



TYPE CERTIFICATE DATA SHEET Nº EA-2021T03

Type Certificate Holder:

THE BOEING COMPANY
1901 Oakesdale Avenue SW
Renton, WA – 98057-2623
USA

FAA TCDS: T00021SE Revision 34

EA-2021T03-00
Sheet 01

BOEING
787-8
787-9
787-10

06 August 2021

This data sheet, which is part of Type Certificate No. 2021T03, prescribes conditions and limitations under which the product, for which the Type Certificate was issued, meets the airworthiness requirements of the Brazilian Aeronautical Regulations.

I – 787-8/787-9/787-10

TRANSPORT CATEGORY APPROVED 06 AUGUST 2021.

ENGINES 787-8

2 Rolls-Royce plc Turbofan Engines; Models: Trent 1000-A, Trent 1000-A2, Trent 1000-AE3, Trent 1000-C, Trent 1000-C2, Trent 1000-CE3, Trent 1000-D, Trent 1000-D2, Trent 1000-D3, Trent 1000-E, Trent 1000-G, Trent 1000-G2, Trent 1000-G3, Trent 1000-H, Trent 1000-H2, Trent 1000-H3, Trent 1000-L2 (Engine Type Certificate No.EM-2018T05-02)

2 General Electric Turbofan Engines; Models: GEnx-1B64, GEnx-1B64/P1, GEnx-1B64/P2, GEnx-1B67, GEnx-1B67/P1, GEnx-1B67/P2, GEnx-1B70, GEnx-1B70/P1, GEnx-1B70/P2, GEnx-1B70C/P1, GEnx-1B70C/P2, GEnx-1B70/75/P1or GEnx-1B70/75/P2 (Engine Type Certificate No. EM-2015T06-03)

Authorization for engine intermix is contained in the appropriate ANAC approved Airplane Flight Manual

ENGINES 787-9

2 Rolls-Royce plc Turbofan Engines; Models: Trent 1000-A2, Trent 1000-AE3, Trent 1000-D2, Trent 1000-D3, Trent 1000-J2, Trent 1000-J3, Trent 1000-K2, Trent 1000-K3 (Engine Type Certificate EM-2018T05-02)

2 General Electric Turbofan Engines; Models: GEnx-1B67/P2, GEnx-1B70, GEnx-1B70/P1, GEnx-1B70/P2, GEnx-1B70/75/P2, GEnx-1B74/75/P1, GEnx-1B74/75/P2, GEnx-1B76A/P2 (Engine Type Certificate No. EM-2015T06-03)

Authorization for engine intermix is contained in the appropriate ANAC approved Airplane Flight Manual

ENGINES 787-10

2 Rolls-Royce plc Turbofan Engines; Models: Trent 1000-J3, Trent 1000-K3 (Engine Type Certificate No. EM-2018T05-02)

2 General Electric Turbofan Engines; Models: GEnx-1B74/75/P2, GEnx-1B76/P2, GEnx-1B76A/P2, (Engine Type Certificate No.EM-2015T06-03)

ENGINE LIMITS 787-8

Static thrust lb/kN, standard day sea level

	Takeoff (see Note 7 for operating limits)	Maximum continuous
RR Trent 1000-A (See Note 4 for ICAO env comp) (see Note 8 for Applicability)	69 194/307,8	64 722/287,9
RR Trent 1000-C (See Note 4 for ICAO env comp) (see Note 9 for Applicability)	74 511/331,4	69 523/309,3
RR Trent 1000-D (See Note 4 for ICAO env comp) (see Note 9 for Applicability)	74 511/331,4	69 523/309,3
RR Trent 1000-E (See Note 4 for ICAO env comp) (see Note 9 for Applicability)	59 631/265,3	58 866/261,8
RR Trent 1000-G (See Note 4 for ICAO env comp) (see Note 9 for Applicability)	72 066/320,6	64 722/287,9
RR Trent 1000-H (See Note 4 for ICAO env comp) (see Note 9 for Applicability)	63 987/284,2	58 866/261,8
RR Trent 1000 - A2 (See Note 17 for ICAO env comp)	69 194/307,8	64 722/287,9
RR Trent 1000 - C2 (See Note 17 for ICAO env comp)	74 511/331,4	69 523/309,3
RR Trent 1000 - D2 (See Note 17 for ICAO env comp)	74 511/331,4	69 523/309,3
RR Trent 1000 - G2 (See Note 17 for ICAO env comp)	72 066/320,6	64 722/287,9
RR Trent 1000 - H2 (See Note 17 for ICAO env comp)	63 897/284,2	58 866/261,8
RR Trent 1000 - L2 (See Note 17 for ICAO env comp)	74 511/331,4	69 523/309,3
RR Trent 1000 - AE3 (See Note 17 for ICAO env comp)	69 194/307,8	64 722/287,9
RR Trent 1000 - CE3 (See Note 17 for ICAO env comp)	74 511/331,4	69 523/309,3
RR Trent 1000 - D3 (See Note 17 for ICAO env comp)	74 511/331,4	69 523/309,3
RR Trent 1000 - G3 (See Note 17 for ICAO env comp)	72 066/320,6	64 722/287,9
RR Trent 1000 - H3 (See Note 17 for ICAO env comp)	63 897/284,2	58 866/261,8
GEnx-1B64 (See Note 18 for SDR Reporting) (See Note 4 for ICAO env comp) (See Note 10 for applicable BOM)	67 000/298	61 500/273,6
GEnx-1B64/P1 (See Note 18 for SDR Reporting) (See Note 4 for ICAO env comp) (See Note 13 for applicable BOM)	67 000/298	61 500/273,6
GEnx-1B64/P2 (See Note 18 for SDR Reporting) (See Note 17 for ICAO env comp) (See Note 15 for applicable BOM)	67 000/298	61 500/273,6
GEnx-1B67 (See Note 18 for SDR Reporting) (See Note 4 for ICAO env comp) (See Note 11 for applicable BOM)	69 400/308,7	61 500/273,6

ENGINE LIMITS 787-8 (CONT.):

GEnx-1B67/P1 (See Note 18 for SDR Reporting) (See Note 4 for ICAO env comp) (See Note 13 for applicable BOM)	69 400/308,7	61 500/273,6
GEnx-1B67/P2 (See Note 18 for SDR Reporting) (See Note 17 for ICAO env comp) (See Note 15 for applicable BOM)	69 400/308,7	61 500/273,6
GEnx-1B70 (See Note 18 for SDR Reporting) (See Note 4 for ICAO env comp) (See Note 12 for applicable BOM)	72 300/321,6	66 500/295,8
GEnx-1B70/P1 (See Note 18 for SDR Reporting) (See Note 4 for ICAO env comp) (See Note 13 for applicable BOM)	72 300/321,6	66 500/295,8
GEnx-1B70/P2 (See Note 18 for SDR Reporting) (See Note 17 for ICAO env comp) (See Note 15 for applicable BOM)	72 300/321,6	66 500/295,8
GEnx-1B70C/P1 (See Note 18 for SDR Reporting) (See Note 4 for ICAO env comp) (See Note 13 for applicable BOM)	72 300/321,6	66 500/295,8
GEnx-1B70C/P2 (See Note 18 for SDR Reporting) (See Note 17 for ICAO env comp) (See Note 15 for applicable BOM)	72 300/321,6	66 500/295,8
GEnx-1B70/75/P1 (See Note 18 for SDR Reporting) (See Note 4 for ICAO env comp) (See Note 13, 14 for applicable BOM)	72 300/321,6	66 500/295,8
GEnx-1B70/75/P2 (See Note 18 for SDR Reporting) (See Note 20 for ICAO env comp) (See Note 15, 16 for applicable BOM)	72 300/321,6	66 500/295,8

ENGINE LIMITS 787-9

Static thrust lb/kN, standard day sea level

	Takeoff (see Note 7 for operating limits)	Maximum continuous
RR Trent 1000 - A2 (See Note 17 for ICAO env comp)	69 194/307,8	64 722/287,9
RR Trent 1000 - D2 (See Note 17 for ICAO env comp)	74 511/331,4	69 523/309,3
RR Trent 1000 - K2 (See Note 17 for ICAO env comp)	78 129/347,5	71 818/319,5
RR Trent 1000 - J2 (See Note 17 for ICAO env comp)	78 129/347,5	71 818/319,5
RR Trent 1000 - AE3 (See Note 17 for ICAO env comp)	69 194/307,8	64 722/287,9
RR Trent 1000 - D3 (See Note 17 for ICAO env comp)	74 511/331,4	69 523/309,3
RR Trent 1000 - J3 (See Note 17 for ICAO env comp)	78 129/347,5	71 818/319,5
RR Trent 1000 - K3 (See Note 17 for ICAO env comp)	78 129/347,5	71 818/319,5
GEnx-1B67/P2 (See Note 18 for SDR Reporting) (See Note 17 for ICAO env comp) (See Note 15 for applicable BOM)	69 400/308,7	61 500/273,6
GEnx-1B70 (See Note 18 for SDR Reporting) (See Note 4 for ICAO env comp) (See Note 12 for applicable BOM)	72 300/321,6	66 500/295,8
GEnx-1B70/P1 (See Note 18 for SDR Reporting) (See Note 4 for ICAO env comp) (See Note 13 for applicable BOM)	72 300/321,6	66 500/295,8
GEnx-1B70/P2 (See Note 18 for SDR Reporting) (See Note 17 for ICAO env comp) (See Note 15 for applicable BOM)	72 300/321,6	66 500/295,8
GEnx-1B70/75/P2 (See Note 18 for SDR Reporting) (See Note 17 for ICAO env comp) (See Note 15, 16 for applicable BOM)	72 300/321,6	66 500/295,8
GEnx-1B74/75/P1 (See Note 18 for SDR Reporting) (See Note 17 for ICAO env comp) (See Note 13 for applicable BOM)	76 700/341,2	68 600/305,2
GEnx-1B74/75/P2 (See Note 18 for SDR Reporting) (See Note 17 for ICAO env comp) (See Note 15 for applicable BOM)	76 700/341,2	68 600/305,2
GEnx-1B76A/P2 (See Note 18 for SDR Reporting) (See Note 17 for ICAO env comp) (See Note 15 for applicable BOM)	78 500/349,2	68 600/305,2

ENGINE LIMITS 787-10

Static thrust lb/kN, standard day sea level

	Takeoff (see Note 7 for operating limits)	Maximum continuous
RR Trent 1000 - J3 (See Note 19 for ICAO env comp)	78 129/347,5	71 818/319,5
RR Trent 1000 - K3 (See Note 19 for ICAO env comp)	78 129/347,5	71 818/319,5
GEnx-1B74/75/P2 (See Note 18 for SDR Reporting) (See Note 19 for ICAO env comp) (See Note 15 for applicable BOM)	76 700/341,2	68 600/305,2
GEnx-1B76/P2 (See Note 18 for SDR Reporting) (See Note 19 for ICAO env comp) (See Note 15 for applicable BOM)	78 500/349,2	68 600/305,2
GEnx-1B76A/P2 (See Note 18 for SDR Reporting) (See Note 19 for ICAO env comp) (See Note 15 for applicable BOM)	78 500/349,2	68 600/305,2

Engine operating limits B787-8:

Engine Limits GEnx	1B64	1B64/P1	1B64/P2	1B67	1B67/P1	1B67/P2
Fan Speed (rpm)						
Max Takeoff	2 326	2 326	2 326	2 326	2 360	2 360
Max Continuous	2 247	2 247	2 247	2 247	2 247	2 247
Indicated Turbine Exhaust Gas Temperature °C/°F						
Max Takeoff	1 035/ 1 895	1 060/ 1 940	1 065/ 1 949	1 035/ 1 895	1 060/ 1 940	1 065/ 1 949
Max Continuous	1 005/ 1 841	1 030/ 1 886	1 030/ 1 886	1 005/ 1 841	1 030/ 1 886	1 030/ 1 886
Ground	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382
Oil Temperature °C/°F						
Max Continuous	160/320	160/320	160/320	160/320	160/320	160/320
Max Transient	177/350	177/350	177/350	177/350	177/350	177/350
Min Oil Pressure psi (red region) Document GEK-112857 Fig.8-1						
Core Speed 60%	10	10	10	10	10	10
Core Speed 80%	12	12	12	12	12	12
Core Speed 100%	22	22	22	22	22	22

Engine operating limits B787-8 (cont.)

