TYPE-CERTIFICATE DATA SHEET

No. E.062

for
RB211-524 & -22B Series

Type Certificate Holder
Rolls-Royce Deutschland Ltd & Co KG
Eschenweg 11
Dahlewitz
15827 Blankenfelde-Mahlow
Germany

For Models: RB211-22B-02,
RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19,
RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524C2-19, RB211-524C2-B-19, RB211-524D4-19, RB211-524D4-B-19, RB211-524D4X-19, RB211-524D4X-B-19,
RB211-524D4-39, RB211-524D4-B-39,
RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19, RB211-524G3-T-19,
RB211-524H2-19, RB211-524H2-T-19, RB211-524H-36, RB211-524H-T-36

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I. General

1. Type/ Model/ Variants (RB211-524 & -22B)

RB211-22B-02
RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19,
RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02,
RB211-524C2-19, RB211-524C2-B-19, RB211-524D4-19, RB211-524D4-B-19, RB211-524D4X-19,
RB211-524D4X-B-19, RB211-524D4-39 and RB211-524D4-B-39
RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19 and RB211-524G3-T-19,
RB211-524H2-19, RB211-524H2-T-19, RB211-524H-36 and RB211-524H-T-36

These models are approved for use on multi-engine civil aircraft classified in the Transport Category (Passenger) at the ratings and within the operating limitations specified below, subject to compliance with the powerplant installation requirements appropriate to approved installations.

The RB211-524G-19 model was originally approved for installation in the B747-400 aircraft on 25 March 1988. This variant is no longer in service and was deleted from the CAA UK ETCDS 1046 at Issue 4 on 9 May 1990.

2. Type Certificate Holder

Rolls-Royce Deutschland Ltd & Co KG
Eschenweg 11
Dahlewitz
15827 Blankenfelde-Mahlow
Germany

DOA ref.: EASA.21J.065

formerly (until 20 February 2019):
Rolls-Royce plc
62 Buckingham Gate
London
SW1E 6AT
United Kingdom

former DOA ref.: EASA.21J.035

3. Manufacturer

Rolls-Royce plc

4. Date of Application

RB211-22B-02, RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19, RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524C2-19, RB211-524C2-B-19, RB211-524D4-19, RB211-524D4-B-19, RB211-524D4X-19, RB211-524D4X-B-19, RB211-524D4-39, RB211-524D4-B-39, RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19,RB211-524G3-T-19, RB211-524H2-19, RB211-524H2-T-19, RB211-524H-36 and RB211-524H-T-36:

Not known

5. EASA Type Certification Date

RB211-22B-02:	12 February 1973
RB211-524-02:	19 December 1975
RB211-524B-02:	15 August 1978
RB211-524B-B-02:	28 August 1987
RB211-524B2-19:	20 March 1978
RB211-524B2-B-19:	28 August 1987
RB211-524B2-39:	25 April 1978
RB211-524B3-02:	04 July 1979
RB211-524B4-02:	14 July 1987
RB211-524B4-D-02:	14 July 1987
RB211-524C2-19:	21 December 1979
RB211-524C2-B-19:	28 August 1987
RB211-524D4-19:	31 March 1981
RB211-524D4-B-19:	28 August 1987
RB211-524D4X-19:	29 July 1988
RB211-524D4X-B-19:	29 July 1988
RB211-524D4-39:	01 August 1983
RB211-524D4-B-39:	28 August 1987
RB211-524G2-19:	12 January 1989
RB211-524G2-T-19:	07 May 1997
RB211-524G3-19:	28 April 1989
RB211-524G3-T-19:	07 May 1997
RB211-524H2-19:	13 September 1989
RB211-524H2-T-19:	07 May 1997
RB211-524H-36:	23 June 1989
RB211-524H-T-36:	07 May 1997

II. Certification Basis

1. State of Design Authority Certification Basis

See paragraph 3. “EASA Certification Basis”.

