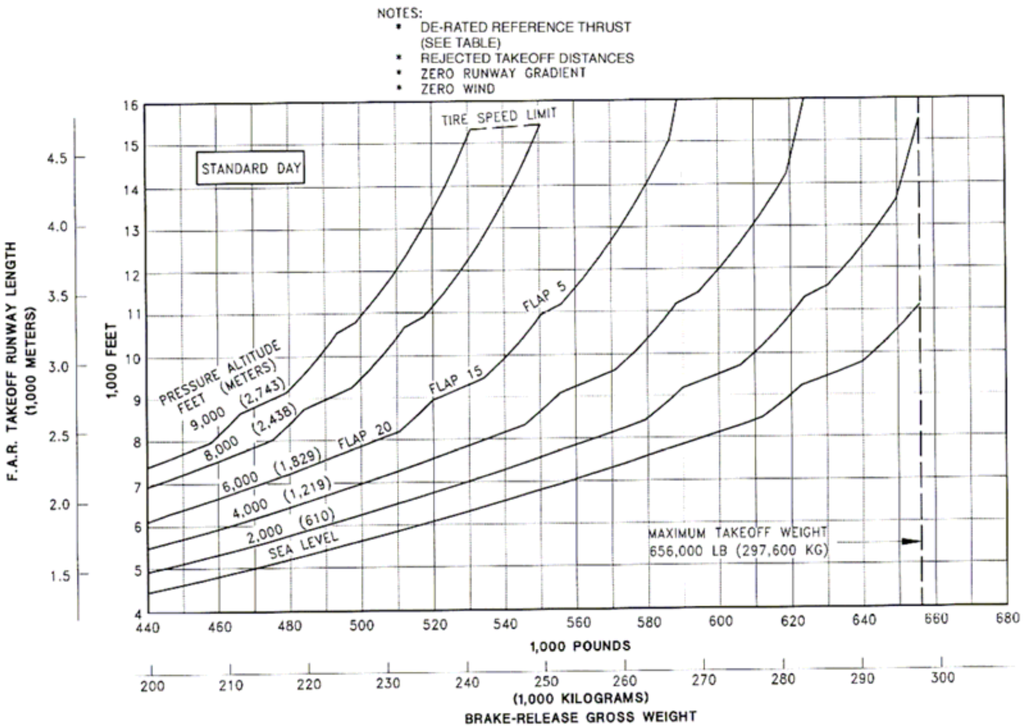
- Passengers (Delta)
  - BusinessElite®: 52
  - Coach: 225
- Forward Cargo Capacity: 67,500 lbs
- Aft Cargo Capacity: 49,000 lbs
- Cargo total volume: 5,656 ft^3