Engine Limits GEnx	1B70	1B70/P1	1B70/P2	1B70C/P 1	1B70C/P 2	1B70/75/ P1	1B70/75/ P2
Fan Speed (rpm)							
Max Takeoff	2 401	2 401	2 401	2 401	2 401	2 401	2 401
Max Continuous	2 319	2 319	2 319	2 319	2 319	2 319	2 319
Indicated Turbine Exhaust Gas Temperature °C/°F							
Max Takeoff	1 035/ 1 895	1 060/ 1 940	1 065/ 1 949	1 060/ 1 940	1 065/ 1 949	1 060/ 1 940	1 065/ 1 949
Max Continuous	1 005/ 1 841	1 030/ 1 886	1 030/ 1 886	1 030/ 1 886	1 030/ 1 886	1 030/ 1 886	1 030/ 1 886
Ground	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382
Oil Temperature °C/°F							
Max Continuous	160/320	160/320	160/320	160/320	160/320	160/320	160/320
Max Transient	177/350	177/350	177/350	177/350	177/350	177/350	177/350
Min Oil Pressure psi (red region) Document GEK-112857 Fig.8-1							
Core Speed 60%	10	10	10	10	10	10	10
Core Speed 80%	12	12	12	12	12	12	12
Core Speed 100%	22	22	22	22	22	22	22

Engine Operating Limits B787-8:

Engine Limits RR Trent 1000	A	C	D	E	G	H
Fan Speed (rpm)						
Max Takeoff	2 721	2 721	2 721	2 721	2 721	2 721
Max Continuous	2 721	2 721	2 721	2 721	2 721	2 721
Turbine Gas Temperature °C/°F						
Max Takeoff	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652
Max Continuous	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562
Ground	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292
Oil Temperature °C/°F						
Max Continuous	196/385 without SB 72-G319; 193/379 with SB 72-G319					
Max Transient	205/401 without SB 72-G319; 201/394 with SB 72-G319					
Minimum Oil Pressure psi						
Ground idle to 74% IP rpm	30					
Between 74% and 100% IP rpm	30-75 without SB 72-G319; 30-90 with SB 72-G319					
Above 100% IP rpm	75 without SB 72-G319; 90 with SB 72-G319					

Engine Operating Limits B787-8 (cont.):

Engine Limits RR Trent 1000	A2	C2	D2	G2	H2	L2
Fan Speed (rpm)						
Max Takeoff	2 723	2 723	2 723	2 723	2 723	2 723
Max Continuous	2 723	2 723	2 723	2 723	2 723	2 723
Turbine Gas Temperature °C/°F						
Max Takeoff	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652
Max Continuous	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562
Ground	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292
Oil Temperature °C/°F						
Max Continuous	193/379	193/379	193/379	193/379	193/379	193/379
Max Transient	201/394	201/394	201/394	201/394	201/394	201/394
Minimum Oil Pressure psi						
Ground idle to 74% IP rpm	30					
Between 74% and 100% IP rpm	30-90					
Above 100% IP rpm	90					

Engine Limits RR Trent 1000	AE3	CE3	D3	G3	H3
Fan Speed (rpm)					
Max Takeoff	2 723	2 723	2 723	2 723	2 723
Max Continuous	2 723	2 723	2 723	2 723	2 723
Turbine Gas Temperature °C/°F					
Max Takeoff	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652
Max Continuous	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562
Ground	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292
Oil Temperature °C/°F					
Max Continuous	196/385	196/385	196/385	196/385	196/385
Max Transient	201/394	201/394	201/394	201/394	201/394
Minimum Oil Pressure psi					
Ground idle to 74% IP rpm	30				
Between 74% and 100% IP rpm	30-90				
Above 100% IP rpm	90				

Engine operating limits B787-9:

Engine Limits GENx	1B67/ P2	1B70	1B70/ P1	1B70/ P2	1B70/75/ P2	1B74/75/ P1	1B74/75/ P2	1B76A/ P2
Fan Speed (rpm)								
Max Takeoff	2 360	2 326	2 401	2 401	2 401	2 496	2 496	2 521
Max Continuous	2 247	2 247	2 319	2 319	2 319	2 375	2 375	2 375
Indicated Turbine Exhaust Gas Temperature °C/°F								
Max Takeoff	1 065/ 1 949	1 035/ 1 895	1 060/ 1 940	1 065/ 1 949	1 065/ 1 949	1 065/ 1 949	1 065/ 1 949	1 065/ 1 949
Max Continuous	1 030/ 1 886	1 005/ 1 841	1 030/ 1 886	1 030/ 1 886	1 030/ 1 886	1 030/ 1 886	1 030/ 1 886	1 030/ 1 886
Ground	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382	750/ 1 382
Oil Temperature °C/°F								
Max Continuous	160/ 320	160/ 320	160/ 320	160/ 320	160/320	160/320	160/320	160/ 320
Max Transient	177/ 350	177/ 350	177/ 350	177/ 350	177/350	177/350	177/350	177/ 350
Min Oil Pressure psi (red region) Document GEK-112857 Fig.8-1								
Core Speed 60%	10	10	10	10	10	10	10	10
Core Speed 80%	12	12	12	12	12	12	12	12
Core Speed 100%	22	22	22	22	22	22	22	22

Engine Operating Limits 787-9 (cont.):

Engine Limits RR Trent 1000	A2	D2	K2	J2	AE3	D3	J3	K3
Fan Speed (rpm)								
Max Takeoff	2 723	2 723	2 723	2 723	2 723	2 723	2 723	2 723
Max Continuous	2 723	2 723	2 723	2 723	2 723	2 723	2 723	2 723
Turbine Gas Temperature °C/°F								
Max Takeoff	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652	900/ 1 652
Max Continuous	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562	850/ 1 562
Ground	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292	700/ 1 292
Oil Temperature °C/°F								
Max Continuous	193/ 379	193/ 379	193/ 379	193/ 379	196/385	196/385	196/385	196/ 385
Max Transient	201/ 394	201/ 394	201/ 394	201/ 394	201/394	201/394	201/394	201/ 394
Minimum Oil Pressure psi								
Ground idle to 74% IP rpm	30					30		
Between 74% and 100% IP rpm	30-90					30-90		
Above 100% IP rpm	90					90		

Engine operating limits B787-10:

Engine Limits GEnx	1B74/75/P2	1B76/P2	1B76A/P2
Fan Speed (rpm)			
Max Takeoff	2 496	2 521	2 521
Max Continuous	2 375	2 375	2 375
Indicated Turbine Exhaust Gas Temperature °C/°F			
Max Takeoff	1 065/1 949	1 065/ 1 949	1 065/ 1 949
Max Continuous	1 030/1 886	1 030/ 1 886	1 030/ 1 886
Ground	750/1 382	750/1 382	750/ 1 382
Oil Temperature °C/°F			
Max Continuous	160/320	160/320	160/320
Max Transient	177/350	177/350	177/350
Min Oil Pressure psi (red limit) Document GEK-112857 (Fig.8-1)			
Core Speed 60%	10	10	10
Core Speed 80%	12	12	12
Core Speed 100%	22	22	22

Engine operating limits 787-10 (cont.):

Engine Limits RR Trent 1000	J3	K3
Fan Speed (rpm)		
Max Takeoff	2 723	2 723
Max Continuous	2 723	2 723
Turbine Gas Temperature °C/°F		
Max Takeoff	900/1 652	900/1 652
Max Continuous	850/1 562	850/1 562
Ground	700/1 292	700/1 292
Oil Temperature °C/°F		
Max Continuous	196/385	196/385
Max Transient	201/394	201/394
Minimum Oil Pressure psi		
Ground idle to 74% IP rpm	30	
Between 74% and 100% IP rpm	30-90	
Above 100% IP rpm	90	

AIRSPEED LIMITS (CAS)

VMO/MMO = 350KEAS / 360KIAS / 0.90M.

For other airspeed limits, see the appropriate ANAC-approved Airplane Flight Manual.

C. G. RANGE

See the appropriate ANAC-approved Airplane Flight Manual.

MAXIMUM WEIGHT

Boeing 787-8:

Ramp (line number 1-19): 486 000 lb/220 445 kg

Ramp (line number 20+): 503 500 lb/228 383 kg

Takeoff (line number 1-19): 484 000 lb/219 538 kg

Takeoff (line number 20+): 502 500 lb/227 930 kg

Landing (line number 1-19): 370 000 lb/167 829 kg

Landing (line number 20+): 380 000 lb/172 365 kg

Zero Fuel (line number 1-19): 345 000 lb/156 489 kg

Zero Fuel (line number 20+): 355 000 lb/161 025 kg

Boeing 787-9:

Ramp*: 563 000 lb/255 372 kg

Takeoff**: 561 500 lb/254 692 kg

Landing: 425 000 lb/192 776 kg

Zero Fuel: 400 000 lb/181 436 kg

*MTW above 561 500 LB (254 692 KG) is allowed only if General Electric GEnx-1B /P2G01 or /P2G02 or Rolls-Royce Trent 1000 3 engine builds are installed in both positions. Otherwise, MTW is limited to 561 500 LB (254 692 KG).

**MTOW above 560000 LB (254011 KG) is allowed only if General Electric GEnx-1B /P2G01 or /P2G02 or Rolls-Royce Trent 1000 3 engine builds are installed in both positions. Otherwise, MTOW is limited to 560 000 LB (254 011 KG).

Boeing 787-10:

Ramp: 561 500 lb/254 692 kg

Takeoff: 560 000 lb/254 011 kg

Landing: 445 000 lb/201 848 kg

Zero Fuel: 425 000 lb/192 776 kg

MINIMUM CREW

Two (2): pilot and copilot.

MAXIMUM PASSENGERS**Boeing 787-8:**

The maximum number of passengers approved for emergency evacuation is:

381 with four pairs of exits in an (A, A, A, A) exit arrangement,
355 with four pairs of exits in a (C, A, A, A) exit arrangement,
330 with four pairs of exits in an (A, A, C, A) exit arrangement, and
300 with four pairs of exits in a (C, A, C, A) exit arrangement.
Maximum passenger capacity may be further limited by
Environmental Control System ventilation per occupant
requirement defined in 25.831(a).

Boeing 787-9:

The maximum number of passengers approved for emergency evacuation is:

420 with four pairs of exits in an (A, A, A, A) exit arrangement,
355 with four pairs of exits in a (C, A, A, A) exit arrangement,
355 with four pairs of exits in an (A, A, C, A) exit arrangement, and
300 with four pairs of exits in a (C, A, C, A) exit arrangement.
Maximum passenger capacity may be further limited by
Environmental Control System ventilation per occupant
requirement defined in 25.831(a).

Boeing 787-10:

The maximum number of passengers approved for emergency evacuation is:

440 with four pairs of exits in an (A, A, A, A) exit arrangement,
355 with four pairs of exits in a (C, A, A, A) exit arrangement,
355 with four pairs of exits in an (A, A, C, A) exit arrangement, and
300 with four pairs of exits in a (C, A, C, A) exit arrangement.
Maximum passenger capacity may be further limited by
Environmental Control System ventilation per occupant
requirement defined in 25.831(a).