2. Reference Date for determining the applicable airworthiness requirements

Not known

3. EASA Certification Basis

2.1. Airworthiness Standards

RB211-22B-02, RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19, RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524C2-19, RB211-524C2-B-19, RB211-524D4-19, RB211-524D4-B-19, RB211-524D4X-19, RB211-524D4X-B-19, RB211-524D4-39, RB211-524D4-B-39:

BCAR Section C, Issue 6, dated 15 June 1966 together with Blue Papers 415, 435, 436, 464, 468, 474, 476, 480, 481, 482, 499, 506, 544, 551 (para 3.2.2 only) and 554

RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19, RB211-524G3-T-19, RB211-524H2-19, RB211-524H2-T-19, RB211-524H-36, RB211-524H-T-36:

JAR-E Change 6 dated 28 August 1981 (BCAR Section C iss 13), plus Blue Papers 792 and 831, Airworthiness Notice 45A Issue 1 (Level 1 software). Exemption from Blue Paper 552. Assumption Reports MDR 69417 Issue 2/ MDR 69507 Issue 1 and MDR 69563 issue 2 refer.

2.2. Special Conditions (SC)

None

2.3. Equivalent Safety Findings

None

2.4. Deviations

None

2.5. Environmental Protection

RB211-524B-B-02, RB211-524B2-B-19, RB211-524B4-02, RB211-524B4-D-02, RB211-524C2-B-19, RB211-524D4-B-19, RB211-524D4X-19, RB211-524D4X-B-19, and RB211-524D4-B-39 engines comply with the aircraft engine emissions and fuel venting requirements BCAR section M Issue 1.

RB211-524G2-19, RB211-524G3-19, RB211-524H-36 and RB211-524H2-19 engines comply with the aircraft engine emissions requirements of BCAR section M issue 1 as amended by Blue Paper M847 and the recommendations of ICAO annex 16 vol 2, First Edition – 1981.

RB211-524G2-T-19, RB211-524G3-T-19, RB211-524H-T-36 and RB211-524H2-T-19 engines comply with the aircraft engine emissions requirements of BCAR section M issue 1 as amended by Blue Paper M847 and the recommendations of ICAO annex 16 vol 2, Second Edition – 1993.

III. Technical Characteristics

1. Type Design Definition

The build standards are defined in the following Drawing Introduction Sheets (DIS) or later approved issues:

DIS 1004 Issue 01	for	RB211-22B-02
DIS 1041 Issue 02	for	RB211-524-02
DIS 1068 Issue 01	for	RB211-524B-02
DIS 1071 Issue 01	for	RB211-524B2-19
DIS 1078 Issue 01	for	RB211-524B2-39
DIS 1088 Issue 01	for	RB211-524B3-02
DIS 1089 Issue 01B	for	RB211-524B4-02
DIS 1091 Issue 01	for	RB211-524D4-19
DIS 1093 Issue 01	for	RB211-524C2-19
DIS 2028 Issue 01	for	RB211-524D4-39
DIS 2077 Issue 01	for	RB211-524B4-D-02
DIS 2068 Issue 01	for	RB211-524B2-B-19
DIS 2069 Issue 01	for	RB211-524C2-B-19
DIS 2070 Issue 01	for	RB211-524D4-B-19
DIS 2079 Issue 01	for	RB211-524B-B-02
DIS 2080 Issue 01	for	RB211-524D4-B-39
DIS 2107 Issue 01	for	RB211-524D4X-19
DIS 2108 Issue 01	for	RB211-524D4X-B-19
DIS 2110 Issue 03	for	RB211-524G2-19
DIS 2116 Issue 02	for	RB211-524G3-19
DIS 2186 Issue 02	for	RB211-524G2-T-19
DIS 2187 Issue 02	for	RB211-524G3-T-19
DIS 2082 Issue 03	for	RB211-524H-36
DIS 2118 Issue 01	for	RB211-524H2-19
DIS 2188 Issue 02	for	RB211-524H2-T-19
DIS 2189 Issue 01	for	RB211-524H-T-36

or later approved issues

2. Description

The RB211-524 & -22B engines are three shaft by-pass turbofan engines with the following characteristics:

engine model	by-pass ratio	pressure ratio
RB211-22B-02	5:1	24.7:1
RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19, RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02	5:1	28.0:1
RB211-524C2-19, RB211-524C2-B-19	5:1	29.0:1
RB211-524D4-19, RB211-524D4-39, RB211-524D4-B-19, RB211-524D4-B-39, RB211-524D4X-19, RB211-524D4X-B-19	5:1	29.5:1
RB211-524G2-T-19, RB211-524G3-T-19, RB211-524H2-T-19, RB211-524H-T-36	4.3:1	32.8:1
RB211-524G2-19, RB211-524G3-19, RB211-524H2-19, RB211-524H-36	4.3:1	32.9:1

The compressor and turbine modules comprise the following features.

	compressor	turbine
low pressure	single stage	3 stages
intermediate pressure	7 stages	single stage
high pressure	6 stages	single stage

3. Equipment

For identification of equipment approved for use on this engine refer to the engine DIS.

