

**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

A20WE
BOEING
Revision 37

747-100 Series
747-200B Series
747-200F Series
747-200C Series
747SR Series
747SP Series
747-100B Series
747-300 Series
747-100B SUD Series
747-400 Series
747-400D Series
747-400F Series

May 31, 2006

TYPE CERTIFICATE DATA SHEET NO. A20WE

This data sheet, which is a part of Type Certificate No. A20WE, prescribes conditions and limitations under which the product for which the Type Certificate was issued meets the airworthiness requirements of the Federal Aviation Regulations.

Holder of Type Certificate: THE BOEING COMPANY
 PO Box 3707
 Seattle, WA 98124

I - 747-100 (Approved December 30, 1969) Transport Aircraft

- Engines: 4 Pratt and Whitney JT9D-3, JT9D-3A, or JT9D-7, JT9D-7A, JT9D-7F, JT9D-7J.
See NOTE 5 regarding intermixing of engines.
- Fuel: See NOTE 3.
- Engine Limits: See data pertinent to all models.
- Airspeed Limits: VMO/MMO 375/0.92 (KEAS) For other airspeed limits see the appropriate FAA Approved Airplane Flight Manual.
- C.G. Range: See the appropriate FAA Approved Airplane Flight Manual.
- Maximum Weights: See the appropriate FAA Approved Airplane Flight Manual.
- Maximum Baggage/Cargo: See the appropriate Weight and Balance Control and Loading Manual.
- Fuel and Oil Capacity: See the appropriate Weight and Balance Control and Loading Manual.
 FAA Approved Weight and Balance Control and Loading Manual: D6-13700
 FAA Approved Airplane Flight Manual: D6-13703

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I. 747-100 (continued)

<u>Model</u>	<u>Eligible Serial Numbers</u>
747-1D1	20208
747-121	19637-19661, 20347-20354
747-122	19753-19757, 19875-19883, 19925-19928
747-123	20100-20109, 20323-20326, 20390, 20391
747-124	19733-19735, 20305
747-127	20207
747-128	19749-19752, 20355, 20376-20378, 20541-20543, 20798-20800, 20954, 21141
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747-130	19746-19748
747-131	19667-19678, 20080-20083, 20320-20322
747-132	19896-19898, 20246, 20247
747-133	20013-20015, 20767, 20881
747-135	19918, 19919
747-136	19761-19766, 20269-20273, 20284, 20708-20810, 20952, 20953, 21213
747-143	19729, 19730
747-146	19725-19727, 20332, 20528, 20531, 20532, 21029
747-148	19744, 19745
747-151	19778-19787
747-156	19957, 19958

II - 747-200B (Approved December 23, 1970) Transport Aircraft

The 747-200B is an extended-range passenger version of the basic 747-100 series aircraft. The exterior geometry of the 747-200B is identical to the 747-100 and aircraft systems are essentially unchanged except for differences resulting from changes outlined below. The principal differences involve the following:

Increased strength wing structure, local body and empennage changes for increased strength, increased center wing tank fuel capacity, increased strength landing gear, modified nacelle and engine acoustic treatment, increased gross weight, and modified balance limits.

Engines: 4 Pratt and Whitney JT9D-3A, JT9D-7, JT9D-7A, JT9D-7F, JT9D-7J, JT9D-70A, JT9D-7Q, JT9D-7Q3, JT9D-7R4G2, or 4 General Electric CF6-50E, CF6-50E1, CF6-50E2, CF6-80C2B1 or 4 Rolls Royce RB211-524B2-19, RB211-524C2-19, RB211-524D4-19, RB211-524D4-39.
See NOTE 5 regarding intermixing of engines.

Fuel: See NOTE 3.

Engine Limits: See data pertinent to all models.

Airspeed Limits: VMO/MMO 375/0.92 (KEAS) For other airspeed limits see the appropriate FAA approved Airplane Flight Manual.

C.G. Range: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Weights: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Baggage/Cargo: See the appropriate Weight and Balance Control and Loading Manual.

Fuel and Oil Capacity: See the appropriate Weight and Balance Control and Loading Manual.

FAA Approved Weight and Balance Control and Loading Manual: D6-13700, 1E-4A-5, 1E-4B-5

FAA Approved Airplane Flight Manuals: D6-13703, D6-33747, D6-34747, D6-35747

<u>Model</u>	<u>Eligible Serial Numbers</u>
747-206B	19922-19924, 20398-20400, 20427, 21110, 21111, 21549, 21550, 21659, 21660, 21848, 22376, 22379, 22380
747-209B	21454, 21843, 22446, 22447

II. 747-200B (continued)

747-211B	21516, 21517
747-212B	20712, 20713, 20888, 21048, 21162, 21316, 21439, 21683, 21684, 21935-21944
747-217B	20801, 20802, 20927, 20929
747-219B	22722-22725, 22791
747-222B	23736, 23737
747-227B	21682, 21991, 22234
747-228B	21326, 21429, 21537, 21731, 21745, 21982, 22272, 22427, 22428, 22794, 23611, 23676, 24067
747-230B	20372, 20493, 20527, 20559, 21220, 21221, 21380, 21588-21591, 21643, 21644, 22363, 22669-22671, 23286, 23287, 23393, 23407, 23509, 23622
747-233B	20977, 21627
747-236B	21238-21241, 21350, 21351, 21536, 21635, 21830, 21831, 22303-22305, 22442, 23711, 23735, 23799, 24088
747-237B	19959, 19960, 20459, 20558, 21182, 21446, 21473, 21829, 21993-21995
747-238B	20009-20012, 20534, 20535, 20841, 20842, 20921, 21054, 21140, 21237, 21352-21354, 21657, 21658, 21977, 22145, 22614-22616
747-240B	21825, 22077
747-243B	19731, 19732, 20520, 22506-22508, 22510-22513, 22969, 23300, 23301, 23476
747-244B	20237-20239, 20556, 20557, 22170, 22171
747-246B	19823-19825, 20333, 20503-20505, 20529, 20530, 20924, 21030, 21031, 21678-21680, 22064, 22065, 22478, 22479, 22745, 22746, 22990, 22991, 23389
747-251B	20356-20360, 21704-21709, 22389, 23111, 23112, 23547-23549
747-256B	20137, 22238, 22239, 22454, 22455, 22764, 24071
747-257B	20116, 20117
747-258B	20135, 20274, 20704, 22254
747-259B	21730
747-267B	21746, 21966, 22149, 22429, 22530, 22872, 23048, 23120
747-269B	21541-21543, 22740
747-281B	23501, 23502, 23698, 23813, 24399
747-282B	20501, 20502, 20928, 21035
747-283B	20120, 20121, 21381, 21575, 22381, 22496
747-284B	20742, 20825
747-286B	21217, 21218
747-287B	21189, 21725-21727, 22297, 22592, 22593
747-2B2B	21614
747-2B3B	22514, 22515
747-2B4B	21097-21099
747-2B5B	20770, 20771, 21772, 21773, 22482, 22485
747-2B6B	21615
747-2D3B	21251, 21252, 22579
747-2D7B	21782-21784, 22337, 22471, 22472
747-2F6B	21832-21834, 22382
747-2G4B	23824, 23825
747-2H7B	22378
747-2J6B	23071, 23461, 23746
747-2L5B	22105-22107
747-2Q2B	21468
747-2U3B	22246-22249, 22768, 22769
747-E4A	20682-20684
747-E4B	20949

III - 747-200F (Approved March 7, 1972) Transport Aircraft

The 747-200F is a freighter version of the basic 747-200B series aircraft. The exterior geometry of the 747-200F is identical to the 747-200B and aircraft systems are essentially unchanged except for differences resulting from the changes outlined below. The principal differences involve the following:

- Upward opening nose cargo door.
- Redesigned interior for freight handling.
- Revised upper deck layout for additional crew members.
- Increased strength of main deck floor and keel beam.
- Increased strength of center wing section.
- Deletion of main deck windows and passenger doors 1 through 5 right side and 2 through 4 left side.
- T.E. flap two position load relief system.

III. 747-200F (continued)

Revised air conditioning system to suit freight requirements.
 Main deck smoke detection system.
 Optional main deck smoke detection system.
 Optional side cargo door.

Engines: 4 Pratt and Whitney JT9D-3A, JT9D-7, JT9D-7A, JT9D-7F, JT9D-7J, JT9D-70A, JT9D-7Q, JT9D-7Q3, JT9D-7R4G2, or 4 General Electric CF6-50E, CF6-50E1, CF6-50E2 or 4 Rolls Royce RB211-524B2-19, RB211-524C2-19, RB211-524D4-19, RB211-524D4-39.
See NOTE 5 regarding intermixing of engines.

Fuel: See NOTE 3.

Engine Limits: See data pertinent to all models.

Airspeed Limits: VMO/MMO 375/0.92 (KEAS) For other airspeed limits see the appropriate FAA Approved Airplane Flight Manual.

C.G. Range: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Weights: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Baggage/Cargo: See the appropriate Weight and Balance Control and Loading Manual.

Fuel and Oil Capacity: See the appropriate Weight and Balance Control and Loading Manual.
 FAA Approved Weight and Balance Control and Loading Manual: D6-13700

FAA Approved Airplane Flight Manuals: D6-13703, D6-33747, D6-35747, D6-34747

<u>Model</u>	<u>Eligible Serial Numbers</u>
747-209F	22299, 24308
747-212F	24177
747-221F	21743, 21744
747-228F	20887, 21255, 21576, 21787, 22678, 22939, 24158, 24735, 24879, 25266
747-230F	20373, 21592, 22668, 23348, 23621, 24138
747-236F	22306
747-243F	22545
747-245F	20826, 20827, 21764, 21841, 22150, 22151
747-246F	21034, 21681, 22063, 22477, 22989, 23391, 23641
747-249F	21827, 21828, 22237, 22245
747-251F	21120-21122, 21321, 22388, 23887, 23888
747-258F	21737
747-267F	23864, 24568
747-268F	24359
747-281F	23138, 23139, 23350, 23919, 24576, 25171
747-2B3F	21515, 21835
747-2B5F	22480, 22481, 22486, 24195, 24196
747-2J6F	24960
747-2J9F	21486, 21487, 21507, 21514, 21668
747-2R7F	21650, 22390
747-2S4F	22169

IV - 747-200C (Approved April 17, 1973) Transport Aircraft

The 747-200C is a convertible version of the basic 747-200B series aircraft. The exterior geometry of the 747-200C is identical to the 747-200B and aircraft systems are essentially unchanged except for differences resulting from the changes outlined below. The principal differences involve the following:

Upward opening nose cargo door.
 Redesigned interior permitting all passenger, all cargo, or mixed passenger/cargo configurations.
 Increased strength of main deck floor and keel beam.

IV. 747-200C (continued)

Increased strength of center wing section.
 T.E. flap two position load relief system.
 Main deck smoke detection system.
 Optional side cargo door.

Engines: 4 Pratt and Whitney JT9D-3A, JT9D-7, JT9D-7A, JT9D-7F, JT9D-7J, JT9D-70A, JT9D-7Q, JT9D-7Q3, JT9D-7R4G2, or 4 General Electric CF6-50E, CF6-50E1, CF6-50E2, or 4 Rolls Royce RB211-524B2-19, RB211-524C2, RB211-524D4.
See NOTE 5 regarding intermixing of engines.