POWER PLANTS

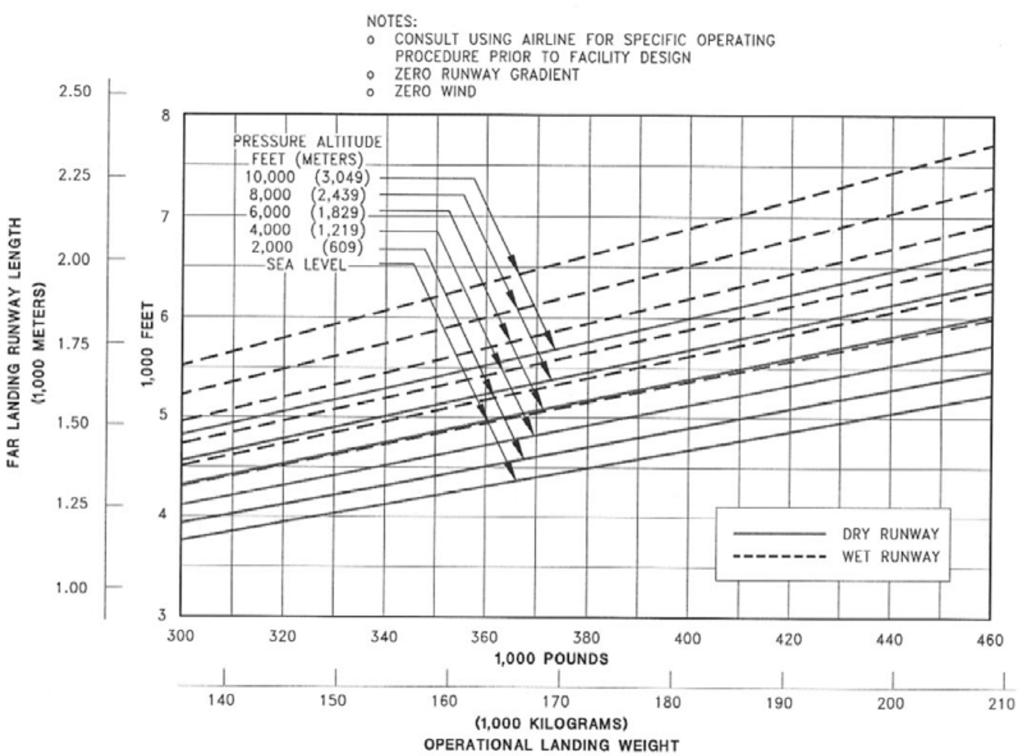
- Delta
  - Rolls Royce Trent 892, max SLS thrust: 92,000 lbs each
- Air France, Continental
  - General Electric GE90-94B, max SLS thrust: 93,700 lbs each
- Korean
  - Pratt & Whitney PW4090, max SLS thrust:

FIELD LENGTHS

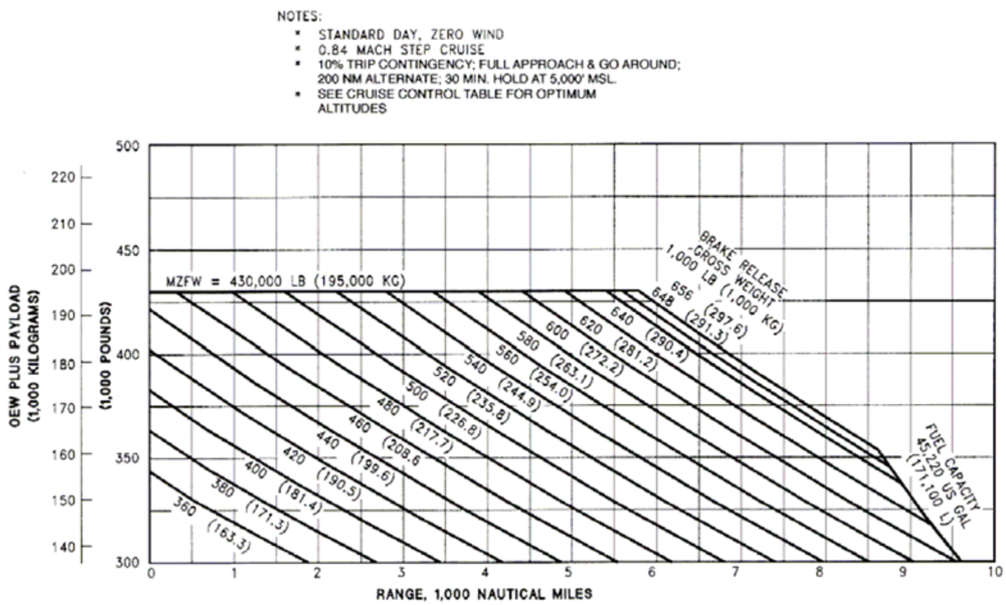
- Take Off:



- Landing:



RANGE

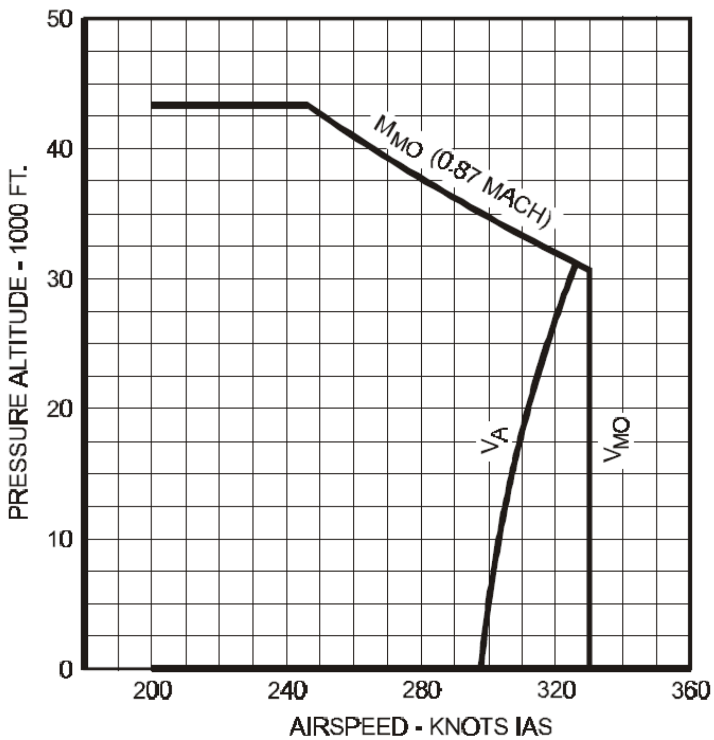


PAYLOAD/RANGE FOR 0.84 MACH CRUISE
MODEL 777-200ER

1) DETERMINE ZERO FUEL WEIGHT (OEW + PAYLOAD)
2) INTERSECTION OF ZERO FUEL WEIGHT & REQUIRED TRIP DISTANCE ON GRAPH EQUALS TAKEOFF WEIGHT
3) TAKEOFF WEIGHT - ZFW = FUEL WEIGHT
4) NORMAL LANDING WEIGHT = ZFW + 25,000 LBS

SPEEDS

- V_{MO}



- V_{REF}

VREF (KIAS)

WEIGHT	FLAP 30	FLAP 25	FLAP 20
630,000	168	173	179
610,000	165	170	176
590,000	162	167	173
570,000	160	164	170
550,000	157	162	168
530,000	154	159	165
510,000	151	156	162
490,000	148	153	159
470,000	145	150	156
450,000	142	147	152
440,000	139	144	149
430,000	136	141	146
410,000	133	138	143
390,000	131	135	140
370,000	129	132	137
350,000	126	130	134
330,000	124	128	131
310,000	122	126	129

- V_1 / V_R / V_2

Flaps	WT. 1000 Lbs.	V_1	V_R	V_2
5	630	150	159	165
	610	147	156	162
	590	144	153	160
	570	141	150	158
	550	139	147	156
	530	136	145	153
	510	133	142	150
	490	129	140	147
	470	125	137	144
	450	121	132	140
	430	116	128	137
	410	114	126	135
	390	112	124	133
	370	110	122	131
	350	109	121	128
	330	108	120	125
	310	108	119	123
15	630	150	154	160
	610	147	151	157
	590	144	148	155
	570	141	145	152
	550	139	142	149
	530	136	139	146
	510	133	136	143
	490	129	133	141
	470	125	129	138
	450	121	126	135
	430	116	123	132
	410	114	121	129
	390	112	117	126
	370	110	114	125
	350	108	111	124
	330	106	110	123
	310	106	110	122
20	630			
	610			
	590	141	143	155
	570	138	140	153
	550	136	137	150
	530	133	134	147
	510	130	131	145
	490	126	128	141
	470	122	125	137
	450	118	122	134
	430	114	119	132
	410	112	117	130
	390	110	114	131
	370	108	112	127
	350	106	110	124
	330	105	109	123
	310	105	109	122

ALTITUDES

- Standard Cruise Altitudes: FL300 – FL410
- Operational Service Ceiling: 43,100 ft

FUEL CONSUMPTION

The Boeing 777-200 has three fuel tanks – left main, right main and center main. Both side tanks have a capacity of 61,395 lbs of fuel (9,300 gallons), while the center fuel tank has a capacity of 81,859 lbs of fuel (12,400 gallons) for a total of approximately 204,649 lbs or 31,000 gallons. With a full load of fuel, the 777-200ER is capable of flying approximately 7,730 nautical miles.