A thrust reverser is incorporated to reverse the fan stream.

A hot stream spoiler is not fitted.

A non-heated nose spinner is fitted to the RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524D4-19, RB211-524D4-39, RB211-524D4-B-19, RB211-524D4-B-39, RB211-524D4X-19 and RB211-524D4X-B-19

4. Dimensions

engine model	length	maximum radius	width	height
RB211-22B-02	5190 mm		2438 mm (2)	2687 mm (3)
RB211-524B-02, RB211-524B-B-02	4547 mm (1)		2413 mm (2)	2733 mm (3)
RB211-524B2-19, RB211-524C2-19, RB211-524B2-B-19, RB211-524C2-B-19	4582 mm (1)		2413 mm (2)	2733 mm (3)
RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02	4805 mm (1)		2413 mm (2)	2733 mm (3)
RB211-524D4-19, RB211-524D4-39, RB211-524D4-B-19, RB211-524D4-B-39, RB211-524D4X-19, RB211-524D4X-B-19	4821 mm (1)		2413 mm (2)	2733 mm (3)
RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19, RB211-524G3-T-19	4759 mm (4)	1460.5 mm		
RB211-524H2-19, RB211-524H2-T-19, RB211-524H-36, RB211-524H-T-36	4759 mm (4)	1460.5 mm		

(1) from front of nose to end of jet pipe nozzle

(2) maximum over fan casing

(3) from lowest point on gearbox to top face of engine mounting pad

(4) from front case flange to rear of Integrated Nozzle Assembly

5. Dry Weight

engine model	dry weight
RB211-22B-02	5410 kg (1)
RB211-524B3-02, RB211-524B4-D-02	5057 kg (2)
RB211-524B2-19, RB211-524B-02, RB211-524B2-B-19, RB211-524B-B-02	5060 kg (2)
RB211-524D4-19, RB211-524D4-39, RB211-524D4-B-19, RB211-524D4-B-39, RB211-524D4X-19, RB211-524D4X-B-19	5078 kg (2)
RB211-524C2-19, 524C2-B-19	5080 kg (2)
RB211-524G2-19, RB211-524G3-19	5775 kg (3)
RB211-524G2-T-19, RB211-524G3-T-19	5688 kg (3)
RB211-524H-36	5775 kg (3)
RB211-524H2-19	5790 kg (3)
RB211-524H-T-36	5688 kg (3)
RB211-524H2-T-19	5703 kg (3)

6. Ratings

Static sea-level ratings under the following conditions:

- International Standard Atmospheric conditions at sea-level
- All optional air bleeds closed

- Aircraft service equipment drives unloaded
- Fuel having a minimum calorific value of 42.8 MJ/kg (18,400 Btu/lb)
- 100% HP = 10,611 rpm 100% IP = 7,000 rpm 100% LP = 3,900 rpm

	maximum take-off		maximum continuous	
	thrust (lbf) (1)	bare engine equivalent thrust (lbf)	thrust (lbf)	bare engine equivalent thrust (lbf)
RB211-22B-02	41,030	42,000	40,140	41,130
RB211-22B-02 (MOD 72-8700)	42,670	43,680	40,140	41,130
RB211-524B-02	49,120	50,000	44,780	45,625
RB211-524B3-02	49,120	50,000	44,780	45,625
RB211-524B4-02	49,120	50,000	44,780	45,625
RB211-524B4-D-02	49,120	50,000	44,780	45,625
RB211-524B2-19	49,120	50,000	44,780	45,625
RB211-524B-B-02	49,120	50,000	44,780	45,625
RB211-524B2-B-19	49,120	50,000	44,780	45,625
RB211-524C2-19	50,600	51,500	46,120	47,000
RB211-524C2-B-19	50,600	51,500	46,120	47,000
RB211-524D4-19	51,980	53,000	47,230	48,160
RB211-524D4-39	51,980	53,000	47,230	48,160
RB211-524D4-B-19	51,980	53,000	47,230	48,160
RB211-524D4-B-39	51,980	53,000	47,230	48,160
RB211-524D4-19, RB211-524D4X-19 (2)	53,460	54,500	47,230	48,160
RB211-524D4-B-19, RB211-524D4X-B-19 (2)	53,460	54,500	47,230	48,160
RB211-524D4X-19	52,810	53,835	47,230	48,160
RB211-524D4X-B-19	52,810	53,835	47,230	48,160
RB211-524G2-19	56,870	58,000	47,230	not known
RB211-524G2-T-19	56,870	58,000	47,230	not known
RB211-524G3-19	56,870	58,000	47,230	not known
RB211-524G3-T-19	56,870	58,000	47,230	not known
RB211-524H-36, RB211-524H2-19	59,450	60,600	47,230	not known
RB211-524H-T-36, RB211-524H2-T-19	59,450	60,600	47,230	not known
RB211-524H2-T-19 (Post SB73-J127)	59,450	60,600	47,230	not known