Fuel: *See NOTE 3.*

Engine Limits: See data pertinent to all models.

Airspeed Limits: VMO/MMO 375/0.92 (KEAS) For other airspeed limits see the appropriate FAA Approved Airplane Flight Manual.

C.G. Range: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Weights: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Baggage/
 Cargo: See the appropriate Weight and Balance Control and Loading Manual.

Fuel and Oil Capacity: See the appropriate Weight and Balance Control and Loading Manual.

FAA Approved Weight and Balance Control and Loading Manual: D6-13700

FAA Approved Airplane Flight Manuals: D6-13703, D6-33747

<u>Model</u>	<u>Eligible Serial Numbers</u>
747-21AC	23652, 24134
747-258C	21190, 21594
747-270C	21180, 21181, 22366
747-271C	21964, 21965, 22403
747-273C	20651-20653

V - 747SR (Approved September 26, 1973) Transport Aircraft

The 747SR is basically a 747-100 series airplane with certain modifications to improve the fatigue life.

Engines: 4 General Electric CF6-45A, CF6-45A2, CF6-50E2 or 4 Pratt and Whitney JT9D-7, JT9D-7A.
See NOTE 5 regarding intermixing of engines.

Fuel: *See NOTE 3.*

Engine Limits: See data pertinent to all models.

Airspeed Limits: VMO/MMO 375/0.92 (KEAS) For other airspeed limits see the appropriate FAA Approved Airplane Flight Manual.

C.G. Range: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Weights: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Baggage/Cargo: See the appropriate Weight and Balance Control and Loading Manual.

Fuel and Oil Capacity: See the appropriate Weight and Balance Control and Loading Manual.
 FAA Approved Weight and Balance Control and Loading Manual: D6-13700

FAA Approved Airplane Flight Manuals: D6-13703, D6-33747

<u>Model</u>	<u>Eligible Serial Numbers</u>
747SR-46	20781-20784, 20923, 21032, 21033
747SR-81	21604-21606, 21922-21925, 22291-22294, 22594, 22595, 22709-22712

VI - 747SP (Approved February 4, 1976) Transport Aircraft

The 747SP (Special Performance) is basically a long-range derivative of the 747-100. The exterior geometry of the 747SP has been changed from the 747-100. Aircraft systems are essentially unchanged except for differences resulting from changes outlined below. The principal differences involve the following:

- Overall airplane length is 47'1" shorter.
- Body is 48'5" shorter.
- Overall airplane height is approximately 2'11" higher.
- Vertical tail has been extended 5 feet.
- Horizontal tail has been extended on each end.
- Flaps have been modified to a single variable pivot flap.
- Main deck doors are reduced to 4 on each side.

Engines: 4 Pratt and Whitney JT9D-3, JT9D-3A, JT9D-7, JT9D-7A, JT9D-7F, JT9D-7J, or 4 Rolls Royce RB211-524B2-19, RB211-524C2-19, RB211-524D4-19, RB211-524D4-39.
See NOTE 5 regarding intermixing of engines.

Fuel: See NOTE 3.

Engine Limits: See data pertinent to all models.

Airspeed Limits: VMO/MMO 375/0.92 (KEAS) For other airspeed limits see the appropriate FAA Approved Airplane Flight Manual.

C.G. Range: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Weights: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Baggage/Cargo: See the appropriate Weight and Balance Control and Loading Manual.

Fuel and Oil Capacity: See the appropriate Weight and Balance Control and Loading Manual.
FAA Approved Weight and Balance Control and Loading Manual: D6-33800

FAA Approved Airplane Flight Manuals: D6-34047, D6-36747

<u>Model</u>	<u>Eligible Serial Numbers</u>
747SP-09	21300, 22298, 22547, 22805
747SP-21	21022-21026, 21441, 21547, 21548, 21648, 21649
747SP-27	21785, 21786, 21992, 22302
747SP-31	21961-21963
747SP-38	22495, 22672
747SP-44	21132-21134, 21253, 21254, 21263
747SP-68	21652, 22503, 22750
747SP-70	22858
747SP-86	20998, 20999, 21093, 21758
747SP-94	21174, 21175
747SP-B5	22483, 22484
747SP-J6	21932-21934
747SP-Z5	23610

VII - 747-100B (Approved August 1, 1979) Transport Aircraft

The 747-100B is basically a 747SR series airplane with certain modifications to permit increases in maximum permissible operating weights.

Engines: 4 Pratt and Whitney JT9D-7A, JT9D-7F, or 4 Rolls Royce RB211-524B2-19, RB211-524C2-19, RB211-524D4-19, RB211-524D4-39.
See NOTE 5 regarding intermixing of engines.

Fuel: See NOTE 3.

Engine Limits: See data pertinent to all models.

VII. 747-100B (continued)

Airspeed Limits: VMO/MMO 375/0.92 (KEAS) For other airspeed limits see the appropriate FAA Approved Airplane Flight Manual.

C.G. Range: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Weights: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Baggage/Cargo: See the appropriate Weight and Balance Control and Loading Manual.

Fuel and Oil Capacity: See the appropriate Weight and Balance Control and Loading Manual.

FAA Approved Weight and Balance Control and Loading Manual: D6-13700

FAA Approved Airplane Flight Manuals: D6-13703, D6-35747

<u>Model</u>	<u>Eligible Serial Numbers</u>
747-146B	22066, 22067, 23150
747-168B	22498-22502, 22747-22749
747-186B	21759

See NOTE 7.

VIII - 747-300 (Approved March 1, 1983) Transport Aircraft

The 747-300 is basically a 747-200 series airplane with a stretched upper deck.

Engines: 4 Pratt and Whitney JT9D-7R4G2 or 4 General Electric CF6-50E2, CF6-80C2B1, or 4 Rolls Royce RB211-524B2-19, RB211-524C2-19, or RB211-524D4-19, RB211-524D4-39.
See NOTE 5 regarding intermixing of engines.

Fuel: See NOTE 3.

Engine Limits: See data pertinent to all models.

Airspeed Limits: VMO/MMO 375/0.92 (KEAS) For other airspeed limits see the appropriate FAA Approved Airplane Flight Manual.

C.G. Range: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Weights: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Baggage/Cargo: See the appropriate Weight and Balance Control and Loading Manual.

Fuel and Oil Capacity: See the appropriate Weight and Balance Control and Loading Manual.
FAA Approved Weight and Balance Control and Loading Manual: D6-13700

FAA Approved Airplane Flight Manuals: D6-13703, D6-33747, D6-35747

<u>Model</u>	<u>Eligible Serial Numbers</u>
747-306	23056, 23137, 23508
747-312	23026-23033, 23243-23245, 23409, 23410, 23769
747-329	23439, 24837
747-337	24159, 24160
747-338	23222-23224, 23408, 23688, 23823
747-341	23394, 23395, 24106-24108
747-344	22970, 22971
747-346	23067, 23068, 23149, 23151, 23482, 23638-23640, 23967-23969, 24018, 24019, 24156
747-357	22704, 22705, 22995, 22996, 23751
747-366	24161, 24162
747-367	23221, 23392, 23534, 23709, 23920, 24215
747-368	23262-23271

VIII. 747-300 (continued):

<u>Model</u>	<u>Eligible Serial Numbers</u>
747-3B3	22870, 23413, 23480
747-3B5	22487, 22489, 24194
747-3D7	23721, 23722
747-3G1	23070
747-3H6	23600

IX - 747-100B SUD (Approved March 24, 1986) Transport Aircraft

The 747-100B SUD is basically a 747-100B series airplane with a stretched upper deck.

Engines:	4 Pratt and Whitney JT9D-7A See NOTE 5 regarding intermixing of engines.
Fuel:	See NOTE 3.
Engine Limits:	See data pertinent to all models.
Airspeed Limits:	VMO/MMO 375/0.92 (KEAS) For other airspeed limits see the appropriate FAA Approved Airplane Flight Manual.
C.G. Range:	See the appropriate FAA Approved Airplane Flight Manual.
Maximum Weights:	See the appropriate FAA Approved Airplane Flight Manual.
Maximum Baggage/Cargo:	See the appropriate Weight and Balance Control and Loading Manual.
Fuel and Oil Capacity:	See the appropriate Weight and Balance Control and Loading Manual.
FAA Approved Weight and Balance Control and Loading Manual:	D6-13700

FAA Approved Airplane Flight Manual: D6-13703

<u>Model</u>	<u>Eligible Serial Numbers</u>
747-146B SUD	23390, 23637

DATA PERTINENT TO ALL MODELS, EXCEPT MODEL 747-400 SERIES

Engine Limits: (Pratt & Whitney)	<u>JT9D-3</u>	<u>JT9D-3A</u>	<u>JT9D-7</u>	<u>JT9D-7A</u>	<u>JT9D-7F</u>	<u>JT9D-7J</u>
Takeoff static thrust standard day, seal level conditions (in pounds); Dry (5 min) (Ideal)	43,500 lbs.	43,500 lbs.	45,500 lbs.	46,150 lbs.	46,750 lbs.	48,650 lbs.
With water injection (2 1/2 min.)	43,500 lbs.	45,000 lbs.	47,000 lbs.	47,670 lbs.	48,650 lbs.	
Maximum continuous static thrust, standard day, sea level condition: (Ideal)	<u>JT9D-3</u>	<u>JT9D-3A</u>	<u>JT9D-7</u>	<u>JT9D-7A</u>	<u>JT9D-7F</u>	<u>JT9D-7J</u>
	36,400 lbs.	36,400 lbs.	39,650 lbs.	40,080 lbs.	39,200 lbs.	40,200 lbs.

Data Pertinent to all Models, except Model 747-400 series (continued):

Engine Limits: (Pratt & Whitney)	<u>JT9D-70A</u>	<u>JT9D-7Q</u>	<u>JT9D-7Q3</u>	<u>JT9D-7R4G2</u>
Takeoff static thrust standard day, sea level conditions (in pounds) Dry (5 min) (Ideal)	51,140 lbs.	51,100 lbs.	51,100 lbs.	54,750 lbs.
Maximum continuous static thrust: standard day, sea level condition: (Ideal)	44,290 lbs.	44,290 lbs.	44,290 lbs.	50,200 lbs.
Engine Limits (General Electric)	CF6-50E CF6-50E1 <u>CF6-50E2</u>	CF6-45A <u>CF6-45A2</u>		<u>CF6-80C2B1</u>
Engine thrust ratings: (Ideal)				
Takeoff (5 min)	51,800 lbs.	45,600 lbs.		55,980 lbs.
Maximum continuous	46,300 lbs.	43,250 lbs.		
Engine Limits: (Rolls Royce)		<u>RB211-524B2-19</u>		
Rated takeoff thrust (5 min.)		49,120 lbs.		
Sea level static conditions (Ideal)				
Rated Maximum continuous thrust		44,780 lbs.		
Engine Limits: (Rolls Royce)	<u>RB211-524C2-19</u>	<u>RB211-524D4-19</u> <u>RB211-524D4-39</u>		
Rated takeoff thrust (5 min.)	50,600 lbs.	51,980 lbs.		
Sea level static conditions (Ideal)				
Rated Maximum continuous thrust	46,120 lbs.	47,230 lbs.		