MAXIMUM BAGGAGE**Boeing 787-8:**

Fwd Hold: 56 250 lb/25 514 kg
Aft Hold: 42 180 lb/19 132 kg
Bulk Hold: 6 030 lb/2 735 kg

Boeing 787-9:

Fwd Hold: 70 560 lb/32 005 kg
Aft Hold: 56 560 lb/25 655kg
Bulk Hold: 6 030 lb/2 735 kg

Boeing 787-10:

Fwd Hold: 81 500 lb/36 967 kg
Adt Hold: 67 500 lb/30 617 kg
Bulk Hold: 6 030 lb/2 735 kg

APU

PRATT & WHITNEY RZESZÓW SA MODEL APS5000A

FUEL CAPACITY**Boeing 787-8:**

Maximum allowable fuel: Center Tank 84 036 liters with Balance Arm 2 514,9 cm; Main Tanks 1 and 2 21 085 liters each with Balance Arm 29194,8 cm
Unusable fuel: 403 liters

Boeing 787-9:

Maximum allowable fuel: Center Tank 84 566 liters with Balance Arm 28196,5 cm; Main Tanks 1 and 2 20 895 liters each with Balance Arm 32202,1 cm
Unusable fuel: 363 liters

Boeing 787-10:

Maximum allowable fuel: Center Tank 84 566 liters with Balance Arm 31255,5 cm; Main Tanks 1 and 2 20 896 liters each with Balance Arm 35250,1 cm
Unusable fuel: 363 liters.

MAXIMUM OPERATING ALTITUDE**Boeing 787-8/-9:**

43 100 ft (13 137 m)

Boeing 787-10:

41 100 ft (12 527 m)

S/N'S ELIGIBLE

787-8: None

787-9: None

787-10: None

A Certificate of Airworthiness for Export endorsed as noted under "Import Requirements" must be submitted for each individual aircraft for which application for a Brazilian Certificate of Airworthiness is made.

IMPORT ELIGIBILITY

A Brazilian Certificate of Airworthiness may be issued on the basis of on an FAA Export Certificate of Airworthiness (or a third country Export Certificate of Airworthiness, in case of used aircraft imported from such country), including the following statement:

"The aircraft covered by this certificate has been inspected, tested and found to be in conformity with the Brazilian approved type design as defined by the Brazilian Type Certificate no. 2021T03 and is in condition of safe operation".

See note 20 for Brazilian requirements acceptance of these airplanes and/or contact ANAC at the following address:

cpct@anac.gov.br.

**CERTIFICATION BASIS FOR BOEING
787-8**

14 CFR Part 25, Airworthiness Standards, through Amendment 25-119 and Amendments 25-120, 25-124, 25-125 and 25-128 with exceptions as noted below.

Section No.: 25.1309

Title: For Cargo Fire Protection Systems and Uncommanded High Thrust

At Amdt: 25.119

Amendment 25-118 was not published and therefore has no applicability.

14 CFR Part 26, Continued Airworthiness and Safety Improvements, through Amendment 26-5, for §§ 26.11, 26.21, 26.37, 26.43, and 26.45:

14 CFR Part 34, Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered, through Amendment 34-5A. In addition, the engine meets ICAO environmental standards defined in Annex 16, amendment 7, dated November 17, 2011. (See Note 17 for additional considerations)

14 CFR Part 36, Noise Standards: Aircraft Type Certification and Airworthiness Certification, through Amendment 36-28. Demonstrated compatibility with the ICAO Annex 16, Volume I, Amendment 9 is documented in the AFM. (See Note 17 for additional considerations)

The Following Optional Design Regulations have been complied with:

Ditching: 14 CFR §§ 25.801, 25.1411(d), (e), (f), (g) and 25.1415

Ice Protection: 14 CFR § 25.1419

ETOPS: The 787-8 has been evaluated in accordance with the type design requirements of 14 CFR § 25.3(b)(2) and 25.1535 and found suitable for greater than 180- minute ETOPS operations when operated and maintained in accordance with Boeing Document No. D021Z002-01, "Model 787 ETOPS Configuration, Maintenance, and Procedures." This finding does not constitute approval to conduct ETOPS.

**CERTIFICATION BASIS FOR
BOEING 787-8
(Cont.)****Exemptions from 14 CFR Part 25:**

1. Grant of Exemption, § 25.562(b)(2), Relief from floor warpage testing requirements for flightdeck seats on the Boeing Model 787 series airplanes; Exemption No. 9486, September 11, 2007.
2. Grant of Exemption, § 25.809(a), Relief from the requirement that flightcrew emergency exits have a means to view outside conditions under all lighting situations for the Boeing Model 787 series airplanes; Exemption No. 10114, August 11, 2010.
3. Grant of Exemption, § 25.809(a), Relief for a limited number of the Boeing Model 787 series airplanes from the requirement that passenger emergency exits have a means to view outside conditions under all lighting situations; Exemption No. 10235A, May 01, 2013 (Limited to aircraft below Line Number 127 for the 787-8 series only).
4. Partial Grant of Exemption, § 25.841(a)(2)(i)(ii), Relief for the Boeing Model 787 series airplanes from the requirement that, during a decompression caused by failures of the engines, airplane cabin pressure altitude not exceed 25,000 feet for more than 2 minutes or exceed 40,000 feet for any duration; Exemption No. 8857, March 30, 2007.
5. Time Limited Grant of Exemption, § 25.1309(c), Temporary relief from the requirement to provide indication of anticipated fuel system contamination to the flightcrew of Boeing Model 787-8 airplanes powered by Rolls-Royce Trent 1000 engines; Exemption No. 10199, January 28, 2011, and Exemption No. 10199A, August 18, 2011, Exemption No. 10199B, June 30, 2014 (Expires April 30, 2017).
6. Grant of Exemption, § 25.1447(c)(1), Relief from the requirement for passenger oxygen masks to be automatically presented before the cabin pressure altitude exceeds 15,000 feet for the Boeing Model 787 series airplanes; Exemption No. 9801, December 12, 2008.
7. Time Limited Grant of Exemption, §§ 25.1305(c)(6) and 25.1309(c), Temporary relief from the requirements to provide indication of impending bypass of the engine oil fuel cooled oil coolers and to provide indication of impending bypass on the main fuel filters of multiple engines, for the Boeing Model 787-8 airplanes powered by General Electric GENx-1B, or subsequent variants of the engine; Exemption No. 10268 (corrected copy), May 24, 2011, and Exemption No. 10268A, August 15, 2011, Exemption No. 10268B, June 30, 2014 (Expires April 30, 2017).
8. Grant of Exemption, Section 25.853(d) which requires that certain interior components of airplanes with passenger capacities of 20 or more meet the flammability test requirements of parts IV and V (heat release and smoke emission) of appendix F of 14 CFR part 25; 10868A, November 5, 2013
9. Grant of Exemption, Section 25.813(e) at Amendment 25-116 No door may be installed between any passenger seats that is occupiable for takeoff and landing and any passenger emergency exit, such that the door crosses any egress path (including aisles, cross aisles and passageways); Exemption 10879, October 18, 2013. Partial Grant of Exemption 10879A, amended in entirety on March 7, 2018, Partial Grant of Exemption 10879B, amended in entirety on December 3, 2018.

**CERTIFICATION BASIS FOR
BOEING 787-8
(Cont.)****Exemptions from 14 CFR Part 25 (cont.):**

10. Time Limited Grant of Exemption §25.1305(c)(5) at Amendment 25-120, providing flight-deck annunciation of operation of the engine VBV ice-protection system; Exemption 11081, issued October 10, 2014, requires production airplanes to be fully compliant after June 30, 2015 and the in-service fleet to be fully compliant after March 31, 2016. Time Limited Grant of Exemption § 25.939(a), at Amendment 25-40, for airplanes that have incorporated engine ice protection system modifications and associated AFM limitations; Exemption 11081A, issued January 20, 2015, requires production airplanes to be fully compliant by June 30, 2015 and prohibits in-service fleet retrofit after June 30, 2015. Exemption 11081B, issued June 10, 2015, extends the dates of 11081A requiring production airplanes to be fully compliant to § 25.939(a), at Amendment 25-40, to December 31, 2015 and prohibits in-service fleet retrofit after December 31, 2015.
11. Time Limited Grant of Exemption, § 25.901(c), 25.1301(a)(4), 25.1309(a), and 25.1309(b). Temporary relief from the requirements as they relate to single failures of the thrust control module that could result in uncommanded high thrust conditions and to the extent necessary to allow type certification of new propulsion control system designs for Model 787-8 and 787-9 airplanes equipped with General Electric GEnx-1B engines; Exemption No. 17112 dated September 23, 2016. The conditions of TLE 17112 require production airplanes to be fully compliant after December 31, 2018, and the in-service fleet to be fully compliant by December 31, 2020.
12. Grant of Exemption, § 25.901(c) to allow type certification of new propulsion control system designs for the Model 787 airplanes without an exact showing of compliance with the "no single failure" requirement of §25.901(c) relating to UHT in combination with high crosswinds in certain takeoff and approach-and-landing scenarios. This exemption applies only to those UHT failure conditions that, when combined with high crosswinds, do not comply with § 25.901(c).; Exemption 17319, issued May 2, 2017
13. Time Limited Grant of Exemption, § 25.903(a)(1) to allow type certification of the Model 787 airplanes equipped with Rolls-Royce Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3 and Trent 1000-H3 engines from the engine requirement that mandates engines comply with the smoke emissions requirements of 14 CFR Part 34. This exemption is based on Time-Limited Grant of Exemption No. 17550 which was issued to Rolls-Royce plc and is required to meet the conditions and limitations of, that timelimited exemption for their engines. Exemption No. 17613, issued October 25, 2017. The conditions of TLE 17613 requires that all in-service airplanes be fully compliant by December 31, 2022. On February 12, 2018 Rolls-Royce plc met condition 6.b of exemption 17550 showing full compliance to 14 CFR Part 34 which meets the requirement of § 25.903(a)(1).