	777-200ER
Range	7,730 nm
Fuel Burn Rate Factor	22.0 lbs/nm
Fuel Base Amount	12,000 lbs

- Fuel Loading Formula: **(Fuel Base Amount + (Distance * Fuel Burn Factor))** Calculation of this formula gives you the correct amount of fuel for your trip.
- As an example, for a 2000 nautical mile flight leg using the 777-200, the formula would be **(12,000 lbs + (2000NM * 22.0))** = 56,000 lbs. Please note that this does not take into account the 45 minute reserve required (approximately 14,000 lbs.)

To load fuel into your aircraft, select ***Aircraft***, then ***Fuel*** and place the correct fuel amounts in the correct tanks.

- Using standard operating procedures (*see below*) allows the pilots to estimate fuel loads closely and for company to budget appropriately.
- First hour's fuel is calculated with a 250 KIAS climb below 10,000 feet MSL, cruise climb above 10,000 feet MSL at 2,000 feet/min to FL240, then at 1,500 feet/min to FL270, then 500-1000 feet/min to cruise altitude.
- Captains ordering fuel for Delta Virtual Airlines flights should remember that more fuel equates into more drag, requiring more power. An unnecessary overabundance of fuel will only cost the company money. Fuel should be kept as close to the trip fuel required as possible.
- However, with that said **it is always the pilot's responsibility to ensure that there is enough legal fuel for the flight**. Any incident that was the result of miscalculating the fuel load will always be the fault and sole responsibility of that flights captain and crew. When in doubt, take more.
- Any trip estimations that you see in this manual are for calm winds and standard temperatures, any deviation from standard, winds or temperature will result in different actual performance for your aircraft.

- Delta Virtual Airlines aircraft should always carry a minimum fuel load for the trip to destination, **alternate** and a 60 min reserve in cruise at low altitude. Pilots are to make sure that the aircraft is always operated within all design limitations. The FAA states that you must have enough fuel to reach your destination, make a missed approach, reach your alternate and hold for 30 minutes. Delta's standard is slightly higher, but if you are expecting bad weather, pack more fuel!

When flying over long bodies of water, remember that in the event of pressurization problem or an engine failure that requires descent to 14,000 feet MSL for passenger comfort, the fuel burn for your aircraft will increase significantly and may leave you short of your initial destination. Plan accordingly!

RECOMMENDED EQUIPMENT

Delta Virtual Airlines provides 32-bit Windows aircraft fleet installer utilities for its aircraft, as part of its Fleet Library. The Boeing 777 fleet installer contains no fewer than ten aircraft – MelJet Delta Air Lines B777-200ER models in the three Delta liveries, as well as examples in Air France and Korean Air Lines colors. Two special paint schemes, the Delta 'Soaring Spirit' and the Korean World Cup 2002, are also included. The installer also contains replacement textures for the default B777-300 that comes with Microsoft Flight Simulator, in Delta, Air France and Korean Air Lines.

All aircraft use the default Boeing 777 panel included with Microsoft Flight Simulator.

These aircraft models and panels are available from the Delta Virtual Airlines Fleet Library, as well as the popular flight simulation web sites **http://www.flightsim.com** and **http://www.avsim.com/**. If you find a model or panel that you believe is superior to the ones provided in the aircraft installer, please contact us and send us a copy.

DELTA VIRTUAL AIRLINES STANDARD OPERATING PROCEDURES

These procedures are designed so that today's crews can work together effectively and safely as well as allowing some standardization of procedures for the company. By standardizing procedures the company can budget flights better financially as flights will always be the same or at least somewhat similar.

For the crews, this means that the company can schedule pilots together that have never flown together before and still maintain a safe operation. For Delta Virtual Airlines, these procedures are for the benefit of the pilots using this manual. By flying using these procedures pilots will be able to make better use of the manual and also operate the aircraft in a similar fashion company wide.