For engine operating limits see the FAA Approved Airplane Flight Manual under the serial numbers section of this data sheet or the appropriate engine type certificate data sheet:

Pratt & Whitney	E3NE and E20EA
General Electric	E23EA and E13NE
Rolls Royce	E12EU

Thrust Setting: The appropriate EPR or N1 thrust setting curve in Section 4 of the Airplane Flight Manual must be used for control of engine thrust.

Maximum Operating Altitude: The maximum operating altitude is 45,100 feet.

Minimum Crew: For all flights, 3 persons (pilot, copilot, flight engineer). When passengers are being carried, one attendant is required at each No. 3 over-wing exit. At least one flight attendant is required on the upper deck during taxi, takeoff and landing when passengers occupy the upper deck.

Maximum Passengers: For 747SR and 747-100, -100B, -200B, -200C airplanes the total passenger capacity is limited to:
550 with 5 pair of Type "A" exits on main deck
440 with 4 pair of Type "A" exits on main deck

Data Pertinent to all Models, except Model 747-400 series (continued):

Upper deck passenger capacity is limited to:
 8 with one exit on the upper deck 16 with one exit, improved slide and smoke barrier
 24 with one exit, straight stairway, smoke barrier, and escape slide capable of operation in 25 kt.
 wind
 32 if in compliance with the requirements of Special Condition No. 25-61-NW-1
 45 if in compliance with the requirements of Special Condition No. 25-71-NW-3
 5 persons on upper deck per Exemption 1870D.
 (747-100 and 747-200)

For 747SP the total passenger capacity is limited to:
 400 passengers with the same upper deck limits as listed above.

For 747-200F the total passenger capacity is limited to:
 19 passengers on upper deck with 2 doors, 25 knot slides, C.G. Limitation, and
 compliance shown with AD 93-07-15; or 19 persons on upper deck equipped with
 emergency descent reels and harnesses, 2 doors and 25 knot slides.
 5 persons on upper deck per Exemption 1870D.

For 747-300 and 747-100B SUD the total passenger capacity is limited to:
 660 passengers with 5 pair of Type "A" exits on the main deck plus one pair of Type "A"
 exits on the upper deck. Main deck limited to 550 and upper deck limited to 110 if in
 compliance with the requirements of modified Special Condition No. 25-71-NW-3,
 transmitted to Boeing by FAA letter dated August 3, 1981.) See NOTE 9.

550 passengers with 4 pair of Type "A" exits on the main deck limited to 440 and upper
 deck limited to 110 if in compliance with the requirements of modified Special
 Condition No. 25-71-NW-3, transmitted to Boeing by FAA letter dated August 3, 1981.

Required Equipment: The basic required equipment as prescribed in the applicable airworthiness regulations (See
 Certification Basis) must be installed in the aircraft for certification. The required equipment is
 noted in the Type Design Data.

Datum: Balance Arm Datum corresponds to Body Station 0 and is 90 inches (290 inches on SP) forward of
 nose. All production stations coincide numerically with arms except on 747SP.
 Horizontal distance of datum to nose gear jack points in 384.7 inches. (584.7 inches on 747SP)

Mean Aerodynamic
 Chord (MAC): MAC length is 327.8 inches. Leading edge of MAC is 1258 inches aft of datum.

Level Means: A plumb-bob attachment and leveling provision scale are provided in the R.H. body wheel well at
 BS 1444.0. They are referred to as ARM on the 747SP and are a true measure in inches aft of a
 forward reference datum which is located 290 inches ahead of the airplane nose.
 Balance ARMS have the following relationship with Body Stations on the 747SP:

BODY STATION INCHES	ADJUSTMENT INCHES	ARM INCHES
90 to 800 (800 to 1,000 Section removed)	+200	290 to 1,000
1,000 to 1,480 (1,480 to 1,640 Section removed)	0	1,000 to 1,480
1,640 to 2,140 (2,140 to 2,360 Section removed)	-160	1,480 to 1,980
2,360 to 2,792	-380	1,980 to 2,412

Data Pertinent to all Models, except Model 747-400 series (continued):Control Surface
Movements:

To insure proper operation of the airplane, the movement of the various control surfaces must be carefully controlled by proper rigging of the flight control systems. The airplane must, therefore, be rigged according to the following FAA-approved data:

Boeing Drawing Numbers		
65B04001	Control Installation	Aileron and Spoiler
65B04002	Control Installation	Elevator
65B04003	Control Installation	Rudder
65B04004	Control Installation	Stabilizer Trim
65B04006	Control Installation	Rudder Trim
65B04007	Control Installation	Wing Flap
65B04016	Control Installation	Speed Brakes

Service Information:

Boeing Reports D6-13592, "Structural Repair Manual", (except for 747SP) is FAA-Approved. Boeing Reports D6-34024, "Structural Repair Manual", is FAA-Approved for the 747SP. Service Bulletins and other service information, when FAA-Approved, will carry a statement to the effect.

Certification Basis:

FAR Part 1, FAR Part 21, FAR Part 36, FAR Part 25 effective February 1, 1965, Amendments 25-1 through 25-8 plus 25-15, 25-17, 25-18, 25-20, and Amendment 25-39 transmitted by FAA letter dated February 4, 1977, and special conditions summarized for record purposes as enclosed with FAA letter to The Boeing Company dated February 20, 1970. Special Condition 4A, revised to apply to airplanes with the landing gear load evener system deleted, was recorded as attachment to an FAA letter to The Boeing Company dated May 12, 1971.

Amendment 25-46, Section 25.803(d) transmitted by FAA letter to The Boeing Company dated September 2, 1983. This is limited to all passenger configurations and 6/7 pallet combi configurations for Model 747-100, -200, and -300 series airplanes.

Special Condition No. 25-61-NW-1 for occupancy not to exceed 32 passengers on the upper deck of airplanes with spiral staircase was transmitted to The Boeing Company by FAA letter dated February 26, 1975.

Special Condition No. 25-71-NW-3 for occupancy not to exceed 45 passengers on the upper deck of airplanes with straight segmented stairway was transmitted to The Boeing Company by FAA letter dated September 8, 1976.

Modification of Special Condition No. 25-71-NW-3 for occupancy not to exceed 110 passengers on the upper deck of airplanes with straight segmented stairway was transmitted to The Boeing Company by FAA letter dated August 3, 1981.

RB211 engine oil filter system complies with FAR 25.1019 and 25.1305(c)(7) of Amendment 25-36.

Special Condition No. 25-77-NW-4 (modification of the autopilot system to approve the airplane for use of the system under category IIIB landing conditions) was transmitted to The Boeing Company by FAA letter dated July 8, 1977.

Special Condition No. 25-ANM-16 for installation of an overhead crew rest area, occupancy not to exceed 10 crewmembers. FAA approved procedures required for compliance with paragraph 13 of the Special Condition are located in Boeing Document D926U303, Appendix D.

Exemptions from FAR Part 25: No. 1013A dated December 24, 1969 - Exemption from FAR 25.471(b) - to allow lateral displacement of the C.G. from the airplane centerline.

Exemption No. 1870D dated April 3, 1991, allows non-crewmembers on the upper deck of 747-200F, 747-200C, and certain 747-100 airplanes when in the main deck cargo configuration.

Data Pertinent to all Models, except Model 747-400 series (continued):

Exemption No. 3035 dated September 9, 1980 - Exemption from section 25.1301(a) and 37.120(a) of the Federal Aviation Regulations - To permit the type certification of specified Boeing Model 747-206B airplanes with: (1) location of the flap position indicator in the lower left-hand corner of the pilot's center instrument panel and (2) servo altimeters configured with dial markings at 50-foot increments. This exemption is subject to the following conditions: (1) It is valid only for airplanes with serial numbers 22376, 22379, and 22380. (2) The type certificate must contain an operating limitation that it is valid only for airplanes being operated by KLM Royal Dutch Airlines with crews trained in the specific configuration.

Compliance with the following optional requirements has been established:

Ditching Provisions FAR 25.801
Ice Protection Provisions FAR 25.1419

Equivalent Safety Findings exist with respect to the following Regulations:

For Model 747-100, -200B, -200F, -200C, 747SR, 747SP, -100B, -300, -100B SUD:
25.1415(d) Emergency Locator Transmitter (ELT)
25.561(b)(3)(ii) Passenger (and non-crewmember) seat track bending calculations only per FAA Memorandum TD6633SE-T-C-1, dated January 26, 2004.

For 747-300 only:

25.812(k)(2)
25.815

For Model 747-100, -200, -300 Series:

25.773(b)(2)(i), Amendments 25-1 through 25-67
25.811(f) Emergency Exit Marking

Production Basis: Production Certificate No. 700.

Equipment: The basic required equipment as prescribed in the applicable airworthiness regulations (See Certification Basis) must be installed.

X - 747-400 (Approved January 10, 1989) Transport Aircraft

The 747-400 is basically 747-300 series airplane with wing extension and winglets, additional fuel tank in the horizontal stabilizer, additional auxiliary fuel tank in the forward section of the cargo bay and reconfigured cockpit for two man crew and associated automation and advanced avionics.

Engines: 4 Pratt and Whitney PW4000 Series, General Electric CF6-80C2B1F, CF6-80C2B5F; or Rolls Royce RB211-524G2-19, RB211-524G3-19, RB211-524H2-19, RB211-524G2-T-19, RB211-524G3-T-19, RB211-524H2-T-19.
WARNING: To prevent unsafe airplane handling characteristics, PW4000 series engines with electronic engine control (EEC) part number 791100-14-102 (Pratt & Whitney part number 54D043) must not be installed on the same airplane as PW4000 series engines that have the ring case compressor configuration. This combination of engine configurations is not approved because of a significant difference in engine acceleration rates and the effect of that difference on airplane handling characteristics. Ring case compressor equipped engines were approved with the same engine model number as previously approved PW4000 configurations, and must be identified by the presence of a "/A5" marked at the end of the "INSTL ARR" block on the engine data plate. SEE NOTE 5 for further information regarding intermixing engines

Engine Thrust Limits: See data pertinent to all Model 747-400's

Fuel: See NOTE 3.

Airspeed Limits: VMO/MMO 365/0.92 (KCAS) For other airspeed limits see the appropriate FAA Approved Airplane Flight Manual.

X. 747-400 (continued):

C.G. Range: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Weights: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Baggage/Cargo: See the appropriate Weight and Balance Control and Loading Manual.

Fuel/Oil Capacity: See the appropriate Weight and Balance Control and Loading Manual.