**CERTIFICATION BASIS FOR
BOEING 787-8
(Cont.)**

Equivalent Levels of Safety (ELOS) are identified as:

TC6918SE-T-A-9	§§ 25.341, 25.343, 25.345, 25.371, 25.373, and 25.391	ELOS Finding for Gust and Continuous Turbulence Design Loads
TC6918SE-T-A-10	§ 25.335(b)	ELOS Finding for Design Airspeeds
TC6918SE-T-A-11	§§ 25.391, 25.393, and 25.415	ELOS Finding for the Ground Gust Requirements
TC6918SE-T-A-12	§ 25.331(c)	ELOS for Symmetric Maneuvering Conditions
TC6918SE-T-A-13	§ 25.629	ELOS for Aeroelastic Stability
PS08-0670-C-1	§ 25.853(a)	ELOS Finding for Adhesives Used in Interior Panel Joint Potting Applications
PS13-1000-C-5	§ 25.853(a)(d)	ELOS Finding for Flammability Testing Hierachy
TC6918SE-T-CS-1	§ 25.810(a)(1)(ii)	ELOS Finding for Escape Slide Inflation Times
TC6918SE-T-CS-2	§ 25.811(f)	ELOS Finding for Emergency Exit Markings and Door Sill Reflectance
PS07-0585-CS-10	§§ 25.811(d), 25.811(g), 25.812(b)(1)(i), and 25.812(b)(1)(ii)	ELOS Finding for Graphical Exit Signs
TC6918SE-T-CS-12	§ 25.791(a)	ELOS Finding for Lighted "No Smoking Signs in Lieu of Placards
TC6918SE-T-CS-14	§§ 25.853 and 25.856(b)	ELOS Finding for Associated to Post-Crash Fire Survivability
PS07-0585-CS-18	§ 25.811(e)(4)(i), (ii), and (iii)	ELOS Finding for the Passenger Door Operational Arrow Location and Color
PS06-0413-CS-25	§ 25.783(e)(2)	ELOS Finding for Passenger and Large Cargo Door Indication
PS09-0987-CS-28	§ 25.562 and 25.785	ELOS Finding for Dynamic Test Requirements for Single Occupant Side-Facing Seats

**CERTIFICATION BASIS FOR
BOEING 787-8
(Cont.)**

Equivalent Levels of Safety (ELOS) are identified as (cont.):

PS12-1032-CS-31 Rev A	§§ 25.562 and 25.785	ELOS Finding for Dynamic Test Requirements for Single Occupant Oblique Seats with Inflatable Restraints
PS12-1033-C-32	§§ 25.562 and 25.785	ELOS Finding for Dynamic Test Requirements for Single Occupant Side-Facing Seats
PS13-0679-CS-33	§§ 25.561 and 25.621	ELOS Finding for Critical Casting Factor Requirements for Model 787 Series Aircraft
PS13-0906-CS-37	§§ 25.562 and 25.785	ELOS Finding for Dynamic Test Requirements for Side-Facing Seats with Shoulder Restraints
PS18-0046-EE-10	§§ 25.1535 and K25.2.2	ELOS Finding for 787 Rolls-Royce Trent 1000-TEN Early ETOPS Airplane Demonstration Tests
TC6918SE-T-ES-5	§ 25.831(g)	ELOS Finding for Acceptable High Temperature Physiological Environment During Failure Condition
TC6918SE-T-ES-16	§ 25.1443(c)	ELOS Finding for the Passenger Oxygen System
TC6918SE-T-ES-18	§ 25.1441(c)	ELOS Finding for Pulse Oxygen System for Passenger
TC6918SE-T-ES-19	§ 25.841(b)(6)	ELOS Finding for Cabin Altitude Warning System for Operations into High Altitude Airports
TC6918SE-T-ES-20	§ 25.1443(d)	ELOS Finding for Portable Pulse Oxygen System
TS15-0029-F-1	§ 25.251	ELOS Finding for Vibration/Buffeting Compliance Criteria, Taxi Aid Camera
TC6918SE-T-F-4	§ 25.1517	ELOS Finding for Rough Air Speed (VRA)

CERTIFICATION BASIS FOR BOEING 787-8 (Cont.) Equivalent Levels of Safety (ELOS) are identified as (cont.):

TC6918SE-T-F-6	§ 25.107 (e)(1)(iv)	ELOS Finding for Minimum Unstick (VMU) Speed Margin
TC6918SE-T-F-14	§ 25.677(b)	ELOS Finding for Trim Displays
TC6918SE-T-F-17	§ 25.255	ELOS Finding for Out-of-Trim Characteristics
PS06-0496-F-18	§ 25.1555	ELOS Engine and APU Fire Handle Design
PS06-0413-F-20	§ 25.1325(e)	ELOS Finding for the Standby Air Data System
PS14-0452-F-23A	§ 25.251	ELOS Finding for Vibration/Buffeting Compliance Criteria, Panasonic Ku-Band Radome Antenna
TC6918SE-T-G-8	§§ 25.1529, 25.1729, Appendix H25.4 To Part 25	ELOS Finding for formatting of Boeing ICA Manuals Airworthiness Limitations on Models 787
PS05-0177-P-2	§ 25.981(b)(2)	ELOS Finding for the Fuel Tank Flammability Rule (FTFR)
TC6918SE-T-P-2	§§ 25.933(a)(1)(i) and 25.933(a)(1)(ii)	ELOS Finding for Flight Critical Thrust Reverser
PS14-0470-P-15	§ K25.2.2(d)(1)	ELOS Finding for the 787-8/-9 Rolls-Royce Trent 1000-TEN ETOPS Ground Test
TC6918SE-T-P-3	§ 25.1182(a)	ELOS Finding for Fire Safety Requirements for the Aft Strut Fairing Compartment
TC6918SE-T-P-13	§§ E25.1, F25.1 and G25.1	ELOS Finding for the Auxiliary Power Unit (APU) Installation
TC6918SE-T-P-17	§ 25.934	ELOS Finding for the Engine and Thrust Reverser System Testing
TC6918SE-T-P-19	§§ 25.1023(b) and 25.1121 (c)	ELOS Finding for Auxiliary Power System
TC6918SE-T-P-20	§§ 25.997 and 25.1305(c)(6)	ELOS Finding for Warning Means for Engine Fuel Filter Contamination

CERTIFICATION BASIS FOR BOEING 787-8 (CONT.) Equivalent Levels of Safety (ELOS) are identified as (cont.):

TC6918SE-T-P-27	§ 25.1145(a)	ELOS Finding for Engine Igniter Flight-deck Switch Configuration
PS06-0414-P-34	§§ 25.1181(a)(6), 25.1181(b), 25.1182, and 25.1183(a)	ELOS Finding for Fire Safety Requirements for GENx-1B
PS13-0546-P-36	§§ 25.1549(b)	ELOS Finding for the Display of Powerplant Instruments
TC6918SE-T-SA-7	§§ 25.1301, 25.1309 and 25.131	ELOS Finding for use of ARAC Recommended Revision
TC6918SE-T-SA-10	§ 25.1459(a)(2)	ELOS Finding for Flight Recorders
TC6918SE-T-SA-11	§ 25.1303(c)(1)	ELOS Finding for Overspeed Aural Warning
TC6918SE-T-SA-29	§ 25.1333(a)	ELOS Finding for Instrument Systems
TC6918SE-T-SE-14	§ 25.1351(b)(5)	ELOS Finding for the Flight Control Electronics DC Power System
PS06-0496-T-SE-15	§ 25.1317(b)	ELOS Finding for High Intensity Radiated Fields (HIRF)
TC6918SE-T-SF-1	§ 25.671(c)(2)	ELOS Finding for Flight Control System Failure Criteria
TC6918SE-T-SF-5	§ 25.777(e)	ELOS Finding for the Wing Flap Control Lever
PS06-0496-SF-7	§ 25.675	ELOS Finding for Seal Krueger Flap Stops

**CERTIFICATION BASIS FOR
BOEING 787-8
(CONT.)**

Special Conditions with respect to the following subjects apply to the Model 787-8:

SC No., Subject

25-348-SC Composite Wing and Fuel Tank Structure Fire Protection Requirements

25-354A-SC Interaction of Systems and Structures, Electronic Flight Control System-Control Surface Awareness, High Intensity Radiated Fields (HIRF) Protection, Limit Engine Torque Loads for Sudden Engine Stoppage, and Design Roll Maneuver Requirement

25-355-SC Reinforced Flightdeck Bulkhead

25-356-SC Systems and Data Networks Security-Isolation or Protection from Unauthorized Passenger Domain Systems Access

25-357-SC Systems and Data Networks Security-Protection of Airplane Systems and Data Networks from Unauthorized External Access

25-359-SC Lithium Ion Battery Installation

25-360-SC Composite Fuselage In-Flight Fire/Flammability Resistance

25-362-SC Crashworthiness Emergency Landing Conditions

25-363-SC Tire Debris Penetration of Fuel Tank Structure

25-365-SC Operation Without Normal Electrical Power

25-370-SC Seats with Non-Traditional, Large, Non-Metallic Panels

25-414-SC Lightning Protection of Fuel Tank Structure to Prevent Fuel Tank Vapor Ignition

25-418-SC Overhead Flight Crew Rest Compartment Occupiable during Taxi, Takeoff, and Landing

25-419-SC Overhead Crew Rest Compartment

25-431-SC Seats with Inflatable Lapbelts

25-458-SC Single-place Side-facing Seats with Inflatable Lapbelts

25-605-SC Structure- Mounted Airbags

25-626A-SC Dynamic Test Requirements for Single-Occupant Oblique (Side-Facing) Seats With or Without Airbag Devices or 3-Point Restraint Systems

25-682-SC Non-Rechargeable Lithium Battery Installations

25-745-SC Seats with Inertia Locking Devices

**CERTIFICATION BASIS FOR
BOEING 787-9**

14 CFR Part 25, Airworthiness Standards, through Amendment 25-128 with with exceptions as noted below.

Section No	Title	At Amdt. 25-
25.107	Takeoff Speeds	135
25.795(b)(1)	Security considerations	N/A
25.795(c)(2)	Security considerations	N/A
25.795(c)(3(i))	Security considerations	N/A
25.125(b)(2)(ii)(B)	Landing	108
25.1309	For Cargo Fire Protection Systems and Uncommmanded High Thrust remains at FAA Special Condition 25-354A-SC for the Integrated Standby Flight Display (ISFD)	128
25.1317		

14 CFR Part 26, Based on 14 CFR §21.101(g) for changes made to TCs applicable provisions of 14 CFR part 26 are included in the certification basis. For any future 14 CFR part 26 amendments, the holder of this TC must demonstrate compliance with the applicable sections.

Compliance has been found for the following regulations through Amendment 26-5, for §§ 26.21, 26.37, 26.43, and 26.45

14 CFR Part 34, Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered, through Amendment 34-5A. In addition, the engine meets ICAO environmental standards defined in Annex 16, amendment 7, dated November 17, 2011. (See Note 17 for additional considerations)

14 CFR Part 36, Noise Standards: Aircraft Type Certification and Airworthiness Certification, through Amendment 36-28. Demonstrated compatibility with the ICAO Annex 16, Volume I, Amendment 9 is documented in the AFM. (See Note 17 for additional considerations)

The Following Optional Design Regulations have been complied with:

Ditching: 14 CFR §§ 25.801, 25.1411(d), (e), (f), (g) and 25.1415

Ice Protection: 14 CFR § 25.1419

ETOPS: The 787-9 has been evaluated in accordance with the type design requirements of 14 CFR § 25.3(b)(2) and 25.1535 and found suitable for greater than 180- minute ETOPS operations when operated and maintained in accordance with Boeing Document No. D021Z002-01, "Model 787 ETOPS Configuration, Maintenance, and Procedures." This finding does not constitute approval to conduct ETOPS.