NOTE: In any circumstance where company procedure conflicts with manufacturer's recommended operation, company procedure will take precedence unless a safety factor is involved. Discretion is the responsibility of the Captain.

PRE-FLIGHT

- Establish electric power.
- Start the APU. As soon as APU has started, check APU bleed air valve open, packs auto and recirculation fans on.
- Hydraulics – Turn on engine pumps (caution lights will remain on until engine start) Turn off C1, C2 pumps, L, C1, and C2 demand pumps until gate departure.
- Load fuel planned for flight. Check that all the fuel pumps are off
- Preflight FMC computer (if available).
- Obtain clearance from Delivery
- Execute "Receiving Aircraft" checklist.

GATE DEPARTURE

- Close aircraft doors 5 minutes prior to scheduled departure time.
- Execute "Before Start" checklist.
- Cabin signs to on, turn on all hydraulics and turn on fuel pumps in all tanks with fuel. If fuel in center check, check cross-feed configuration for engine start and take-off.
- Request pushback.
- Beacon and navigation lights ON.
- Contact ramp and push back.
- Make sure throttle is at idle and start engines. Both engines can be started at the same time.
- Shutdown APU.
- Execute "After Start" checklist.
- Request taxi clearance.
- Taxi lights - as required.
- Release brakes and taxi to assigned runway. Idle thrust is sufficient to keep the aircraft rolling.

TAKEOFF

- Taxi lights OFF, landing lights ON, Strobe and wing lights ON.

- Flight Director ON.
- Auto-Throttle ARMED.
- Execute “Before Take-off” checklist.
- Once cleared for take off, advance the thrust levers to stabilize engines. Hit the TOGA switch to set TO thrust (should be set by 80 knots).
- Accelerate to V_1.
- At V_R, rotate the aircraft smoothly (2.5 deg/sec) to 15 degrees pitch up.
- At 100 ft AGL with a positive rate of climb, select the gear up.
- Maintain pitch angle to achieve IAS V_2+15.
- At acceleration height, lower the nose to 10 degrees to accelerate the aircraft and set flaps 1°. Set CLB thrust.
- At 210 KIAS, retract flaps.
- Execute after take off checklist.
- Accelerate to and maintain 250 KIAS below 10,000 ft MSL unless “no speed restrictions” issued by ATC. In this case, accelerate to cruise climb speed.

CLIMB

- Initial rate of climb: 2000 – 4000 fpm, depending on GW and CLB thrust, at 250 KIAS to 10,000 feet MSL.
- At 10,000 ft MSL:
  - decrease pitch angle to accelerate to cruise climb speed of 320 KIAS (climb rate around 2000 – 3000 fpm, depending on GW).
  - Landing lights OFF.
  - Alert the cabin crew that use of approved portable electronic devices is now approved.
  - Set seatbelt sign to auto, leave no-smoking on
- At transition altitude:
  - reset altimeters to STD pressure.

CRUISE

- Monitor flight progress, fuel flow, and engine operations.

DESCENT

- Review STAR / ILS charts and weather conditions at destination.
- Descent before 100nm may increase fuel, however T/D is at pilot’s discretion.
- Turn seat belt sign to on and reset MCP altitude to lowest cleared altitude.

- Execute “In Range” Checklist.
- Set altimeter for your destination at FL180 or local transition level.
- Descend at mach 0.84 until 320 KIAS, at which point the pilot should throttle down to 310 KIAS.
- Reduce speed down to 270 KIAS passing through FL180.
- Throttle down to 250 KIAS below 15,000 feet MSL, 240 KIAS below 12,000 feet MSL.
- Landing lights on below 10,000 feet MSL. Confirm Seat Belt sign ON.
- Set Autobrakes

APPROACH

- Arm spoilers.
- Intercept the glide slope with flaps 15°.
- Enter missed approach altitude into MCP.
- Select Gear DOWN when the glide slope is one dot above.
- Slow the aircraft on the glide slope to 160 KIAS and flaps 20°.
- Passing OM select flaps 30° and slow down to Vref (Vref+5 if using Autoland).
- Execute “Approach” Checklist.