FAA Approved Weight and Balance Control and Loading Manual: D043U400

FAA Approved Airplane Flight Manuals: D6-U10001, D6-U10002, and D6-U10003

<u>Model</u>	<u>Eligible Serial Numbers</u>
747-406	23982, 23999-24001, 24201, 24202, 24517, 24518, 25086, 25087, 25356, 25413, 26372-26374, 27202, 28195, 28196, 28459, 28460, 30454, 30455
747-409	24309-24313, 27965, 28709-28712, 29030, 29031, 29219, 29906, 33734-33737
747-412	24061-24066, 24226, 24227, 24975, 25068, 25127, 25128, 26547-26552, 26554-26557, 26562, 27066-27070, 27132-27134, 27137, 27178, 27217, 28022, 28023, 28025, 28028, 28029, 28031, 28032, 29950
747-419	24386, 24855, 25605, 26910, 29375
747-422	24322, 24363, 24380-24385, 25158, 25224, 25278, 25279, 25379, 25380, 25395, 26875-26881, 26890, 26892, 26899-26903, 26906, 26908, 28715-28717, 28810-28813, 29166-29168, 30023
747-428	24969, 24990, 25238, 25302, 25344, 25599-25602, 25628-25630, 32868, 32869, 32871
747-430	23816, 23817, 24285-24288, 24715, 24740, 24741, 24761, 24966, 24967, 25045-25047, 26425-26427, 28086, 28284-28287, 29101, 29492, 29493, 29868-29872, 32445
747-433	24998, 25074, 25075
747-436	23908-23911, 24047-24058, 24447, 24629, 24630, 25406, 25427, 25432, 25434, 25435, 25809, 25810-25814, 25817-25824, 27090-27092, 27349, 27350, 27478, 28700, 28848-28859, 27078, 27164, 27165, 27214, 28094, 28095
747-437	24354, 24373, 24406, 24481-24483, 24779, 24806, 24887, 24974, 25067, 25151, 25245, 25315, 25544-25547, 25564-25566, 32909-32914
747-441	24956, 24957
747-443	30885, 32337-32340
747-444	24976, 25152, 26637, 26638, 28468, 29119
747-446	24423-24427, 24777, 24784, 24870, 24885, 24886, 25064, 25212, 25260, 25308, 26341-26344, 26346, 26350, 26353, 26355, 26356, 26359-26362, 27099, 27100, 27645, 27646, 27648, 27650, 29899
747-451	23719, 23720, 23818-23821, 24222-24225, 26473, 26474, 26477, 30267-30269, 33001, 33002
747-458	26055, 26056, 27915, 29328
747-467	23814, 23815, 24631, 24850, 24851, 24925, 24955, 25082, 25211, 25351, 25869-25874, 27117, 27230, 27595
747-468	28339-28343
747-469	27338, 27663
747-475	24883, 24895, 24896, 25422
747-481	24801, 24833, 24920, 25135, 25207, 25641, 25645, 28282, 28283, 29262, 29263, 30322
747-41R	29406, 32745, 32746
747-45E	26062, 27062, 27063, 27141, 27142, 27154, 27173, 27174, 27898, 27899, 28092, 28093, 29061, 29111, 29112
747-47C	24730, 24731
747-48E	25405, 25452, 25777-25780, 25782, 25784, 28551, 28552
747-4B3	24154, 24155
747-4B5	24198-24200, 24619, 24621, 25205, 25275, 26392-26398, 26400, 26402-26405, 26407, 26409, 26412, 27072, 27177, 27341, 27662, 28096, 28335
747-4D7	24458, 24459, 24993, 25366, 26609, 26610, 26615, 26616, 27093, 27723- 27725, 28705, 28706, 32369-32370 , 33770, 33771
747-4F6	27261, 27262, 27602, 27827, 27828, 28959-28961
747-4H6	24315, 24405, 24836, 25126, 25699-25703, 27042-27044, 27672, 28426-28428, 28432, 28433, 28435, 29900, 29901, 30158
747-4J6	24346-24348, 25879-25883, 28754-28756, 29070, 29071, 30158
747-4P8	33684

X. 747-400 (continued):

747-4Q3	29486
747-4Q8	24958, 26255, 26326, 28194, 28757
747-4U3	25704, 25705

For engine operating limits see the FAA Approved Airplane Flight Manual referenced under Section X of this data sheet or the appropriate engine type certificate data sheet:

Pratt and Whitney:	E24NE
General Electric:	E13NE
Rolls Royce:	E30NE

Thrust Setting: The appropriate EPR or N1 thrust setting curves in Section 4 of the Airplane Flight Manual (AFM) must be used for control of engine thrust.

Maximum Operating Altitude: 45,100 feet

Minimum Crew: For all flights, 2 persons (pilot, copilot). When passengers are being carried, one attendant is required at each No. 3 over-wing exit. At least one flight attendant is required on the upper deck during taxi, takeoff, and landing when passengers occupy the upper deck.

Maximum Passengers: For 747-400 the total passenger capacity is limited to:

660 passengers with 5 pair of Type "A" exits on main deck plus one pair of Type "A" exits on the upper deck. (Main deck limited to 550 and upper deck limited to 110 if in compliance with the requirements of modified Special Condition Number 25-71-NW-3, transmitted to Boeing by FAA letter dated August 3, 1981.) See NOTE 9.

Required Equipment: The basic required equipment as prescribed in the applicable airworthiness regulations (See Certification Basis) must be installed in the aircraft for certification. The required equipment is noted in the Type Design Data.

Datum: Balance Arm Datum corresponds to Body Station 0 and is 90 inches forward of nose. All production stations coincide numerically with arms. Horizontal distance of datum to nose gear jack points is 384.7 inches.

MAC: MAC length is 327.8 inches. Leading edge of MAC is 1258 inches aft of datum.

Level Means: A plumb-bob attachment and leveling provision scale are provided in the R.H. body wheel well at BS 1444.0.

Control Surface Movements: To insure proper operation of the airplane, the movement of the various control surfaces must be carefully controlled by proper rigging of the flight control systems. The airplane must, therefore, be rigged according to the following FAA-approved data:

Boeing Drawing Numbers:

251U1001	Rigging Procedures Aileron and Spoiler
251U2001	Rigging Procedures Elevator
251U3002	Rigging Procedures Rudder
251U4001	Rigging Procedures Stabilizer Trim
253U5001	Rigging Procedure - Control Stand (Includes flap control assembly)
256U2001	Rigging Procedures Leading Edge Flaps
256U3001	Rigging Procedures Trailing Edge Flaps
251U1003	Rigging Procedures Speed Brakes

Service Information: Boeing Report D6-34U102, "Structural Repair Manual," is FAA-approved. Service Bulletins and other Service information, when FAA-approved, will carry a statement to that effect.

X. 747-400 (continued):

Certification Basis: Part 25 of the FAR, effective February 1, 1965, as amended by Amendments 25-1 through 25-59 with the following exceptions:

<u>SECTION NO.</u>	<u>TITLE</u>	<u>THRU AMDT.25-</u>
25.107	Takeoff speeds	41
25.109	Accelerate-stop distance	41
25.149	Minimum control speed	41
25.251	Vibration and buffeting	22
25.305	Strength and deformation	22
25.331	General	45
25.351	Yawing conditions	45
25.365	Pressurized cabin loads	53
25.571	Damage-tolerance and fatigue evaluation of structure	9
25.607	Fasteners	22
25.631	Bird Strike damage	(NA)**
25.657	Hinges	22
25.675	Stops	37
25.683	Operation tests	22
25.772	Pilot compartment doors	46
25.773(b)(2)(ii)	Pilot Compartment View	72
25.783	Doors	53
25.785	Seats, berths, safety belts, harnesses	50
25.787	Stowage Compartments	31
25.789	Retention of items of mass in passenger and crew compartments	45
25.809	Emergency exit arrangement	45
25.812	Emergency lighting	31
25.832	Cabin ozone concentration	(NA)**
25.858	Cargo compartment fire detections systems	(NA)**
25.1103	Induction system ducts and air duct systems	45
25.1401	Anticollision light system	26
25.1438	Pressurization and pneumatic systems	(NA)**
25.1529	Instructions for continued airworthiness	(NA)**

**Not applicable - The requirements of this section do not apply to this type design because the original certification basis, which did not include this section, has been determined to be adequate.

Part 36 of the FAR as amended by Amendments 36-1 through 36-15, and any later amendments in existence at the time of certification.

Special Federal Aviation Regulation (SFAR) 27, as amended by Amendments 27-1 through 27-6 and any later amendments in existence at the time of type certification.

The following special conditions, exemptions; and equivalent safety findings, which are part of the Model 747-300 certification basis, are also part of the certification basis for the Model 747-400.

The special conditions include those enclosed with FAA letter to The Boeing Company dated February 20, 1970, and the following:

1. Special Condition 4A, revised to apply to airplanes with the landing gear load evener system deleted, was recorded as an enclosure to an FAA letter to The Boeing Company dated May 12, 1971.
2. Special Condition No. 25-61-NW-1 for occupancy not to exceed 32 passengers on the upper deck of airplanes with spiral staircase was transmitted to The Boeing Company by FAA letter dated February 26, 1975.
3. Special Condition No. 25-71-NW-3 for occupancy not to exceed 45 passengers on the upper deck of airplanes with straight segmented stairway was transmitted to The Boeing Company by FAA letter dated September 8, 1976.

X. 747-400 (continued):

4. Modification of Special Condition No. 25-71-NW-3 for occupancy not to exceed 110 passengers on the upper deck of airplanes with straight segmented stairway was transmitted to The Boeing Company by FAA letter dated August 3, 1981.
5. Special Condition No. 25-77-NW-4 (modification of the auto pilot system to approve the airplane for use of the system under Category IIIb landing conditions) was transmitted to The Boeing Company by FAA letter dated July 8, 1977.
6. Special Condition No. 25-ANM-16 for use of an overhead crew rest area, occupancy not to exceed ten crewmembers was transmitted to The Boeing Company by FAA letter dated November 19, 1987. FAA approved procedures required for compliance with paragraph 13 of the Special Condition are located in Boeing Document D926U303, Appendix D.
7. Special Condition No. 25-ANM-24 applicable to flight deck displays and propulsion control system was provided to Boeing on December 22, 1988.
8. Special Condition No. 25-ANM-25 which established lightning and radio frequency (RF) energy protection requirements was provided to Boeing on December 22, 1988.

Exemptions from FAR Part 25:

No. 1013A dated December 24, 1969 - Exemption from Section 25.471(b) to allow lateral displacement of the C.G. from the airplane centerline.

The following optional requirements, which are part of the Model 747-300 certification basis, apply also to the 747-400:

Ditching Provisions Section 25.801
Ice Protection Provisions Section 25.1419

The following equivalent safety findings, previously made for earlier models under the provisions of Section 21.21(b)(1), are also applicable to the Model 747-400:

Width of Aisle	Section 25.815
Pilot Compartment View	Section 25.773
Use of 1-g Stall Speed (nonstructural items)	Several (747-400 only)
Use of 1-g Stall Speed (structural items)	Several (747-400 only)
Position Light Distribution and Intensities	Section 25.1389(b)(3) (747-400 only)
Fire-detection System	Section 25.1203 See Note 1.
Pressure Relief	Section 25.1103(d) See Note 1.
Emergency Locator Transmitter (ELT)	Section 25.1415(d)
Emergency Exit Marking	Section 25.811(f)

X. 747-400 (continued):

Note 1: Applies to RB211-524G/H series engine installations only.

Equivalent Safety Findings exist with respect to the following Regulation:
25.773(b)(2)(i), Amendments 25-1 through 25-67 (Boeing 747-400 Series)

Part 25 of the FAR, effective February 1, 1965, as amended by Amendment 25-1 through 25-59 with the following exceptions: (*See Note 15*).

Certification Maintenance Requirements (CMR's):

The CMR's are listed in either the FAA-approved Section 9 of Boeing Maintenance Planning Data Document D6-21U400 or the applicable engine Type Certificate Data Sheet. The more restrictive requirement from these two documents shall be in force.