**CERTIFICATION BASIS FOR
BOEING 787-9
(Cont.)****Exemptions from 14 CFR Part 25:**

1. Grant of Exemption, § 25.562(b)(2), Relief from floor warpage testing requirements for flightdeck seats on the Boeing Model 787 series airplanes; Exemption No. 9486, September 11, 2007.
2. Grant of Exemption, § 25.809(a), Relief from the requirement that flightcrew emergency exits have a means to view outside conditions under all lighting situations for the Boeing Model 787 series airplanes; Exemption No. 10114, August 11, 2010.
3. Partial Grant of Exemption, § 25.841(a)(2)(i)(ii), Relief from the requirement that the airplane must be designed so that occupants will not be exposed to a cabin pressure altitude that exceeds the following after decompression from any failure condition not shown to be extremely improbable:
 - (i) Twenty-five thousand (25,000) feet for more than 2 minutes; or
 - (ii) Forty Thousand (40,000) feet for any duration for the Boeing Company's Model 787-9 airplanes.Exemption No. 10962, March 3, 2014
4. Grant of Exemption, § 25.1447(c)(1), Relief from the requirement for passenger oxygen masks to be automatically presented before the cabin pressure altitude exceeds 15,000 feet for the Boeing Model 787 series airplanes; Exemption No. 9801, December 12, 2008.
5. Time Limited Grant of Exemption §25.1301(a)(1), Relief from the requirements that the airplane must function properly when installed be designed appropriate to its intended function for Ram Air Turbine (RAT) Generator Control Unit (GCU) on the Boeing model 787-9 airplane and Time Limited Grant of Exemption §25.1301(a)(4), §25.1309(a) and §25.1309(b)(2), Relief from the requirements that Systems and equipment must function properly when installed; Systems and equipment must perform intended function and Hazardous effects must be improbable for the Altitude-Select knob on the Boeing model 787-9 Autoflight Mode Control Panel; Exemption No. 11002, June 12, 2014 (Expires August 31, 2015 for the RAT GCU, November 30, 2015 for the MCP Altitude-select knob).
6. Grant of Exemption, § 25.853(d) and condition 1 of Special Condition No. 25-370-SC relief from the flammability requirements for large surface areas on seats in the Boeing Model 787-9 series airplanes; Exemption 10868, September 12, 2013 and Exemption No. 10868A, November 5, 2013.
7. Grant of Exemption, Section 25.813(e) at Amendment 25-116 No door may be installed between any passenger seats that is occupiable for takeoff and landing and any passenger emergency exit, such that the door crosses any egress path (including aisles, cross aisles and passageways); Exemption 10879, October 18, 2013. Partial Grant of Exemption 10879A, amended in entirety on March 7, 2018, Partial Grant of Exemption 10879B, amended in entirety on December 3, 2018.

**CERTIFICATION BASIS FOR
BOEING 787-9
(CONT.)****Exemptions from 14 CFR Part 25 (Cont.):**

8. Time Limited Grant of Exemption §25.1305(c)(5) at Amendment 25-120, providing flight-deck annunciation of operation of the engine VBV ice-protection system; Exemption 11081, issued October 10, 2014, requires production airplanes to be fully compliant after June 30, 2015 and the in-service fleet to be fully compliant after March 31, 2016. Time Limited Grant of Exemption § 25.939(a), at Amendment 25-40, for airplanes that have incorporated engine ice protection system modifications and associated AFM limitations; Exemption 11081A, issued January 20, 2015, requires production airplanes to be fully compliant by June 30, 2015 and prohibits in-service fleet retrofit after June 30, 2015. Exemption 11081B, issued June 10, 2015, extends the dates of 11081A requiring production airplanes to be fully compliant to §25.939(a), at Amendment 25-40, to December 31, 2015 and prohibits in-service fleet retrofit after December 31, 2015.

9. Time Limited Grant of Exemption, § 25.901(c), 25.1301(a)(4), 25.1309(a), and 25.1309(b). Temporary relief from the requirements as they relate to single failures of the thrust control module that could result in uncommanded high thrust conditions and to the extent necessary to allow type certification of new propulsion control system designs for Model 787-8 and 787-9 airplanes equipped with General Electric GENx-1B engines; Exemption No. 17112 dated September 23, 2016. The conditions of TLE 17112 require production airplanes to be fully compliant after December 31, 2018, and the in-service fleet to be fully compliant by December 31, 2020.

10. Grant of Exemption, § 25.901(c) to allow type certification of new propulsion control system designs for the Model 787 airplanes without an exact showing of compliance with the "no single failure" requirement of § 25.901(c) relating to UHT in combination with high crosswinds in certain takeoff and approach-and-landing scenarios. This exemption applies only to those UHT failure conditions that, when combined with high crosswinds, do not comply with § 25.901(c).; Exemption 17319, issued May 2, 2017

11. Time Limited Grant of Exemption, § 25.903(a)(1) to allow type certification of the Model 787 airplanes equipped with Rolls-Royce Trent 1000-AE3, Trent 1000-D3, Trent 1000-J3 and Trent 1000-K3 engines from the engine requirement that mandates engines comply with the smoke emissions requirements of 14 CFR Part 34. This exemption is based on Time-Limited Grant of Exemption No. 17550 which was issued to Rolls-Royce plc and is required to meet the conditions and limitations of, that time-limited exemption for their engines. Exemption No. 17613, issued October 25, 2017. The conditions of TLE 17613 requires that all inservice airplanes be fully compliant by December 31, 2022. On February 12, 2018 Rolls-Royce plc met condition 6.b of exemption 17550 showing full compliance to 14 CFR Part 34 which meets the requirement of § 25.903(a)(1).

CERTIFICATION BASIS FOR BOEING 787-9 (Cont.) Equivalent Levels of Safety (ELOS) are identified as:

TC6918SE-T-A-9	§§ 25.341, 25.343, 25.345, 25.371, 25.373, and 25.391	ELOS Finding for Gust and Continuous Turbulence Design Loads
TC6918SE-T-A-10	§ 25.335(b)	ELOS Finding for Design Airspeeds
TC6918SE-T-A-11	§§ 25.391, 25.393, and 25.415	ELOS Finding for the Ground Gust Requirements
TC6918SE-T-A-12	§ 25.331(c)	ELOS for Symmetric Maneuvering Conditions
TC6918SE-T-A-13	§ 25.629, 25.671(c)(2)	ELOS Finding for Aeroelastic Stability
PS13-1000-C-5	§ 25.853(a)(d)	ELOS Finding for Flammability Testing Hierachy
TC6918SE-T-CS-1	§ 25.810(a)(1)(ii)	ELOS Finding for Escape Slide Inflation Times
TC6918SE-T-CS-2	§ 25.811(f)	ELOS Finding for Emergency Exit Markings and Door Sill Reflectance
PS07-0585-CS-10	§§ 25.811(d), 25.811(g), 25.812(b)(1)(i), and 25.812(b)(1)(ii)	ELOS Finding for Graphical Exit Signs
TC6918SE-T-CS-12	§ 25.791(a)	ELOS Finding for Lighted "No Smoking" Signs in Lieu of Placards
TC6918SE-T-CS-14	§ 25.856(b)	ELOS Finding for Associated to Post-Crash Fire Survivability
PS07-0585-CS-18	§ 25.811(e)(4)(i), (ii), and (iii)	ELOS Finding for the Passenger Door Operational Arrow Location and Color
PS06-0413-CS-25	§ 25.783(e)(2)	ELOS Finding for Passenger and Large Cargo Door Indication
PS12-1033-C-32	§§ 25.562 and 25.785	ELOS Finding for Dynamic Test Requirements for Single Occupant Side-Facing Seats
PS13-0679-CS-33	§§ 25.561 and 25.621	ELOS Finding for Critical Casting Factor Requirements for Model 787 Series Aircraft

CERTIFICATION BASIS FOR BOEING 787-9 (Cont.) Equivalent Levels of Safety (ELOS) are identified as (cont.):

PS13-0906-CS-37	§§ 25.562 and 25.785	ELOS Finding for Dynamic Test Requirements for Side-Facing Seats
PS18-0046-EE-10	§§ 25.1535 and K25.2.2	ELOS Finding for 787 Rolls-Royce Trent 1000-TEN Early ETOPS Airplane Demonstration Tests
TC6918SE-T-ES-5	§ 25.831(g)	ELOS Finding for Acceptable High Temperature Physiological Environment During Failure Condition
TC6918SE-T-ES-16	§ 25.1443(c)	ELOS Finding for the Passenger Oxygen System
TC6918SE-T-ES-18	§ 25.1441(c)	ELOS Finding for Pulse Oxygen System for Passenger
TC6918SE-T-ES-19	§ 25.841(b)(6)	ELOS Finding for Cabin Altitude Warning System for Operations into High Altitude Airports
TC6918SE-T-ES-20	§ 25.1443(d)	ELOS Finding for Portable Pulse Oxygen System
TC6918SE-T-F-4	§ 25.1517	ELOS Finding for Rough Air Speed (VRA)
TC6918SE-T-F-14	§ 25.677(b)	ELOS Finding for Trim Displays
TC6918SE-T-F-17	§ 25.255	ELOS Finding for Out-of-Trim Characteristics
PS06-0496-F-18	§ 25.1555(d)(1)	ELOS Engine and APU Fire Handle Design
PS06-0496-T-F-21	§ 25.1325(e)	ELOS Finding for the Standby Air Data System
PS06-0496-F-22	§ 25.123(a) and (b)	ELOS Finding for Speeds for EM Route Flight Paths
TC6918SE-T-G-8	§§ 25.1529, 25.1729, Appendix H25.4 (a) and (b)	ELOS Finding for Formatting of Boeing Instructions for Continued Airworthiness Manuals - Airworthiness Limitations

CERTIFICATION BASIS FOR BOEING 787-9 (Cont.) Equivalent Levels of Safety (ELOS) are identified as (cont.):

PS14-0452-F-23A	§ 25.251	ELOS Finding for Vibration/Buffeting Compliance Criteria, Panasonic Ku-Band Radome Antenna
PS05-0177-P-2	§ 25.981(b)(2)	ELOS Finding for the Fuel Tank Flammability Rule (FTFR)
TC6918SE-T-P-2	§§ 25.933(a)(1)(i) and 25.933(a)(1)(ii)	ELOS Finding for Flight Critical Thrust Reverser
TC6918SE-T-P-3	§ 25.1182(a)	ELOS Finding for Fire Safety Requirements for the Aft Strut Fairing Compartment
TC6918SE-T-P-13	Part 25 subpart E,F & G	ELOS Finding for the Auxiliary Power Unit (APU) Installation
PS14-0470-P-15	§ K25.2.2(d)(1)	ELOS Finding for the 787-8/-9 Rolls-Royce Trent 1000-TEN ETOPS Ground Test
TC6918SE-T-P-17	§ 25.934	ELOS Finding for the Engine and Thrust Reverser System Testing
TC6918SE-T-P-19	§§ 25.1023(b) and 25.1121 (c)	ELOS Finding for Auxiliary Power System
TC6918SE-T-P-20	§§ 25.997 and 25.1305(c)(6)	ELOS Finding for Warning Means for Engine Fuel Filter Contamination
TC6918SE-T-P-27	§ 25.1145(a)	ELOS Finding for Engine Igniter Flight-deck Switch Configuration
PS06-0414-P-34	§§ 25.1181(a)(6), 25.1181(b), 25.1182, and 25.1183(a)	ELOS Finding for Fire Safety Requirements for GENx-1B
PS13-0546-P-36	§§ 25.1549(b)	ELOS Finding for the Display of Powerplant Instruments
TC6918SE-T-SA-10	§ 25.1459(a)(2)	ELOS Finding for Flight Recorders
TC6918SE-T-SA-11	§ 25.1303(c)(1)	ELOS Finding for Overspeed Aural Warning

CERTIFICATION BASIS FOR BOEING 787-9 (Cont.) Equivalent Levels of Safety (ELOS) are identified as (cont.):

TC6918SE-T-SA-29	§ 25.1333(a)	ELOS Finding for Instrument Systems
PS06-0496-T-SA-31	§§ 25.1301, 25.1309, and 25.1310	ELOS Finding for Use of ARAC Recommended Revision
PS12-0038-SE-11	§ 25.1713(c)	ELOS Finding for the Engine Wiring Interconnection System (EWIS)
PS14-1031-SE-28	§ 25.1713(c)	ELOS Finding for the Engine Wiring Interconnection System (EWIS) - Fire Protection
TC6918SE-T-SE-14	§ 25.1351(b)(5)	ELOS Finding for the Flight Control Electronics DC Power System
PS06-0496-T-SE-15	§ 25.1317(b)	ELOS Finding for High Intensity Radiated Fields (HIRF)
TC6918SE-T-SF-1	§ 25.671(c)(2)	ELOS Finding for Flight Control System Failure Criteria
TC6918SE-T-SF-5	§ 25.777(e)	ELOS Finding for the Wing Flap Control Lever
PS06-0496-SF-7	§ 25.675	ELOS Finding for Seal Krueger Flap Stops
TS15-0029-F-1	§ 25.251	ELOS Finding for Vibration/Buffering Compliance Criteria, Taxi Aid Camera