(1) including losses of the production propulsion fan duct and thrust reverser, jet pipe and afterbody cowlings and that portion of the pylon washed by the fan stream

(2) These figures are only applicable to the Reduced Envelope described in Operating Limitations, see section IV

7. Control System

RB211-22B-02, RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19, RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524C2-19, RB211-524C2-B-19, RB211-524D4-19, RB211-524D4-B-19, RB211-524D4X-19, RB211-524D4X-B-19, RB211-524D4-39, RB211-524D4-B-39:

The engine fuel system is controlled automatically by the main fuel flow regulator in response to throttle position. The main control parameter is the P4/P1 ratio. The fuel flow regulator also senses P3 and N3 to position the variable metering orifice to provide a fuel flow consistent with the power selected. Fuel is supplied from the aircraft fuel system by a LP fuel pump, through a LP fuel cooled oil cooler and fuel filter to a HP fuel pump. The HP fuel pump delivers fuel through a Fuel Flow Regulator, HP Fuel Cooled Oil Cooler and HP Fuel Filter to a fuel manifold and fuel spray nozzles located in the combustion section of the engine. Manual control of the fuel flow for engine starting and stopping is effected through a 3 position fuel switch controlling the electrical supply to a shut-off valve and a fuel enrichment valve solenoid.
For a more detailed description refer to the applicable Operating Instructions.

RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19, RB211-524G3-T-19, RB211-524H2-19, RB211-524H2-T-19, RB211-524H-36, RB211-524H-T-36:

> Digital Electronic Engine Fuel Control system in which the software is designated level 1 according to Airworthiness Notice 45A (DO-178A/ED-12A)

8. Fluids (Fuel, Oil, Additives)

8.1 Fuel and additives

For the list of approved fuels, see relevant Operating Instructions.

Minimum fuel pressure at engine inlet (measured at inlet to engine LP fuel pump): not less than 5 lbf/in^2 abs plus true fuel vapour pressure with zero vapour/liquid ratio between sea-level and 45,000 ft altitude.

Minimum drainage period (from closing HP fuel cock after a false start): 30 seconds

8.2 Oil

Refer to the Operating Instructions for information on approved oil specifications.

9. Aircraft Accessory Drives

The loads, weights and power extraction of the accessory gearbox power off-takes are described in the applicable installation manuals.

10. Maximum Permissible Air Bleed Extraction

The engine bleed is automatically scheduled from the engine IP and HP bleed ports by a valve in the aircraft ducting which selects the appropriate supply in response to a signal sensing compressor delivery pressure.

Bleed air is extracted from the IP delivery port at engine power settings above that giving a compressor.

At engine power settings above that giving a reference pressure greater than the changeover pressure, bleed air is extracted from the IP delivery port.

At power settings below this pressure, bleed is extracted from the HP bleed port.