Production Basis: Production Certificate No. 700.

Equipment: The basic required equipment as prescribed in the applicable airworthiness regulations (see Certification Basis) must be installed in the aircraft.

XI - 747-400D (Approved October 10, 1991) Transport Aircraft

The 747-400D is basically the 747-400 series airplane with strengthened wings and without the 6-foot wing tip extension and 6-foot winglet. It is delivered with a wing tip equivalent in planform to the 747-300 airplane and has provisions for a "one-time" conversion from the Domestic configuration to the International configuration by adding the 747-400 wing extension and winglet.

Engines: 4 General Electric CF6-80C2B1F

Engine Thrust Limits: See data pertinent to all Model 747-400's

Fuel: See NOTE 3.

Airspeed Limits: VMO/MMO 365/0.92 (KCAS) For other airspeed limits see the appropriate FAA Approved Airplane Flight Manual.

C.G. Range: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Weights: See the appropriate FAA Approved Airplane Flight Manual.

Maximum Baggage/Cargo: See the appropriate Weight and Balance Control and Loading Manual.

Fuel and Oil Capacity: See the appropriate Weight and Balance Control and Loading Manual.

FAA Approved Weight and Balance Control and Loading Manual: D043U400

FAA Approved Airplane Flight Manual: D6U10002

<u>Model</u>	<u>Eligible Serial Numbers</u>
747-446D	25213, 25214, 26345, 26347-26349, 26351, 26352
747-481D	25292, 25639, 25640, 25642-25644, 25646, 25647, 27163, 27436, 27442

For engine operating limits see the FAA Approved Airplane Flight Manual referenced under Section XI of this data sheet or the appropriate engine type certificate data sheet:

	General Electric:	E13NE
Thrust Setting:	The appropriate EPR or N1 thrust setting curves in Section 4 of the Airplane Flight Manual (AFM) must be used for control of engine thrust.	

Maximum Operating Altitude: 45,100 feet

XI. 747-400D (continued):

- Minimum Crew: For all flights, 2 persons (pilot, copilot). When passengers are being carried, one attendant is required at each No. 3 over-wing exit. At least one flight attendant is required on the upper deck during taxi, takeoff, and landing when passengers occupy the upper deck.
- Maximum Passengers: For 747-400D airplanes the total passenger capacity is Limited to:

660 passengers with 5 pair of Type "A" exits on main deck plus one pair of Type "A" exits on the upper deck. (Main deck limited to 550 and upper deck limited to 110 if in compliance with the requirements of modified Special Condition Number 25-71-NW-3, transmitted to Boeing by FAA letter dated August 3, 1981).
- Required Equipment: The basic required equipment as prescribed in the applicable airworthiness regulations (See Certification Basis) must be installed in the aircraft for certification. The required equipment is noted in the Type Design Data.
- Datum: Balance Arm Datum corresponds to Body Station 0 and is 90 inches forward of nose. All production stations coincide numerically with arms. Horizontal distance of datum to nose gear jack points is 384.7 inches.
- MAC: MAC length is 327.8 inches. Leading edge of MAC is 1258 inches aft of datum.
- Level Means: A plumb-bob attachment and leveling provision scale are provided in the R.H. body wheel well at BS 1444.0.
- Control Surface Movements: To insure proper operation of the airplane, the movement of the various control surfaces must be carefully controlled by proper rigging of the flight control systems. The airplane must, therefore, be rigged according to the following FAA-approved data:
- Boeing Drawing Numbers:
- | | | |
|----------|--------------------|--|
| 251U1001 | Rigging Procedures | Aileron and Spoiler |
| 251U2001 | Rigging Procedures | Elevator |
| 251U3002 | Rigging Procedures | Rudder |
| 251U4001 | Rigging Procedures | Stabilizer Trim |
| 253U5001 | Rigging Procedures | Control Stand (includes flap control assembly) |
| 256U2001 | Rigging Procedures | Leading Edge Flaps |
| 256U3001 | Rigging Procedures | Trailing Edge Flaps |
| 251U1003 | Rigging Procedures | Speed Brakes |
- Service Information: Boeing Report D6-34U102, "Structural Repair Manual," is FAA-approved. Service Bulletins and other Service information, when FAA-approved, will carry a statement to that effect.
- Certification Basis: Part 25 of the FAR, effective February 1, 1965, as amended by Amendments 25-1 through 25-70 with the following exceptions:

<u>SECTION NO.</u>	<u>TITLE</u>	<u>THRU AMDT.25-</u>
25.107	Takeoff speeds	41
25.109	Accelerate-stop distance	41
25.149	Minimum control speed	41
25.251	Vibration and buffeting	22
25.305	Strength and deformation	22
25.331	General	45
25.351	Yawing conditions	45
25.365(g)	Pressurized cabin loads	53
25.561	General	63
25.562	Emergency landing dynamic conditions	63**
25.571	Damage-tolerance and fatigue evaluation of structure	9
25.607	Fasteners	22

XI. 747-400D (continued):

25.631	Bird strike damage	(NA)**
25.657	Hinges	22
25.675	Stops	37
25.683	Operation tests	22
25.772	Pilot compartment doors	46
25.783	Doors	53
25.785	Seats, berths, safety belts, harnesses	50
25.809	Emergency exit arrangement	45
25.812	Emergency lighting	31
25.855	Cargo or baggage compartments	59
25.858	Cargo Compartment Fire Detection Systems	(NA)**
25.1103	Induction system ducts and air duct systems	45
25.1401	Anticollision light system	26
25.1438	Pressurization and pneumatic systems	(NA)**
25.1529	Instructions for continued airworthiness	(NA)**

** Not applicable - The requirements of this section do not apply to this type design because the original certification basis, which did not include this section, has been determined to be adequate.

Part 36 of the FAR as amended by Amendments 36-1 through 36-18.

Special Federal Aviation Regulation (SFAR) 27, as amended by Amendments 27-1 through 27-6, and any later amendments in existence, at the time of certification

The following special conditions, exemptions, and equivalent safety findings, which are part of the Model 747-300 certification basis, are also part of the certification basis for the Model 747-400D:

The special conditions include those enclosed with FAA letter to The Boeing Company dated February 20, 1970, and the following:

1. Special Condition 4A, revised to apply to airplanes with the landing gear load evener system deleted, was recorded as an enclosure to an FAA letter to The Boeing Company dated May 12, 1971.
2. Special Condition No. 25-61-NW-1 for occupancy not to exceed 32 passengers on the upper deck of airplanes with spiral staircase was transmitted to The Boeing Company by FAA letter dated February 26, 1975.
3. Special Condition No. 25-71-NW-3 for occupancy not to exceed 45 passengers on the upper deck of airplanes with straight segmented stairway was transmitted to The Boeing Company by FAA letter dated September 8, 1976.
4. Modification of Special Condition No. 25-71-NW-3 for occupancy not to exceed 110 passengers on the upper deck of airplanes with straight segmented stairway was transmitted to The Boeing Company by FAA letter dated August 3, 1981.
5. Special Condition No. 25-77-NW-4 (modification of the auto pilot system to approve the airplane for use of the system under Category IIIB landing conditions) was transmitted to The Boeing Company by FAA letter dated July 8, 1977.
6. Special Condition No. 25-ANM-16 for use of an overhead crew rest area, occupancy not to exceed ten crewmembers was transmitted to The Boeing Company by FAA letter dated November 19, 1987.
7. Special Condition No. 25-ANM-24 applicable to flight deck displays and propulsion control system was provided to Boeing on December 22, 1988. FAA approved procedures required for compliance with paragraph 13 of the Special Condition are located in Boeing Document D926U303, Appendix D.
8. Special Condition No. 25-ANM-25 which established lightning and radio frequency (RF) energy protection requirements was provided to Boeing on December 22, 1988.

XI. 747-400D (continued):

Exemptions from FAR Part 25:

No. 1013A dated December 24, 1969 - Exemption from Section 25.471(b) to allow lateral displacement of the C.G. from the airplane centerline.

The following Optional requirements, which are part of the Model 747-300 certification basis, apply also to the 747-400D:

Ditching Provisions	Section 25.801
Ice Protection Provisions	Section 25.773

The following equivalent safety findings, previously made for earlier models under the provisions of Section 21.21(b)(1), are also applicable to the Model 747-400D:

Width of Aisle	Section 25.815
Use of 1-g Stall Speed (nonstructural items)	Several
Use of 1-g Stall Speed (structural items)	Several
Position Light Distribution and Intensities	Section 25.1389(b)(3)
Emergency Locator Transmitter (ELT)	Section 25.1415(d)
Emergency Exit Markings	Section 25.811(f)

Part 25 of the FAR, effective February 1, 1965, as amended by Amendment 25-1 through 25-59 with the following exceptions: (*See Note 15*)

Certification Maintenance Requirements (CMR's):

The CMR's are listed in the FAA-approved Section 9 of Boeing Maintenance Planning Data Document D6-21U400 or the applicable engine Type Certificate Data Sheet. The more restrictive requirements from these two documents shall be in force.

Production Basis: Production Certificate No. 700.

Equipment: The basic required equipment as prescribed in the applicable airworthiness regulations (see Certification Basis) must be installed in the aircraft.

Note: The Boeing Company has offered and the FAA has agreed, to upgrade the certification basis for the Model 747-400D in relation to FAR Part 25.365 (Amendment 25-54), Pressurized Cabin Loads on the condition that initial deliveries need not comply at the time of delivery, but shall be retrofitted later.

By March 31, 1993, Model 747-400D production airplanes must include an FAA-approved production change which demonstrates compliance with the Certification Basis. Retrofit modification kits will also be available (beginning June 30, 1993) for installation in airplanes delivered without the production change (S/N's 25213, 25214, 25292, 25639, 25640, 25642 & 26347).

XII - 747-400F (Approved October 14, 1993) Transport Aircraft

The new 747-400F (Freighter) is basically the 747-400 series airplane with strengthened wings and the 747-200F fuselage.