**CERTIFICATION BASIS FOR
BOEING 787-9
(CONT.)**

Special Conditions with respect to the following subjects apply to the Model 787-9:

Special Condition Subject

25-348-SC Composite Wing and Fuel Tank Structure Fire Protection Requirements

25-354A-SC Interaction of Systems and Structures, Electronic Flight Control System-Control Surface Awareness, High Intensity Radiated Fields (HIRF) Protection, Limit Engine Torque Loads for Sudden Engine Stoppage, and Design Roll Maneuver Requirement

25-356-SC Systems and Data Networks Security-Isolation or Protection From Unauthorized Passenger Domain Systems Access

25-357-SC Systems and Data Networks Security-Protection of Airplane Systems and Data Networks from Unauthorized External Access

25-359-SC Lithium Ion Battery Installation

25-360-SC Composite Fuselage In-Flight Fire/Flammability Resistance

25-362-SC Crashworthiness Emergency Landing Conditions

25-363-SC Tire Debris Penetration of Fuel Tank Structure

25-365-SC Operation Without Normal Electrical Power

25-370-SC Seats with Non-Traditional, Large, Non-Metallic Panels

25-414-SC Lightning Protection of Fuel Tank Structure to Prevent Fuel Tank Vapor Ignition

25-418-SC Overhead Flight Crew Rest Compartment Occupiable during Taxi, Takeoff, and Landing

25-419-SC Overhead Crew Rest Compartment

25-431-SC Seats With Inflatable Lapbelts

25-458-SC Single-place Side-facing Seats with Inflatable Lapbelts

25-552-SC Dynamic Test Requirements for Multiple Occupant Side-Facing Seats with Inflatable Restraints

25-605-SC Structure- Mounted Airbags

25-626A-SC Dynamic Test Requirements for Single-Occupant Oblique (Side- Facing) Seats With or Without Airbag Devices or 3-Point Restraint Systems

25-682-SC Non-Rechargeable Lithium Battery Installations

25-745-SC Seats with Inertia Locking Devices

Certification basis for boeing 787-10

14 CFR Part 25, Airworthiness Standards, through Amendment 25-137, 25-141, 25-140 for §25.1093(b)(1) for ice crystal icing conditions only (remains at amendment 72 for icing conditions in part 25 appendix C and falling and blowing snow), and 25-139 for structures to 25.307, 25.621, 25.721, 25.787, and 25.963 with exceptions as noted below.

Section No	Title	At Amdt. 25-
25.795(b)(1), (c)(2), (c) (3)(i)	Security considerations	N/A
25.125(b)(2)(ii)(B)	Landing	108
25.1302	Installed systems and equipment for use by flightcrew	N/A
25.1316	ECS components: Pack Control Unit (PCU), Common Motor/Starter Controller (CMSC), Auto Transformer Rectifier Unit (ATRU), E5 and E6 Power Panels, Power Electronics Cooling Systems (PECS) Pumps, PECS Diverter Valve, Overheat Detection System, Valve Control Unit (Cabin Pressure Control System)	80

14 CFR Part 26, Based on 14 CFR §21.101(g) for changes made to TCs applicable provisions of 14 CFR part 26 are included in the certification basis. For any future 14 CFR part 26 amendments, the holder of this TC must demonstrate compliance with the applicable sections.

Compliance has been found for the following regulations through Amendment 26-6, for §§ 26.37, 26.43, and 26.45

14 CFR Part 34, Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered, through Amendment 34-5A. In addition, the engine meets ICAO environmental standards defined in Annex 16, amendment 7, dated November 17, 2011. (See Note 19 for additional considerations)

Certification basis for boeing 787-10 (cont.)

14 CFR Part 36, Noise Standards: Aircraft Type Certification and Airworthiness Certification, through Amendment 36-29. Demonstrated compatibility with the ICAO Annex 16, Volume I, Amendment 10 is documented in the AFM. (See Note 19 for additional considerations)

The Following Optional Design Regulations have been complied with:
Ditching: 14 CFR §§ 25.801, 25.1411(d), (e), (f), (g) and 25.1415

Ice Protection: 14 CFR § 25.1419

ETOPS: The 787-10 has been evaluated in accordance with the type design requirements of 14 CFR § 25.3(b)(2) and 25.1535 and found suitable for greater than 180-minute ETOPS operations when operated and maintained in accordance with Boeing Document No. D021Z002-01, "Model 787 ETOPS Configuration Maintenance, and Procedures." This finding does not constitute approval to conduct ETOPS.

Exemptions from 14 CFR Part 25:

1. Partial Grant of Exemption, § 25.841(a)(2)(i)(ii), Relief from the requirement that the airplane must be designed so that occupants will not be exposed to a cabin pressure altitude that exceeds the following after decompression from any failure condition not shown to be extremely improbable:

(i) Twenty-five thousand (25,000) feet for more than 2 minutes but not more than 3 minutes; or

(ii) Forty thousand (40,000) feet for 1 minute but not to exceed 41,100 feet for any duration for the Boeing Company's Model 787-10 airplanes. Exemption No. 14821, February 12, 2016.

2. Grant of Exemption, § 25.853(d) and condition 1 of Special Condition No. 25-370-SC relief from the flammability requirements for large surface areas on seats in the Boeing Model 787-9 series airplanes; Exemption 10868, September 12, 2013 and Exemption No. 10868A, November 5, 2013.

3. Grant of Exemption, § 25.562(b)(2), Relief from floor warpage testing requirements for flightdeck seats on the Boeing Model 787 series airplanes; Exemption No. 9486, September 11, 2007.

4. Grant of Exemption, § 25.809(a), Relief from the requirement that flightcrew emergency exits have a means to view outside conditions under all lighting situations for the Boeing Model 787 series airplanes; Exemption No. 10114, August 11, 2010.

5. Grant of Exemption, § 25.1447(c)(1), Relief from the requirement for passenger oxygen masks to be automatically presented before the cabin pressure altitude exceeds 15,000 feet for the Boeing Model 787 series airplanes; Exemption No. 9801, December 12, 2008.

6. Grant of Exemption, § 25.901(c) to allow type certification of new propulsion control system designs for the Model 787 airplanes without an exact showing of compliance with the "no single failure" requirement of § 25.901(c) relating to UHT in combination with high crosswinds in certain takeoff and approach-and-landing scenarios. This exemption applies only to those UHT failure conditions that, when combined with high crosswinds, do not comply with § 25.901(c).; Exemption 17319, issued May 2, 2017.

**Certification basis for boeing
787-10 (cont.)****Exemptions from 14 CFR Part 25 (Cont.):**

7. Time Limited Grant of Exemption, § 25.903(a)(1) to allow type certification of the Model 787 airplanes equipped with Rolls-Royce Trent 1000-J3 engines from the engine requirement that mandates engines comply with the smoke emissions requirements of 14 CFR Part 34. This exemption is based on Time-Limited Grant of Exemption No. 17550 which was issued to Rolls-Royce plc and is required to meet the conditions and limitations of, that time-limited exemption for their engines. Exemption No. 17613, issued October 25, 2017. The conditions of TLE 17613 requires that all in-service airplanes be fully compliant by December 31, 2022. On February 12, 2018 Rolls-Royce plc met condition 6.b of exemption 17550 showing full compliance to 14 CFR Part 34 which meets the requirement of § 25.903(a)(1).

8. Time Limited Grant of Exemption, § 25.939(a), Temporary relief for Boeing Model 787-10 airplanes with GENx-1B/P2 engines from the requirement that turbine engines must be free of adverse operating conditions during normal and emergency operation within the airplane operational envelope while operating in ice crystal icing conditions: Exemption No. 17966 dated August 31, 2018. The conditions of TLE 17966 require production airplanes to be fully compliant after December 20, 2019 and airplanes produced under this exemption to be retrofitted by December 20, 2019.

9. Partial Grant of Exemption, Section 25.813(e) at Amendment 25-128 No door may be installed between any passenger seats that is occupiable for takeoff and landing and any passenger emergency exit, such that the door crosses any egress path (including aisles, cross aisles and passageways); Exemption 10879B, amended in entirety on December 3, 2018.

Certification basis for boeing 787-10 (cont.)

Equivalent Levels of Safety (ELOS) are identified as:

TC6918SE-T-A-10	§ 25.335(b)	ELOS Finding for Design Airspeeds
TC6918SE-T-A-13	§ 25.629, 25.671(c)(2)	ELOS Finding for Aeroelastic Stability
PS13-0546-A-21	§§ 25.571(b)	ELOS Finding for Damage Tolerance and Fatigue Evaluation of Structure
PS08-0670-C-1	§ 25.853(a)	ELOS Finding for Adhesives Used in Interior Panel Bent Joint Potting Applications
PS13-1000-C-5	§ 25.853(a)(d)	ELOS Finding for Flammability Testing Hierachy
TC6918SE-T-CS-1	§ 25.810(a)(1)(ii)	ELOS Finding for Escape Slide Inflation Times
TC6918SE-T-CS-2	§ 25.811(f)	ELOS Finding for Emergency Exit Markings and Door Sill Reflectance
TC6918SE-T-CS-3	§ 25.811(f)	ELOS Finding for Emergency Exit Markings (combined w/ TC6918SE-TCS-2)
PS07-0585-CS-10	§§ 25.811(d), 25.811(g), 25.812(b)(1)(i), and 25.812(b)(1)(ii)	ELOS Finding for Graphical Exit Signs
TC6918SE-T-CS-12	§ 25.791(a)	ELOS Finding for Lighted "No Smoking" Signs in Lieu of Placards
TC6918SE-T-CS-14	§ 25.856(b)	ELOS Finding for Associated to Post-Crash Fire Survivability
PS07-0585-CS-18	§ 25.811(e)(4)(i), (ii), and (iii)	ELOS Finding for the Passenger Door Operational Arrow Location and Color
PS06-0413-CS-25	§ 25.783(e)(2)	ELOS Finding for Passenger and Large Cargo Door Indication
PS13-0679-CS-33	§§ 25.561 and 25.621	ELOS Finding for Critical Casting Factor Requirements for Model 787 Series Aircraft

Certification basis for boeing 787-10 (cont.)

Equivalent Levels of Safety (ELOS) are identified as (cont.):

PS18-0046-EE-10	§§ 25.1535 and K25.2.2	ELOS Finding for 787 Rolls-Royce Trent 1000-TEN Early ETOPS Airplane Demonstration Tests
TC6918SE-T-ES-5	§ 25.831(g)	ELOS Finding for Acceptable High Temperature Physiological Environment During Failure Condition
TC6918SE-T-ES-16	§ 25.1443(c)	ELOS Finding for the Passenger Oxygen System
TC6918SE-T-ES-18	§ 25.1441(c)	ELOS Finding for Pulse Oxygen System for Passenger
TC6918SE-T-ES-19	§ 25.841(b)(6)	ELOS Finding for Cabin Altitude Warning System for Operations into High Altitude Airports
TC6918SE-T-ES-20	§ 25.1443(d)	ELOS Finding for Portable Pulse Oxygen System
TC6918SE-T-F-14	§ 25.677(b)	ELOS Finding for Trim Displays
TC6918SE-T-F-17	§ 25.255	ELOS Finding for Out-of-Trim Characteristics
PS06-0496-F-18	§ 25.1555(d)(1)	ELOS Engine and APU Fire Handle Design
PS06-0496-F-22	§ 25.123(a) and (b)	ELOS Finding for Speeds for EM Route Flight Paths
PS14-0452-F-23A	§ 25.251	ELOS Finding for Vibration/Buffeting Compliance Criteria, Panasonic Ku-Band Radome Antenna
TC6918SE-T-G-8	§§ 25.1529, 25.1729, Appendix H25.4 (a) and (b)	ELOS Finding for Formatting of Boeing Instructions for Continued Airworthiness Manuals - Airworthiness Limitations
PS05-0177-P-2	§ 25.981(b)(2)	ELOS Finding for the Fuel Tank Flammability Rule
TC6918SE-T-P-2	§§ 25.933(a)(1)(i) and 25.933(a)(1)(ii)	ELOS Finding for Flight Critical Thrust Reverser

Certification basis for boeing 787-10 (cont.)