LANDING

- Maintain pitch angle between 1 and 3 degrees at flare.
- Retard throttle at “10 feet” callout.
- After touchdown, apply reverse thrust.
- At 80 knots stow thrust reversers and lower spoilers
- Taxi off the runway.
- Obtain clearance to taxi to gate/parking area.

TAXI TO TERMINAL

- Strobes and Landing Lights OFF.
- Taxi Lights ON.
- Retract flaps.
- Flight Director OFF.
- Start APU.

SECURING THE AIRCRAFT

- Parking Brake SET.
- Taxi Lights OFF.
- Shut down the engines.
- Seat belt sign off.
- Once engines have stopped, turn off all navigation and beacon lights.
- Shut off all fuel pumps, all hydraulics except right demand pump.
- Disconnect APU bleed, Engine Bleed
- Disconnect external power and turn off APU.
- Battery OFF.
- Execute "Parking" Checklist.

NORMAL CHECKLISTS

RECEIVING AIRCRAFT

▪ Altimeters & Flt. Inst.	SET, CHECKED
▪ Parking Brake	SET
▪ Fuel Control Switches	CUTOFF
▪ Transponder	STANDBY
▪ Log Book / ETOPS	CHECKED & ON BOARD
▪ Preflight Briefing	COMPLETE

BEFORE START

▪ Seat Belt Sign	ON
▪ Fuel	___ REL, ____ ONBOARD
▪ Fuel Pumps	ON
▪ Beacon	ON
▪ MCP	SET
▪ Reference Speeds	SET
▪ Trim	___ UNITS, ZERO, ZERO
▪ Flight Controls	CHECKED

AFTER START

▪ Engine Anti-Ice	AS REQUIRED
▪ Autobrake	RTO
▪ Flaps	SET___

BEFORE TAKEOFF

▪ Departure Briefing	COMPLETE
▪ Flaps	___
▪ Transponder	TA / RA

AFTER TAKEOFF

▪ Gear	UP
▪ Flaps	UP

IN RANGE

▪ Seat Belt Sign	ON
▪ Altimeters & Flt. Inst.	SET, CHECKED
▪ Reference Speeds	SET
▪ Autobrake	SET
▪ Arrival Briefing	COMPLETE

APPROACH

▪ Radio & Courses	IDENTIFIED & SET
▪ Altimeters	SET
▪ Landing Announcement	CABIN READY

LANDING

▪ Speed Brakes	ARMED
▪ Gear	DOWN
▪ Flaps	_____

AFTER LANDING

▪ APU	AS REQUIRED
▪ Anti-Ice	AS REQUIRED
▪ Exterior Lights	AS REQUIRED
▪ Autobrake	OFF
▪ Speed Brakes	DOWN
▪ Flaps	UP
▪ Transponder	STANDBY

PARKING

▪ Fuel Control Switches	CUTOFF
▪ Parking Brake	AS REQUIRED
▪ Seat Belt Sign	OFF
▪ Fuel Pumps	OFF
▪ Beacon	OFF
▪ Flight Directors	OFF
▪ Logbook / FOB / ACARS	COMPLETED

EMERGENCY PROCEDURES

MISSED APPROACH

- Execute Missed Approach procedure if at minimums with no visual reference, or if uncomfortable with the landing. Never try and salvage a landing out of a poor final approach.
- Call for Max Thrust and flaps 20°.
- Engage autopilot missed approach course.
- Once positive rate of climb attained, select gear up.
- At 1,500 feet AGL lower nose to 10 degrees and continue with the take off procedure for cleaning the aircraft up.

REJECTED TAKE-OFF

- Set Throttles Full Reverse Thrust (Auto-brake should engage).
- Spoilers UP.
- Ensure Auto-brake has engaged and if not engage manually.
- Call the Tower and inform you are aborting Take-off.