Engines:	4 Pratt & Whitney PW4000 Series, 4 General Electric CF6-80C2B1F, CF6-80C2B5F; or 4 Rolls-Royce RB211-524-G2-19, RB211-524G3-19, RB211-524H2-19, RB211-524G2-T-19, RB211-524G3-T-19, RB211-524H2-T-19 WARNING: To prevent unsafe airplane handling characteristics, PW4000 series engines with electronic engine control (EEC) part number 791100-14-102 (Pratt & Whitney part number 54D043) must not be installed on the same airplane as PW4000 series engines that have the ring case compressor configuration. This combination of engine configurations is not approved because of a significant difference in engine acceleration rates and the effect of that difference on airplane handling characteristics. Ring case compressor equipped engines were approved with the same engine model number as previously approved PW4000 configurations, and must be identified by the presence of a "/A5" marked at the end of the "INSTL ARR" block on the engine data plate. SEE NOTE 5 for additional information regarding intermixing engines.
Engine Thrust Limits:	See data pertinent to all Model 747-400's
Fuel:	See NOTE 3.
Airspeed Limits:	VMO/MMO 365/0.92 (KCAS) For other airspeed limits see the appropriate FAA Approved Airplane Flight Manual.
C.G. Range:	See the appropriate FAA Approved Airplane Flight Manual.
Maximum Weights:	See the appropriate FAA Approved Airplane Flight Manual.
Maximum Baggage/Cargo:	See the appropriate Weight and Balance Control and Loading Manual.
Fuel and Oil Capacity:	See the appropriate Weight and Balance Control and Loading Manual.
FAA Approved Weight and Balance Control and Loading Manual:	D043U550
FAA Approved Airplane Flight Manual:	D6U10001, D6U10002 and D6U10003

<u>Model</u>	<u>Eligible Serial Numbers</u>
747-406F	33694-33696
747-409F	30759-30770, 33729, 33731-33733, 33739
747-412F	26553, 26558-26561, 26563, 28026, 28027, 28030, 28032, 28263, 32897-32902
747-428F	25632, 32866, 32867, 32870, 33096, 33097
747-446F	33748, 33749
747-467F	27175, 27503, 30804, 30805, 32571, 34150
747-481F	34016, 34017
747-4B5F	26401, 26406, 26408, 26411, 26413, 26414, 26416, 27073, 32808, 32809, 33515-33517, 33945, 33946, 34302
747-4G4F	30201
747-4H6F	28434, 29902
747-4R7F	25866-25868, 29053, 29729-29733, 30400, 30401, 33827, 34235
747-41BF	32803, 32804
747-45EF	30607-30609
747-46NF	30808-30812
747-47UF	29252-29261, 30558, 30559, 32837, 32838, 32840
747-48EF	25781, 25783, 27603, 28367, 29170, 29907
747-4FTF	34235, 34239, 34240

For engine operating limits see the FAA Approved Airplane Flight Manual referenced under Section XII of this data sheet or the appropriate engine type certificate data sheet:

Pratt & Whitney	E24NE
General Electric:	E13NE
Rolls-Royce	E30NE

Thrust Setting: The appropriate EPR or N1 thrust setting curves in Section 4 of the Airplane Flight Manual (AFM) must be used for control of engine thrust.

XII. 747-400F (continued):

- Maximum Operating Altitude: 45,100 feet
- Minimum Crew: For all flights, 2 persons (pilot, copilot).
- Maximum Persons: For 747-400F airplanes the total persons capacity is Limited to: Six (6) persons on the upper deck per Exemption 1870E
- Required Equipment: The basic required equipment as prescribed in the applicable airworthiness regulations (See Certification Basis) must be installed in the aircraft for certification. The required equipment is noted in the Type Design Data.
- Datum: Balance Arm Datum corresponds to Body Station 0 and is 90 inches forward of nose. All production stations coincide numerically with arms. Horizontal distance of datum to nose gear jack points is 384.7 inches.
- MAC: MAC length is 327.8 inches. Leading edge of MAC is 1258 inches aft of datum.
- Level Means: A plumb-bob attachment and leveling provision scale are provided in the R.H. body wheel well at BS 1444.0.
- Control Surface Movements: To insure proper operation of the airplane, the movement of the various control surfaces must be carefully controlled by proper rigging of the flight control systems. The airplane must, therefore, be rigged according to the following FAA-approved data:
- Boeing Drawing Numbers:
- | | | |
|----------|---|---------------------|
| 251U1001 | Rigging Procedures | Aileron and Spoiler |
| 251U2001 | Rigging Procedures | Elevator |
| 251U3002 | Rigging Procedures | Rudder |
| 251U4001 | Rigging Procedures | Stabilizer Trim |
| 253U5001 | Rigging Procedures - Control Stand (includes flap control assembly) | |
| 256U2001 | Rigging Procedures | Leading Edge Flaps |
| 256U3001 | Rigging Procedures | Trailing Edge Flaps |
| 251U1003 | Rigging Procedures | Speed Brakes |
- Service Information: Boeing Report D6-34U102, "Structural Repair Manual," is FAA-approved. Service Bulletins and other Service Information, when FAA-approved, will carry a statement to that effect.
- Certification Basis: Part 25 of the FAR, effective February 1, 1965, as amended by Amendments 25-1 through 25-67 with the following exceptions:
(See Note 14 for cargo compartment liner requirements)

<u>SECTION NO.</u>	<u>TITLE</u>	<u>THRU AMDT.25-</u>
25.107	Takeoff speeds	41
25.109	Accelerate-stop distance	41
25.149	Minimum control speed	41
25.251	Vibration and buffeting	22
25.305	Strength and deformation	22
25.331	General	45
25.351	Yawing conditions	45
25.365(g)	Pressurized Compartment Loads	53
25.562	Emergency landing dynamic conditions	63**
25.571	Damage-tolerance and fatigue evaluation of structure	9
25.607	Fasteners	22
25.631	Bird strike damage	22
25.657	Hinges	22
25.675	Stops	37
25.683	Operation tests	22
25.772	Pilot compartment doors	46
25.773(b)(2)(ii)	Pilot Compartment View	72
25.783	Doors	53

XII. 747-400F (continued):

25.809(f)(1)(v)	Emergency exit arrangement	45
25.812	Emergency lighting	31
25.858	Cargo Compartment Fire Detection Systems	(NA)**
25.1103	Induction system ducts and air duct systems	45
25.1401	Anticollision light system	26
25.1438	Pressurization and pneumatic systems	(NA)**
25.1529	Instructions for continued airworthiness	(NA)**

***Not Applicable - The requirements of this section do not apply to this type design because the original certification basis, which did not include this section, has been determined to be adequate.*

Part 36 of the FAR as amended by Amendments 36-1 through 36-20.

Special Federal Aviation Regulation (SFAR) 27, as amended by Amendments 27-1 through 27-7. (Same as FAR Part 34, October 14, 1993)

The following special conditions, exemptions, and equivalent safety findings, which are part of the Model 747-200F and 747-400 certification basis, are also part of the certification basis for the Model 747-400F:

The special conditions include those enclosed with FAA letter to The Boeing Company dated February 20, 1970, and the following:

1. Special Condition 4A, revised to apply to airplanes with the landing gear load evener system deleted, was recorded as an enclosure to an FAA letter to The Boeing Company dated May 12, 1971.
- 2, 3, and 4 were removed in this Revision 27, dated August 1, 1996
5. Special Condition No. 25-77-NW-4 (modification of the auto pilot system to approve the airplane for use of the system under Category IIIb landing conditions) was transmitted to The Boeing Company by FAA letter dated July 8, 1977.
6. was removed in this Revision 27, dated August 1, 1996
7. Special Condition No. 25-ANM-24 applicable to flight deck displays and propulsion control system was provided to Boeing on December 22, 1988.
8. Special Condition No. 25-ANM-25 which established lightning and radio frequency (RF) energy protection requirements was provided to Boeing on December 22, 1988.

Exemptions from FAR Part 25:

- No. 1013A dated December 24, 1969 - Exemption from Section 25.471(b) to allow lateral displacement of the C.G. from the airplane centerline.

New Exemption for 747-400F:

- No. 1870E dated September 8, 1993, allows maximum of six (6) non-crew members on the upper deck.
 No. 5649 dated April 27, 1993, exempts latches on the decompression vent doors from meeting 25.855(c).

The following optional requirements, which are part of the Model 747-400 certification basis, apply also to the 747-400F:

Ditching Provisions	Section 25.801
Ice Protection Provisions	Section 25.773

The following equivalent safety findings (ESF), previously made for earlier models under the provisions of Section 21.21(b)(1), are also applicable to the Model 747-400F:

Width of Aisle	Section 25.815
Use of 1-g Stall Speed (nonstructural items)	Several
Use of 1-g Stall Speed (structural items)	Several
Position Light Distribution and Intensities	Section 25.1389(b)(3)

XII. 747-400F (continued):

	Emergency Locator Transmitter (ELT)	Section 25.1415(d)
New ESF for 747-400F:	Emergency Exit Marking	Section 25.811(f)
	Doors	Section 25.783(e)
	Part 25 of the FAR, effective February 1, 1965, as amended by Amendment 25-1 through 25-59 with the following exceptions: (<i>See Note 15</i>).	

Certification Maintenance Requirements (CMR's):

The CMR's are listed in the FAA-approved Section 9 of Boeing Maintenance Planning Data Document D621U400 or the applicable engine Type Certificate Data Sheet. The more restrictive requirement from these two documents shall be in force.

Production Basis: Production Certificate No. 700.

Equipment: The basic required equipment as prescribed in the applicable airworthiness regulations (see Certification Basis) must be installed in the aircraft for certification.

XIII. 747-400SF Major Design Change

A 747-400 SF (Special Freighter), or optionally known as a 747-400 BCF (Boeing Converted Freighter), is a 747-400 Series passenger airplane that has been modified in accordance with FAA-approved Boeing Service Bulletin 747-00-2004 to operate in a freighter configuration. These aircraft remain as 747-400 Series aircraft for documentation purposes on this TCDS and with regard to the applicability of airworthiness directives. Because of the magnitude of this design change, the certification basis for the changed aspects was required to be established and documented in accordance with section 21.101 (Changed Product Rule).

All general information in TCDS A20WE for the 747-400 Series remains applicable to an airplane operating in the 747-400 SF configuration, with the following exceptions:

Maximum Passengers: There are no provisions for the carriage of passengers. A maximum of 20 supernumeraries can occupy the aft cabin of the upper deck as given in Exemption 8590.

Minimum Crew: There is no requirement for a flight attendant, as given in Exemption 8590.

FAA Approved Weight and Balance Control and Loading Manual: D043U544

FAA Approved Airplane Flight Manual: D6U10003

Service Information: Boeing Report D634U104, "Structural Repair Manual," is FAA-approved. Service Bulletins and other Service Information, when FAA-approved, will carry a statement to that effect.

Certification Maintenance Requirements (CMR's):

The CMR's are listed in the FAA-approved Section 9 of Boeing Maintenance Planning Data Document D621U400 or the applicable engine Type Certificate Data Sheet. The more restrictive requirement from these two documents shall be in force.