Equivalent Levels of Safety (ELOS) are identified as (cont.):

TC6918SE-T-P-3	§ 25.1182(a)	ELOS Finding for Fire Safety Requirements for the Aft Strut Fairing Compartment
TC6918SE-T-P-13	Part 25 subpart E,F & G	ELOS Finding for the Auxiliary Power Unit (APU) Installation
PS14-0470-P-15	§ K25.2.2(d)(1)	ELOS Finding for the 787-8/-9 Rolls-Royce Trent 1000-TEN ETOPS Ground Test
TC6918SE-T-P-17	§ 25.934	ELOS Finding for the Engine and Thrust Reverser System Testing
TC6918SE-T-P-19	§§ 25.1023(b) and 25.1121 (c)	ELOS Finding for Auxiliary Power System
TC6918SE-T-P-20	§§ 25.997 and 25.1305(c)(6)	ELOS Finding for Warning Means for Engine Fuel Filter Contamination
TC6918SE-T-P-27	§ 25.1145(a)	ELOS Finding for Engine Igniter Flight-deck Switch Configuration
PS06-0414-P-34	§§ 25.1181(a)(6), 25.1181(b), 25.1182, and 25.1183(a)	ELOS Finding for Fire Safety Requirements for GENx-1B
PS13-0546-P-36	§§ 25.1549(b)	ELOS Finding for the Display of Powerplant Instruments
TC6918SE-T-SA-10	§ 25.1459(a)(2)	ELOS Finding for Flight Recorders
TC6918SE-T-SA-11	§ 25.1303(c)(1)	ELOS Finding for Overspeed Aural Warning
TC6918SE-T-SA-29	§ 25.1333(a)	ELOS Finding for Instrument Systems
PS06-0496-T-SA-31	§§ 25.1301, 25.1309, and 25.1310	ELOS Finding for Use of ARAC Recommended Revision
PS12-0038-SE-11	§ 25.1713(c)	ELOS Finding for the Engine Wiring Interconnection System (EWIS)

Certification basis for boeing 787-10 (cont.)

Equivalent Levels of Safety (ELOS) are identified as (cont.):

PS14-1031-SE-28	§ 25.1713(c)	ELOS Finding for the Engine Wiring Interconnection System (EWIS) - Fire Protection
TC6918SE-T-SE-14	§ 25.1351(b)(5)	ELOS Finding for the Flight Control Electronics DC Power System
PS06-0496-T-SE-15	§ 25.1317(b)	ELOS Finding for High Intensity Radiated Fields (HIRF)
TC6918SE-T-SF-1	§ 25.671(c)(2)	ELOS Finding for Flight Control System Failure Criteria
TC6918SE-T-SF-5	§ 25.777(e)	ELOS Finding for the Wing Flap Control Lever
PS06-0496-SF-7	§ 25.675	ELOS Finding for Seal Krueger Flap Stops

**Certification basis for boeing
787-10 (cont.)**

Special Conditions with respect to the following subjects apply to the Model 787-10:

Special Condition Subject

25-348-SC Composite Wing and Fuel Tank Structure Fire Protection Requirements

25-354A-SC Interaction of Systems and Structures, Electronic Flight Control System-Control Surface Awareness, and Design Roll Maneuver Requirement

25-356-SC Systems and Data Networks Security-Isolation or Protection From Unauthorized Passenger Domain Systems Access

25-357-SC Systems and Data Networks Security-Protection of Airplane Systems and Data Networks from Unauthorized External Access

25-359-SC Lithium Ion Battery Installation

25-360-SC Composite Fuselage In-Flight Fire/Flammability Resistance

25-362-SC Crashworthiness Emergency Landing Conditions

25-363-SC Tire Debris Penetration of Fuel Tank Structure

25-365-SC Operation Without Normal Electrical Power

25-370-SC Seats with Non-Traditional, Large, Non-Metallic Panels

25-414-SC Lightning Protection of Fuel Tank Structure to Prevent Fuel Tank Vapor Ignition

25-418-SC Overhead Flight Crew Rest Compartment Occupiable during Taxi, Takeoff, and Landing

25-419-SC Overhead Crew Rest Compartment

25-431-SC Seats With Inflatable Lapbelts

25-552-SC Dynamic Test Requirements for Multiple Occupant Side-Facing Seats with Inflatable Restraints

25-605-SC Structure- Mounted Airbags

25-626A-SC Dynamic Test Requirements for Single-Occupant

Oblique (Side- Facing) Seats With or Without Airbag Devices or 3-Point Restraint Systems

25-644-SC Flaps Up Vertical Modal Suppression (F0VMS)

25-682-SC Non-Rechargeable Lithium Battery Installations

25-745-SC Seats with Inertia Locking Devices

INFORMATION AND NOTES

The following information and notes apply to all models unless otherwise noted

Additional design requirements and conditions:

The following design details or information must be maintained to ensure that an unsafe design condition is not present:

In-flight Engine Restart

The Boeing Model 787 engines incorporate numerous technological advances intended to increase efficiency and reliability. However, some of these features have the potential to decrease engine in-flight starting performance relative to the engines envisioned when the applicable sections of 14 CFR Part 25 were promulgated. The following criteria for engine in-flight starting performance must be met to ensure that the level of safety intended by §§ 25.903(e) and 25.1351(d) is maintained on airplanes powered by current technology engines.

1. Appropriate procedures for restarting the engines in the following cases must be provided in the airplane flight manual (AFM):
 - a. a fuel cut during climb after the takeoff phase (defined as the flight phase from start of the takeoff roll to 1500 feet above the runway altitude),
 - b. loss of all alternating current (AC) power in combination with an all engine flameout, and
 - c. all engine flame-out at or below 20,000 feet.

Uncontrollable High Engine Thrust or Power

Numerous single and anticipated combinations of failures within traditional engine control systems result in losing the normal means to control the magnitude and/or direction of engine thrust (power). For some of these anticipated failure conditions, the flight crew cannot be relied upon to recognize and mitigate the failures before they become hazardous or catastrophic. The following design features are required to ensure an unsafe condition does not exist with regards to the loss of the normal means to control engine thrust (power):

1. Dual channel full authority digital electronic (engine) control (FADEC) which monitors engine conditions to trim fuel flow
2. Thrust control malfunction accommodation to address conditions where fuel metering is not responding to pilot input on the ground, and
3. Redundant mechanical control interface between the flight crew and the FADEC.

Engine Rotor-Lock Evaluation

Service experience has shown that some engines are susceptible to a condition known as rotor-lock following an in-flight shut-down from power settings ranging from high power to idle. The engine design must be free from engine rotor lock.

Fuel Feed System Icing Threats

Under certain conditions, over a period of low fuel temperatures, ice may accumulate in the airplane fuel feed system and then be fed or released downstream to the engine, and result in failure to achieve a commanded thrust level, and this is considered an unsafe condition. As such, each aircraft/engine and aircraft/auxiliary power system (APS) fuel feed system must either be designed to prevent an accumulation of ice anywhere within the fuel tank and feed system from being released into the engine and APS fuel system, or be designed so no loss of engine thrust occurs due to release of any ice accumulation anywhere within the airplane/engine operating envelope.

**INFORMATION AND NOTES
(cont.)****The following information and notes apply to all models unless
otherwise noted (cont.)**Return Landing Capability

Examination of takeoff performance capabilities of current and proposed large transport aircraft indicates that requirements other than climb performance should be addressed when considering safe return operations and the need for a fuel jettison system. The 787 fuel jettison system must be installed, and the jettison rate should be such that there is adequate return to landing capability, when considering the following items, in a 30-minute flight with 15 minutes of active fuel jettisoning in conjunction with operational procedures:

1. Exceedance of certificated maximum brake energies;
2. Exceedance of tire speed limits;
3. Controllability (e.g., hydraulic or flight control system failures);
4. Margins to flap placard, or load relief operation speeds in turbulent air;
5. Climb capability, engine inoperative procedure;
6. Landing distances (actual distances, including contaminated runway).

25.125 Landing (787-9/-10)

The enhanced stall protection (ESP) is a required by design to ensure the intended level of safety. Any subsequent type design change, modification, or repair that disable or modify ESP are not acceptable.

Security Considerations (787-9/-10)

The Boeing Model 787-9/-10 was granted an exception per 14 CFR 21.101(b) for §§25.795(b)(1), (c)(2) and (c)(3)(i) based on design feature similar to but not equivalent to their intent. These security features must be in consideration in any subsequent type design change, modification, or repair to ensure the level of safety designed into the 787-9/-10 is maintained. Modifications that reduce flight critical system separation or adversely impact flight deck smoke protection, system separation and protections for searching above the overhead stowage compartments are not acceptable.

Operational Exemptions for Domestic or Foreign Operator into or out of airports in the United States

Boeing Model 787 airplanes equipped with Rolls-Royce Trent 1000-X(X)3 series engines were granted Time Limited Exemption (TLE) 17550 for relief from § 34.21(e)(2). § 91.203(d) requires compliance with the fuel venting and exhaust emission requirement of 14 CFR Part 34 for operators coming into or flying out of airport in the United States. The following TLE's were granted for operators whose engines were produced under Rolls-Royce TLE No. 17550:

Exemption No. 17644 (NPD)
 Exemption No. 17645 (NSB)
 Exemption No. 17646 (ANZ)
 Exemption No. 17675A (ANA, ARE, BAB, BEJ, ELA, ETH, GUL, LOT, LAN, NEO, RBA, SIA, VAA).

These TLE are to be considered granted to these airlines and their subsidiaries. The conditions of these TLE's require that in-service airplanes be fully compliant by December 31, 2022.

On February 12, 2018 Rolls-Royce plc met condition 6.b of exemption 17550 showing full compliance to 14 CFR Part 34. This showing of compliance is applicable to engines produced under this exemption and meets the § 91.203(d) requirement for all domestic or foreign operators into or out of airports in the United States.

**INFORMATION AND NOTES
(cont.)****The following information and notes apply to all models unless
otherwise noted (cont.)**

Certification Maintenance Requirements (CMRs):

See FAA-approved Certification Maintenance Requirements, document number D011Z009-03-03.

Production Basis:

Production Certificate No. 700. (See Note 1 and Note 5 for PC applicability).

Leveling Means:

A plumb bob attachment and leveling provision scale are provided in the left main gear wheel well.

Datum:

Sta 0.0, located 55.8 in forward of airplane nose (B.S. 55.8).