SINGLE ENGINE DEPARTURE

- Compensate for lack of power by adding the appropriate rudder.
- Reduce climb rate to 1000 fpm as opposed to 2200 fpm.
- Reduce throttle to 75% N_1.
- Return to Origin airport.

ENGINE FIRE

- Thrust Levers CLOSED.
- Fuel Control Switch – CUT OFF.
- Engine Fire Handle – Pull on respective engines.
- APU – Start to provide second generator source.

ENGINE FAILURE SHUTDOWN MID FLIGHT

- Thrust Lever – CLOSED.
- Fuel Control Switch – CUT OFF.
- APU – Start to provide second generator source.
- Set Fuel Cross feed from tank on failed engine side.
- Reduce altitude to one where acceptable power setting can be established.
- Reduce cruise speed to Mach 0.65 or less.
- If possible continue to destination otherwise attempt to return to origin, inform ATC of intentions and situation.

SINGLE ENGINE OUT LANDING

- Use flaps 20^o and $Vref_{20}$ for approach and landing.
- Use rudder to compensate for lack of power.
- Stay on or above the glide slope at all times.
- Set auto-brakes to MAX AUTO.
- Do not use Thrust reversers on rollout.
- Proceed as if normal landing with the exceptions listed above.

TOTAL POWER LOSS

- Determine if possible to reach airfield, if not search for an appropriate field or clearing to land in.
- Stay on or above the glide slope at all times during approach, once you get below it, you can't get back up it.
- Use full flaps for landing.
- Set auto-brakes to MA AUTO.
- Continue as if normal landing.

GEAR STUCK UP

- Attempt to lower gear using back up hydraulic system.
- Inform Air Traffic Control of your situation.
- Follow ATC instructions on where to land. If options given preferences are:
    1. 5000’ Smooth/flat field
    2. Grass beside runway (assuming no taxiways to be crossed)
    3. Runway
    4. Large lake or wide river
    5. Bay
    6. Open Ocean
- Use full Flaps.
- Use lowest possible landing speed to minimize damage.
- Sound evacuation alarm on landing.

PILOT NOTES AND OBSERVATIONS

While the 777 is one of the most technologically advanced commercial aircraft in the world, pilots should always remember that the 777 is still a very large aircraft. Therefore, large aircraft rules apply to the 777. For instance, pilots should not try a very short approach with very tight turns as if they were flying a 737 or other smaller aircraft. The 777's power can offset some pilot errors, but the power can also cause problems during tight maneuvers.

One of the best aspects of the 777 is the aircraft's performance in severe weather conditions. Not only is the aircraft stable, but strong crosswinds can be handled on demand. The advanced systems of the 777 make navigating through bad weather easier than in other commercial aircraft. However, wind shear can be a problem given the aircraft's weight.

If air traffic control gives reports of wind shear on final approach, stay slightly above the listed altitude when crossing decision height to leave enough room for expected wind shear. This will give the pilot more room to recover and with the 777's advanced braking capabilities, slowing after a hot landing is not as difficult as in other large aircraft such as the 767-400, 747-400 and 340-600.

Given the high thrust output from the 777 engines, climbing at higher rates is not as difficult as in other large aircraft. However, to save on fuel consumption, pilots should always use the listed climb procedures unless instructed otherwise by air traffic control.

One of the most important attributes of a 777 pilot is knowledge of international flight rules and trans-oceanic rules given the 777's international flight schedule. Pilots of the 777 should always monitor the trans-oceanic information centers and plan their flights accordingly. While the 777 can handle severe conditions, it is the pilot's responsibility to plan effectively and safely.

It is recommended that all 777 pilots stay up-to-date on all international flight rule changes and NAT track changes. Most 777 routes are international routes and therefore the 777 pilots (along with the MD-11 pilots) should be the most knowledgeable when it comes to trans-oceanic and international flight planning.

Also, due to the international aspect of the 777, pilots in the program should keep international charts on board at all times and be aware of changes to these charts. If you need assistance finding a particular chart or have questions regarding interpretation of the charts, please contact the 777 Chief Pilot.

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