The 747-400 SF certification basis was established according to the requirements given in § 21.101 and AC 21.101-1, and was determined in accordance with FAA Order 8110.48. The conversion to the 747-400 SF configuration entails the following product level changes:

1. Passenger to Freighter change (significant product level change, per AC 21.101-1) and,
2. Upper Deck Interior Rearrangement (not a significant change, per AC 21.101-1)

1. Significant Product Level Change - Passenger to Freighter Conversion:

Certification basis: Part 36: unchanged from 747-400 Series
 SFAR 27: unchanged from 747-400 Series
 Part 25 of the FAR, effective February 1, 1965, as amended by Amendments 25-1 through 25-112 with the following exceptions per section 21.101(b):

XIII. 747-400SF Major Design Change (cont'd)

<u>SECTION NO.</u>	<u>TITLE</u>	<u>THRU AMDT.25-</u>
25.305 (a)(b)	Strength and Deformation	25-22
25.365	Pressurized Compartment	25-53, except as follows: Areas that comply with Amendment 25-54: Lower Lobe – Nose area, STA 140 to 460, all below WL 200. Wing – Wheel Well Floor Beam area Areas that comply with Amendment 25-72: Ceiling compartment above Main Deck Cargo Compartment. Main Deck Cargo Compartment. Lower Lobe – Forward, Aft, and Aft Bulk Cargo Compartments.
25.561	Emergency Landing Conditions	25-91, except the requirements of § 25.561(c)(1)(ii) are not included in the certification basis.
25.571	Damage Tolerance and Fatigue Evaluation of Structure	25-22
25.831(a)	Ventilation	25-41
25.841(a)	Pressurized Cabins	25-38

Changed Areas:

The following is a listing of the changes incorporated as part of the passenger to freighter conversion:

- Increased maximum zero fuel weight
- Strengthened wing-to-body joint, main deck floor, fuselage frames and fuselage stub beams
- Replaced aft upper deck floor beams with tension ties
- Added a main deck side cargo door, door surround structure, and related control wiring
- Installed provisions (structural, electrical & drainage) to support installation of cargo handling systems
- Modified upper deck floor beams to allow installation of a folding ladder
- Installed new main deck sidewall & ceiling cargo liners
- Deactivated horizontal stabilizer tail fuel tanks (if previously installed)
- Reconfigured air conditioning, air distribution, equipment cooling, cabin pressurization, and lavatory/galley ventilation systems to freighter configurations
- Changed decompression venting
- Added main deck smoke detection and class E depressurization capability
- Replaced smoke detectors with area detectors in the lower cargo compartments
- Replaced cabin pressure controller for compatibility with cargo fire mode
- Added additional Halon bottle and air conditioning for the lower cargo compartments
- Added a main deck rigid cargo barrier forward of STA 140 and a 9-G cargo net aft of the aft bulkhead of the upper deck

All other changes resulting from the Passenger to Freighter Product Level Change are either Secondary or Not Affected in accordance with § 21.101 and AC 21.101-1. Amendment levels for sections of 14CFR Part 25 that apply to Secondary Changes or Not Affected Areas remain at the 747-400 Series amendment levels.

2. Product Level Change - Upper Deck Interior Reconfiguration:

Certification basis:

The certification basis for the changed aspects associated with the upper deck interior configuration rearrangement is unchanged from the 747-400 Series in accordance with section 21.101(b)(1).

XIII. 747-400SF Major Design Change (cont'd)

Special Conditions:	<p>Special conditions that are part of the certification basis for the 747-400 Series apply to the airplane operating in the 747-400 SF configuration, unless otherwise noted below:</p> <p>Special Condition 25-ANM-16 (use of an overhead crew rest area, occupancy not to exceed ten crewmembers) does not apply to aircraft operated in the 747-400SF configuration.</p> <p>Special Conditions 25-61-NW-1 (occupancy not to exceed 32 passengers on the upper deck – spiral staircase) and 25-71-NW-3 (occupancy not to exceed 45 (or later, 110) passengers on the upper deck of airplanes with a straight segmented stairway):</p> <p>The 747-400 SF conversion removes the stairway between the main and upper deck, which eliminates some aspects of Special Conditions 25-61-NW-1 and 25-71-NW-3 as described below. For Special Condition 25-61-NW-1, all aspects related to occupant egress and escape provisions noted in this special condition are also addressed in Special Condition 25-71-NW-3. Special Condition 25-71-NW-3 remains part of the certification basis for the 747-400 Series operating in the 747-400 SF configuration, with the following noted exceptions:</p> <ol style="list-style-type: none"> 1. The requirements of Special Condition numbered 25-71-NW-3, 3(a)(1) through 3(a)(7) do not apply to airplanes in the 747-400 SF configuration. 2. The requirements of Special Condition numbered 25-71-NW-3, 4(a) and 4(b) do not apply to airplanes in the 747-400 SF configuration.
Exemptions:	<p>All exemptions from 14CFR Part 25 listed in TCDS A20WE for the 747-400 Series apply to the 747-400 SF configuration.</p> <p>Exemption 8590, dated July 27, 2005, allows up to 20 persons to occupy the upper deck cabin of the 747-400 SF without a flight attendant.</p>
Equivalent Safety Findings:	<p>All existing Equivalent Safety Findings listed in TCDS A20WE for the 747-400 Series apply to the 747-400 operated in the 747-400 SF configuration.</p> <p>ELOS ES-1 was granted on 12/06/2005</p>
TCDS Notes:	<p>All Notes in TCDS A20WE that apply to the 747-400 Series also apply to an airplane operated in the 747-400 SF configuration.</p> <p>Note 14, as applicable to the 747-400F Series, is also applicable to the 747-400 Series operated in the 747-400 SF configuration.</p>
Optional Requirements:	<p>All optional requirements in TCDS A20WE that apply to the 747-400 Series also apply to an airplane operated in the 747-400 SF configuration.</p>

DATA PERTINENT TO ALL MODEL 747-400 SERIES:

Engine Models	PW4056	PW4062A	CF6-80C2B1F	RB211-524G, RB211-524G2, RB211-524G3	RB211-524H, RB211-524H2
<u>Thrust Limits:</u>					
Takeoff, Sea Level, Standard Day (5 minutes)	56,750 lbs.	62,000 lbs.	57,160 lbs.	56,870 lbs.	59,450 lbs
Maximum Continuous	47,970 lbs.	47,970 lbs.	49,800 lbs.	47,230 lbs.	47,230 lbs.

XIII. 747-400SF Major Design Change (cont'd)

CERTIFICATION BASIS:

Amendment 25-102, section 25.981(c) transmitted to The Boeing Company dated August 24, 2005. This is limited to airplanes incorporating The Boeing Model 747-400 airplane Flammability Reduction System (fuel tank inerting).

Special Conditions No. 25.285-SC for the certification and operation requirements of the flammability reduction means (fuel tank inerting).

NOTES APPLY TO ALL MODELS UNLESS OTHERWISE SPECIFIED

NOTE 1. A current Weight and Balance Supplement including a list of equipment included in certificated weight empty and loading instructions must be in each aircraft at the time of original airworthiness certification and at all times thereafter except in the case of an operator having an approved weight control system.

NOTE 2. Airplane operation must be in accordance with the FAA Approved Airplane Flight Manual. All placards required by either the FAA Approved Airplane Flight Manual, the applicable operating rules or the certification basis must be installed in the airplane.

NOTE 3. The following fuels are eligible for Pratt and Whitney engines: JP-1, JP-4, and JP-5 fuels conforming to the P&WA Specification No. 522E or later revision may be used separately or mixed in any proportion without adversely affecting the engine operation or power output. No fuel control adjustment is required when switching fuel types.

G.E. engines use fuels conforming to G.E. Spec. D50TF2. MIL-T-5624, Grades JP-4 or JP-5, and ASTM D1655, Jet A, Jet A1, and Jet 8 are consistent with G.E. Specifications. [JP-8 is also approved for use in CF6-80C2 Series engines incorporating Dribble Flow Fuel Nozzles PN 9331M72P33, P34 and P41 are prohibited from the use of JP-4 and Jet B (wide cut) fuel.

The following fuels are eligible for Rolls Royce RB211-524 Series engines:

Grade (Type)	Specification
Kerosene,(Type) (AVTUR:JP-1)	D. Eng. R.D. 2453
	D. Eng. R.E. 2494
	A.S.T.M. D1655 Jet A
	A.S.T.M. D1655 Jet A-1
Wide Cut Fuels (AVTAG:JP-4)	3-GP-23
	I.A.T.A. Kerosene Type
	D. Eng. R.D. 2454
	D. Eng. R.D. 2486
	A.S.T.M. D1655 Jet B Type
	3-GP-22
High Flash Point (AVCAT:JP-5)	MIL-T-5624 JP-4 Grade
	I.A.T.A. Wide Cut
	RB211-524G/H-T series engines are prohibited from the use Of JP-4 and Jet B (wide cut) fuel
High Flash Point (AVCAT:JP-5)	D.Eng. R.D. 2498
	3-GP-24
	MIL-T-5624 JP-5 Grade 13

Optional Additives (Applies to all engines)

The only optional additives that may be used in approved fuel are as follows:

- (1) Anti-static additive - Shell ASA3 in concentrations not exceeding 1.0 parts per million (grams per cubic meter).
- (2) Anti-icing additive - Specification D. Eng. R.D. 2451 (Issue 2) or MIL/1/27686E in concentrations not exceeding 0.15 percent by volume.

NOTES APPLY TO ALL MODELS UNLESS OTHERWISE SPECIFIED (continued):

- (3) Anti-Corrosion/lubricity additive - HITEC E515 may be used (formerly Santolene C) at a concentration range up to 5 lb. per 35,000 Imperial gallons, which gives a phosphorus content in the order of 0.07 parts per million.
- (4) Anti-microbiological additive - Biobor JF may be used on an intermittent or not-continuous basis at a concentration level not exceeding 270 parts per million (20 ppm Boron). It is permitted to burn off the treated fuel provided the concentration does not exceed 270 ppm, and the fuel is not contaminated by microbial debris.
- (5) Corrosion inhibitor additive:
 - (a) TOLAD 245 - in concentrations not exceeding 12 lb. per 35,000 Imperial gallons (approximately 35 mg/L).
 - (b) APOLLO PRI 19 - in concentrations not exceeding 8 lb. per 35,000 Imperial gallons (approximately 23 mg/L).
 - (c) EMERY 9855 - in concentrations not exceeding 12 lb. per 35,000 Imperial gallons (approximately 35 mg/L).

Fuel load and usage limitations are contained in the FAA Approved Airplane Flight Manual applicable to each operator.

The following oils are eligible for the engines:

Pratt & Whitney: Synthetic type conforming to P&WA 521 as revised.
P&WA Turbojet Engine
Service Bulletin No. 238 lists approved brand oils.

General Electric: G.E. engines use synthetic type oil conforming to G.E. Spec. D50TF1, classes A and B. G.E. Service Bulletin 79-1 lists approved oil brands.

Rolls Royce: RB211 engines use ESSO Turbo Oil 25 or Aero Shell Turbine Oil 555. Castrol 580 gas turbine oil II and these oils reclaimed to Rolls Royce standards.

NOTE 4. LIFE LIMITED PARTS AND INSPECTION REQUIREMENTS:

Nose Landing Gear:

The nose landing gear is life-limited to 50,430 landings. This service life may be corrected to flight hours based on service route segments average times and must be approved by the FAA.

Refueling Spoiler:

Inflight refueling spoiler P/N 65B20238 is limited to 20,000 inflight operations.

Escape System:

Escape system cool gas generator cartridges manufactured by Olin Corporation and stored either in their original (unopened) shipping canisters or in a cool gas generator between +10°F and +90°F for up to 6 years from date of manufacture are considered serviceable. Cartridges stored for more than 6 years must not be put into service. Inservice cartridge life is limited to 3 years.

Escape system cool gas generator cartridges manufactured by Talley Industries (Ref. Boeing Service Bulletin 747-25-2448) have a storage limit of 7 years from the date of manufacture. Cartridges stored for more than 7 years must not be put in service.
Inservice cartridge life is limited to 3 years.

Escape system off-wing slide door and latch thruster (six each per airplane) must be replaced after 15 firings. In addition, the housing bore must be replaced if the bore is 0.002 inches more than the maximum drawing tolerance. Thruster cartridges must be replaced before 5 years calendar time after date of manufacture.

Number 3 and 4 Flap Track Fairings:

The following parts on numbers 3 and 4 flap track fairings are life limited when operated with an RB211 engine in the spare engine position.