Mean Aerodynamic Chord (MAC):

246.9 in (672,13 cm)

Control Surfaces 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 in the following Boeing documents:

B787-A-27-11-00-18A-270B-A - Aileron Rigging
 B787-A-27-11-00-19A-270B-A - Flaperon Rigging
 B787-A-27-31-00-27A-270B-A - Elevator Rigging
 B787-A-27-21-00-31A-270B-A - Rudder Rigging
 B787-A-27-51-00-28A-270B-A - Trailing Edge Flap System Rigging
 B787-A-27-61-00-17A-270B-A - Spoiler Rigging

787-8 Maximum control surface travel:

Control Surface	Maximum TED/TEL (Deg.)	Maximum TEU/TER (Deg.)
Ailerons	16.94°	-32.20°
Elevators	26.93°	-32.54°
Flaperon	39.26°	-31.61°
Spoilers 6, 7, 8, 9	-13.21°	60.95°
Spoilers 1, 2, 3, 12, 13, 14	-13.24°	60.77°
Spoilers 4, 5, 10, 11	-13.16°	63.00°
Rudder	32.10°	-31.83°
Horizontal Stabilizer	4.25°	-12.75°
Inboard Flaps	41.20°	-2.80°
Outboard Flaps	41.20°	-2.00°
Inboard Slats	23.47°	-0.34°
Outboard Slats	30.16°	-0.40°

**INFORMATION AND NOTES
(cont.)**

The following information and notes apply to all models unless otherwise noted (cont.)

787-9 Maximum control surface travel:

Control Surface	Maximum TED/TEL (Deg.)	Maximum TEU/TER (Deg.)
Ailerons	16.94°	-32.20°
Elevators	26.93°	-32.54°
Flaperon	39.26°	-31.61°
Spoilers 6, 7, 8, 9	-13.23°	61.15°
Spoilers 1, 2, 3, 12, 13, 14	-13.24°	60.77°
Spoilers 4, 5, 10, 11	-13.40°	62.91°
Rudder	32.40°	-32.00°
Horizontal Stabilizer	4.25°	-12.75°
Inboard Flaps	43.00°	-2.80°
Outboard Flaps	43.00°	-2.00°
Inboard Slats	26.52°	-0.34°
Outboard Slats	31.56°	-0.40°

787-10 Maximum control surface travel:

Control Surface	Maximum TED/TEL (Deg.)	Maximum TEU/TER (Deg.)
Ailerons	16.94°	-32.20°
Elevators	26.93°	-32.54°
Flaperon	39.26°	-31.61°
Spoilers 6, 7, 8, 9	-13.23°	61.15°
Spoilers 1, 2, 3, 12, 13, 14	-13.24°	60.77°
Spoilers 4, 5, 10, 11	-13.40°	62.91°
Rudder	32.40°	-32.00°
Horizontal Stabilizer	4.25°	-12.75°
Inboard Flaps	43.00°	-2.80°
Outboard Flaps	43.00°	-2.00°
Inboard Slats	26.52°	-0.34°
Outboard Slats	31.56°	-0.40°

Trailing Edge Down = TED
 Trailing Edge Up = TEU
 Trailing Edge Left = TEL
 Trailing Edge Right = TER
 Degrees = Deg.

Required Equipment

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

**INFORMATION AND NOTES
(cont.)****The following information and notes apply to all models unless
otherwise noted (cont.)**

Service Information

The following documents are FAA-approved; Service Bulletins and other service information, when FAA-approved, will contain a statement declaring FAA approval.

Boeing Document B787-81205-Z0210-00, "787-8 Structural Repair Manual"

Boeing Document B787-81205-Z0310-00 "787-9 Structural Repair Manual"

Boeing Document B787-81205-Z0410-00 "787-10 Structural Repair Manual"

MANUALS

WBM

A current weight and balance report, including a list of equipment included in the certificated empty weight and loading instructions when necessary, must be provided for each aircraft at the time of original certification. This is in accordance with RBAC 25.29

AFM

Airplane operation must be in accordance with the ANAC-approved Airplane Flight Manual, (AFM A211776 and Brazilian ANAC approved Supplement D631Z003-ANAC). All placards required by either the ANAC-approved Flight Manual, the applicable operating rules, or the Certification Basis must be installed in the airplane in accordance with RBAC 25.1541 through 25.1563.

ICAs

In accordance with RBAC 25.571, 25.981, 25.1529 (and 25.1729 for 787-9 and 787-10), the ANAC has accepted the Boeing Model 787 Instructions for Continued Airworthiness in Section 9 of the 787 Maintenance Planning Data, Boeing Document D011Z009-03 and sub-tier documents listed below. The operational limitations and maintenance tasks set forth in the following documents constitute the Airworthiness Limitations of the Boeing 787-8/-9/-10 model airplanes. For airplanes delivered after August 5, 2019, the applicable revision level of each of these documents is listed on the airplane-specific Revision Effectivity Record (RER) MPE-RER-787-LNXXX letter of each airplane. Airplane operators are required to observe the limitations and perform the maintenance tasks per the specified revision level or a later ANAC approved revision of the documents.

D011Z009-03-01, 787 Airworthiness Limitations (AWLs). Contains required structural inspections and the retirement times for structural safe-life and life-limited parts. Also contains required retirement times for systems life-limited parts and other systems limitations.

D011Z009-03-02, 787 Airworthiness Limitations (AWLs) Line Number Specific. Existing structures AWLs that were impacted by airplane production non-conformances may result in airplane specific revised inspection requirements and/or inspection intervals.

D011Z009-03-03, 787 Certification Maintenance Requirements (CMRs). Required periodic tasks to specific Systems installations.

D011Z009-03-04, 787 Special Compliance Items (SCIs) /Airworthiness Limitations. This document lists and provides instructions for Airworthiness Limitation Instructions (ALIs) and Critical Design Configuration Control Limitations (CDCCLs) required to comply with RBAC Part 25.981.

**INFORMATION AND NOTES
(cont.)****The following information and notes apply to all models unless
otherwise noted (cont.)****NOTES**

Note 1

The following Aircraft Serial Numbers were produced under the Type Certification only:

787-8: (Added to the PC700 Production Limitation Record on August 26, 2011) 34486, 34832, 36277, 36278, 36281, 36282, 36283, 36284, 40693, 40694, & 40695

787-9: (Added to the PC700 Production Limitation Record on June 13, 2014) 34334, 34522, 35422, 36404, 36405, 41988, 41989

787-10: (Added to the PC700 Production Limitation Record on February 15, 2018) 40929, 60256, 60253, 60257

Note 2

Installations using quick release hardware to install commodities such as galleys, closets, lavatories and stowage bins in adaptable zones in the passenger cabin shall be shown compliant to 25.561(c)(2).

Note 3

The models 787-8, 787-9 and 787-10 have been approved to operate in "Reduced Vertical Separation Minimum (RVSM) airspace. Continued airworthiness and operational approval aspects of RVSM must be constructed according to FAA document 91-RVSM Change 2, dated 19 February 2004 titled Approval of Aircraft and Operators for Flight in Airspace Above Flight Level (FL) 290 Where a 1,000 Foot Vertical Separation Minimum is Applied."

Note 4

EASA has found the model 787-8 and 787-9 to be compliant with the International Civil Aviation Organization (ICAO) Annex 16, Volume II, Amendment 6, for Emissions, and with the ICAO Annex 16, Volume I, Amendment 9, Chapter 4, for Noise.

Note 5

Production Certificate No. 700 was amended to include the 787-8, 787-9 and 787-10 and issued. Boeing is authorized to issue airworthiness certificates under the Organization Delegation Authorization (ODA) Procedures of 14 CFR part 183, subpart D, and FAA Order 8100.15.

Note 6

Boeing and GE have determined that the GEnx engines on these 787-8 aircraft intermittently emit a sometimes clearly visible fuel vapor fog after shutdown, as a result of a small quantity of fuel being released from the engine's fuel system. These emissions do not present a safety issue or appreciable environmental impact. Boeing and GE will modify the design of the aircraft and engines by December 31, 2012 to completely eliminate this fuel venting on new aircraft. Boeing has included an airworthiness limitation in the instructions for continued airworthiness for the affected aircraft requiring incorporation of the modified design by December 31, 2014.

Note 7

See the ANAC approved Flight Manual for engine ratings and operating limits. The normal 5-minute takeoff time limit may be extended to 10 minutes for engine out contingency if permitted by the Limitations Section of the ANAC approved Airplane Flight Manual.

Note 8

Applicable to Trent 1000-A Engines with or without M/SB 72-G319 incorporated.

**INFORMATION AND NOTES
(cont.)****The following information and notes apply to all models unless
otherwise noted (cont.)**

- Note 9 Applicable only to Trent 1000-C, Trent 1000-D, Trent 1000-E, Trent 1000-G and Trent 1000-H Engines with M/SB 72-G319 incorporated.
- Note 10 Applicable to Bill of Materials for GEnx-1B64G03 or GEnx-1B64G04
- Note 11 Applicable to Bill of Materials for GEnx-1B67G03 or GEnx-1B67G04
- Note 12 Applicable to Bill of Materials for GEnx-1B70G03 or GEnx-1B70G04
- Note 13 Applicable to Bill of Materials for GEnx-1B64/P1G01, GEnx-1B67/P1G01, GEnx-1B70/P1G01, GEnx-1B70C/P1G01, GEnx-1B70/75/P1G01 and GEnx-1B74/75/P1G01 respectively.
- Note 14 Same as GEnx-1B70/P1 except for extended takeoff flat rating ambient temperature (101.8°F/38.8°C at sea level).
- Note 15 Applicable to Bill of Materials for GEnx-1B64/P2G01 or GEnx-1B64/P2G02, GEnx-1B67/P2G01 or GEnx-1B67/P2G02, GEnx-1B70/P2G01 or GEnx-1B70/P2G02, GEnx-1B70C/P2G02, GEnx-1B70/75/P2G01 or GEnx-1B70/75/P2G02, GEnx-1B74/75/P2G01 or GEnx-1B74/75/P2G02, GEnx-1B76/P2G01 or GEnx-1B76/P2G02, and GEnx-1B76A/P2G01 or GEnx-1B76A/P2G02 respectively.
- Note 16 Same as GEnx-1B70/P2 except for extended takeoff flat rating ambient temperature (101.8°F/38.8°C at sea level).
- Note 17 For the 787-8 and 787-9 the engine manufacturers have declared that the ICAO emissions standards identified in Annex 16, Volume II, Third Edition, Part III, Chapter 2, Section 2.2.2 for SN, Section 2.3 .2 for CO and HC, Section 2.3.2.e.3 for NOx (also known as CAEP/8), and Part II Chapter 2 for fuel venting have also been demonstrated. The FAA has found the engine installations compatible with the ICAO Annex 16, Volume I, Amendment 9, Chapter 4, for Noise.
- Note 18 The FAA has concluded that the occurrence of any uncommanded high-thrust failure condition, or any of the associated causal failures listed within Boeing Document D011Z009-03-01, may endanger the safe operation of an airplane. Consequently, the FAA recommends that operators report any such failures in accordance with Title 14, Code of Federal Regulations 121.703(c), 125.409(c), and 135.415(c).
- Note 19 For the 787-10 the engine manufacturers have declared that the ICAO emissions standards identified in Annex 16, Volume II, Third Edition, Part III, Chapter 2, Section 2.2.2 for SN, Section 2.3 .2 for CO and HC, Section 2.3.2.e.3 for NOx (also known as CAEP/8), and Part II Chapter 2 for fuel venting have also been demonstrated. The FAA has found the engine installations compatible with the ICAO Annex 16, Volume I, Amendment 10, Chapter 4, for Noise.
- Note 20 The differences of the Brazilian airplanes in relation to the basic FAA type design are summarized below:
1. The Brazilian Airplane Flight Manual (AFM A211776/Supplement D631Z003-ANAC)
 2. Markings and placards.

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This TCDS is available at ANAC website:

<https://sistemas.anac.gov.br/certificacao/Produtos/EspecificacaoOrgE.asp>