NOTES APPLY TO ALL MODELS UNLESS OTHERWISE SPECIFIED (continued):

152-Hour Life Limit

Outboard Vertical Rod - Rod Ends - 69B14163
 Drive Rod Attach Fittings to the Mid-Flap - 65B39035-1
 Box Links - 65B15598, 65B15599, 65B15598-1-3 and 65B15599-1-3-5
 Seal Support Channels - 65B15544 and 65B15666
 Drive Rod Tubes - 65B15929, 65B15929-3 and 65B15929-8
 Outboard Vertical Rod Tubes - 69B13761-2
 Inboard Vertical Rod Tubes - 69B13762-2

300-Hour Life Limit

Inboard Vertical Rod - Rod Ends - 69B14163-1
 Drive Truss Fittings - 65B17002-1 and 65B17003-1

600-Hour Life Limit

Lateral Rod Tubes - 69B13750-5 and 69B13750-6

1200-Hour Life Limit

Outboard Vertical Rod Brackets - 69B13755-2 and 69B13758-1
 Lateral Rod Brackets - 69B13758-2 and 69B13759-2

747-400F Nacelle Strut Spring Beam Assemblies:

The following spring beam assemblies are life limited to 50,000 landings.

<u>Engine Installation</u>	<u>Engine Position</u>	<u>Part Number</u>
GE CF6-80C2 Series	1	311U0050-46 and -48
	4	311U0050-42 and -44
RR RB211-524G/H Series	1	321U0496-11 and -12
	4	65B89727-27 and -28
PW 4000 Series	1	311U0050-46 and -48
	4	311U0050-50 and -52

Engine Pylon - Required Inspections:

All outboard engine pylons incorporating the strut beams with spherical bearings must be inspected for bearing seizure every 6,000 flight hours on all models except for the 747-400 airplane. The inspection interval shall not exceed 12,500 hours for the 747-400 airplane. Inspection procedures specified in Boeing Maintenance Planning Document D6-13747, or D621U400 for the 747-400 airplane, or equivalent are acceptable.

NOTE 5.

The Pratt and Whitney JT9D-3 and JT9D-3A engines and the JT9D-3A, JT9D-7, JT9D-7A, JT9D-7F, JT9D-7Q, JT9D-7Q3, JT9D-7R4G2, and JT9D-7J engines may be intermixed in the combinations and with the appropriate limitations noted in the FAA Approved Airplane Flight Manual.

The Pratt and Whitney JT9D-7H engines may be intermixed with all JT9D-7 engines with appropriate limitations noted in the FAA Approved Airplane Flight Manual.

The Pratt and Whitney JT9D-7AH engines may be intermixed with all JT9D-7A engines with appropriate limitations noted in the FAA Approved Airplane Flight Manual.

The General Electric CF6-50C engines may be intermixed with CF6-50E engines with appropriate limitations noted in the FAA Approved Airplane Flight Manual.

The Rolls Royce RB211-524B2-19, RB211-524C2-19, and RB211-524D4-19, and RB211-524D4-39 engines may be intermixed with the appropriate limitations noted in the FAA Approved Airplane Flight Manual.

NOTES APPLY TO ALL MODELS UNLESS OTHERWISE SPECIFIED (continued):

The Rolls Royce RB211-524D4X-19 and RB211-524D4X-B-19 engines may be intermixed with RB211-524D4-19 and RB211-524D4-39 engines with the appropriate limitations noted in the FAA Approved Airplane Flight Manual.

The Rolls Royce RB211-524D4-B-19 and RB211-524D4-B-39 engines may be intermixed with RB211-524D4-19 and RB211-524D4-B-39 engines with the appropriate limitations noted in the FAA Approved Airplane Flight Manual.

The Rolls-Royce RB211-524B2-B-19 engines may be intermixed with RB211-524B2-19 engines, and RB211-524C2-B-19 engines may be intermixed with RB211-524C2-19 engines with the appropriate limitations noted in the FAA Approved Airplane Flight Manual.

The Rolls-Royce RB211-524G2-19, RB211-524G3-19, and RB211-524H2-19 engines may be intermixed in the combinations and with the appropriate limitations noted in the FAA Approved Airplane Flight Manual.

The Rolls-Royce RB211-524G2-T-19, RB211-524G3-T-19, and RB211-524H2-T-19 engines may be Intermixed in the combinations and with the appropriate limitations noted in the FAA-Approved Airplane Flight Manual.

The Rolls-Royce RB211-524G2-T-19, RB211-524G3-T-19, and RB311-524H2-T-19 engines may be Intermixed with RB524G2-19, RB211-534G3-19 and RB211-524H2-19 in the combinations and with the Appropriate limitations noted in the FAA-Approved Airplane Flight Manual.

NOTE 6 Blow-in door and fixed lip nacelles may be intermixed in the combinations and the appropriate limitations noted in the FAA Approved Airplane Flight Manual and in the appropriate Appendix of the Airplane Flight Manual.

NOTE 7. The 747-100B series airplanes are basically 747SR series airplanes.

NOTE 8. There are service bulletins which call for modifications which do not comply with the Type Certification Basis. These service bulletins are listed in Boeing Document D6-30300 titled "Service Bulletin 747". The records of airplanes imported into the USA should be reviewed to be sure that further modifications are accomplished to ensure compliance, if the non FAA-approved service bulletins modifications have been installed.

NOTE 9. On certain 747-300 and 747-400 airplanes, the Upper deck exits are rated as a Type "I" due only to the interior arrangement. Requirements for the rerating of the exit are located in FAA Letter ANM-120S:RSY, dated August 1, 1989. The passenger capacity of these airplanes is the same as for the 747-200B (550 total passengers with up to 45 on the upper deck.)

Also on certain 747-400 airplanes, Door No. 3 is rated as a Type "I" due only to the interior arrangement. Requirements for the rerating of the exit are located in FAA Letter ANM-120S:JG dated December 21, 1988. The passenger capacity is limited to 485 total with up to 45 on the upper deck when the upper deck is also rated as Type "I". With the upper deck rated as a Type "A" the passenger capacity is 595 total (485 main deck plus 110 on the upper deck).

NOTE 10. Airplanes line number 679, 685, 696, 700, 705, 708, 710, and on were manufactured after August 20, 1988, and Airplane line numbers 804 and subsequent were manufactured after August 20, 1990, (Reference FAR 121.312(a)(1) Amendment 121-198). Airplane line numbers 805 through 814 are exempt (Exemption No. 5176A). See Boeing Document D6-30300 titled "Service Bulletin 747" for cross reference of line number to serial number to block number.

NOTE 11. Message Category Definitions

1. Warning: Defined as an operational or aircraft system condition which may require immediate corrective or compensatory action by the crew.
2. Cautions: An operational or aircraft system condition which requires immediate crew awareness and prompt compensatory action.

NOTES APPLY TO ALL MODELS UNLESS OTHERWISE SPECIFIED (continued):

3. Advisories: An operational or aircraft system condition which requires crew awareness for possible future compensatory action.
4. Memo: Crew reminders of the current state of selected normal conditions.
5. Status: Indications of airplane's condition for dispatch.
6. FMC Alerts: Associated with advisories - FMC related operational conditions which require crew awareness for possible future compensatory action.
7. CMC Messages: Detailed (maintenance level) messages related to airplane faults.

NOTE 12. **MESSAGE, OPERATION, ACTION AND RESPONSIBILITY:**

Message	Responsibility	Phase of Operation	How Quickly is: Awareness Req'd	Action Req'd
WARNING	PILOTS	ALL	IMMEDIATE	IMMEDIATE
CAUTIONS	PILOTS	ALL	IMMEDIATE	PROMPT
ADVISORIES	PILOTS	ALL	TIMELY	TIMELY*
STATUS	GROUND CREW AND PILOTS	DISPATCH	DISPATCH	BEFORE DISPATCH, DEPENDS ON MMEL
FMC ALERTS	PILOTS	ALL WHEN USING FMCs	TIMELY	TIMELY (if required)
FMC ADVISORIES	PILOTS	ALL WHEN USING FMCs	TIMELY	TIMELY (if required)
CMC	GROUND CREW & MAINTENANCE	DISPATCH PREPARATION & CHECKS	WHEN REQ'D BY CMR OR MAINTENANCE	CMR OR SCHEDULE A MAINTENANCE

*Depends on other failures, phase of flight or context of operation of airplane.

NOTE 13. The Boeing 747 Supplemental Structural Inspection Document D6-35022 (See AD 84-21-02, Amendment 39-4936) will be revised to include the 747-300 and 747-400/-400D/-400F at a time to be determined by FAA engineering.

NOTE 14. The class E cargo compartment on the 747-400F is required to be fitted with a full fire resistant liner which meets the requirement of Part 25 Appendix F, Part III at Amendment 25-60. This requirement is documented in Issue Paper SE-1, Stage 4, dated October 14, 1993, titled Protection of Critical Systems and Equipment within Class E Cargo Compartments.

NOTE 15. Boeing production line numbers 1047 and on have incorporated the 747 strut modification program in the production sequence. The certification basis for the strut-to-wing attachment structure complies with the following FAR's at the upgraded amendment levels listed below:

FAR(s)	Subject	Amendment Level
25.301, 25.303, 25.307	General Structure	78
25.305	Strength and Deformation	54
25.321 through 25.563	Load Conditions	78
25.571	Damage Tolerance	45
25.581 through 25.625	Design and Construction	78
25.629	Aerodynamic Stability	78

Boeing Production Line Numbers 1 through 1046 have incorporated the 747 strut modification program by means of Airworthiness Directive (AD) compliance. The certification basis of this modification is as listed above. The AD's are as follows: 95-13-07 (CF6-45/-50 & JT9D-70; AD 95-13-06 (PW4000 & CF6-80C2); AD 95-13-05 (RB211); and AD 95-10-16 (JT9D-3, -7).

NOTE 16. The Rolls-Royce Model RB211-524B-19 is removed as an eligible engine because it is removed from the Engine Type Certificate Data Sheet E12EU.

NOTES APPLY TO ALL MODELS UNLESS OTHERWISE SPECIFIED (continued):

NOTE 17: For Model 747-100, -200B, -200F, -200C, SR, SP, -100B, -300, and -100B SUD series airplanes: Mandatory replacement times, inspection intervals, related inspection procedures and all critical design configuration control limitation for the fuel tank system determined during the Special Federal Aviation Regulation No. 88 program and for compliance with 14 CFR 25.981 are listed in the FAA-approved Airworthiness Limitations document, Boeing 747-100/200/300/SP Airworthiness Limitations and Certification Maintenance Requirements, Document D6-13747-CMR, Revision March 2006 or later FAA-approved revision.

NOTE 18: For Model 747-400, -400D, and -400F series airplanes: Mandatory replacement times, inspection intervals, related inspection procedures and all critical design configuration control limitation for the fuel tank system determined during the Special Federal Aviation Regulation No. 88 program and for compliance with 14 CFR 25.981 and Special Conditions No. 25.285-SC are listed in the FAA-approved Airworthiness Limitations and Certification Maintenance Requirement, Section 9, of Boeing 747-400 Maintenance Planning Data Document D621U400-9, Revision August 2005 or later FAA-approved revision.

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