On the RB21-22B engine, the nose cowl anti-icing air is always taken from the IP port and this nose cowl anti-icing air is approximately 1.5% of IP compressor flow. On all other engine models, the nose cowl anti-icing air bleed flow is included in the maximum bleed flows quoted for IP and HP bleeds.

engine model	reference pressure	valve controller	altitude	changeover pressure (lbf/in², gauge) (1)
RB211-22B-02	IP compressor delivery (P3)	all	sea-level	42
			35,000 ft	25
RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19, RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524C2-19, RB211-524C2-B-19, RB211-524D4-19, RB211-524D4-39, RB211-524D4-B-19, RB211-524D4-B-39, RB211-524D4X-19, RB211-524D4X-B-19	HP compressor delivery (P4)	60B 40123-2	sea-level	84 ± 3
			30,000 ft	84 ± 4
			40,000 ft	71 ± 3
		60B 40123-3, maximum setting	sea-level	89
			36,000 ft	89
			45,000 ft	66
		60B 40123-3, minimum setting	sea-level	79
			30,000 ft	79
			45,000 ft	56
RB211-524G2-19, RB211-524G3-19, RB211-524G2-T-19, RB211-524G3-T-19	HP compressor delivery (P3.0)	60B 40123-103	sea-level	84 ± 3
			30,000 ft	84 ± 4
			45,000 ft	71 ± 3
RB211-524H-36, RB211-524H-T-36	HP compressor delivery (P3.0)	all	sea-level	105 ± 5
			27,000 ft	105 ± 5
			43,000 ft	75 ± 5
RB211-524H2-19, , RB211-524H2-T-19	HP compressor delivery (P3.0)	all	sea-level	84 ± 3
			30,000 ft	84 ± 4
			45,000 ft	71 ± 3

(1) changeover pressure varies linearly between the values indicated at the mentioned altitudes

The compressor air bleeds are to be used in accordance with the Rolls-Royce instructions, and such that the Operating Limitations are not exceeded.

The maximum engine rpm at which bleed may be used is unrestricted.

The air delivery for aircraft services is as follows:

engine model	operation	maximum HP bleed (% compressor flow)		maximum IP bleed (% compressor flow)		maximum LP bleed (% fan flow)	
RB211-22B-02	normal	ground idle to changeover point	9.0	ground idle to flight idle	1.5	N/A	
				flight idle to max. take-off	6.5		
	abnormal	ground idle to changeover point	12.0	flight idle to max. take-off	6.5		
RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19, RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524C2-19, RB211-524C2-B-19, RB211-524D4-19, RB211-524D4-39, RB211-524D4-B-19, RB211-524D4-B-39, RB211-524D4X-19, RB211-524D4X-B-19	N/A	ground idle to changeover point	9.0	changeover point	7.2	from ground idle to 93% HP rpm	0.5
				maximum continuous	5.0	maximum continuous	0.4
				maximum take-off	3.4	maximum take-off	0.6
RB211-524G2-19, RB211-524G3-19, RB211-524G2-T-19, RB211-524G3-T-19	N/A	ground idle to changeover point	9.0	changeover point	6.3	from ground idle to 93% HP rpm	0.6
				maximum continuous	5.0	maximum continuous	0.4
				maximum take-off	3.4	maximum take-off	0.6
RB211-524H-36, RB211-524H-T-36	N/A	ground idle to changeover point	10.6	changeover point	6.3	from ground idle to 93% HP rpm	0.6
				maximum continuous	5.0	maximum continuous	0.4
				maximum take-off	3.4	maximum take-off	0.6
RB211-524H2-19, RB211-524H2-T-19	N/A	ground idle to changeover point	9.0	changeover point	6.3	from ground idle to 93% HP rpm	0.6
				maximum continuous	5.0	maximum continuous	0.4
				maximum take-off	3.4	maximum take-off	0.6

IV. Operating Limitations

The following operating limitations are applicable when the accuracy of the installed engine instrumentation is in accordance with the following reports.

RB211-22B-02	RR report APS 1018 issue 3
RB211-524B-02 RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524B-B-02	RR report APS 1028
RB211-524B2-19, RB211-524C2-19, RB211-524B2-B-19, RB211-524C2-B-19	RR report APS 1030
RB211-524D4-19, RB211-524D4-39, RB211-524D4-B-19, RB211-524D4-B-39, RB211-524D4X-19, RB211-524D4X-B-19	RR report APS 1037
RB211-524G2-19, RB211-524G3-19, RB211-524G2-T-19, RB211-524G3-T-19	RR report APS 1047
RB211-524H-36, RB211-524H-T-36	RR report APS 1050
RB211-524H2-19, RB211-524H2-T-19	RR report APS 1047

The engines may be used up to ISA +40°C.

engine model	flat ratings			
RB211-22B-02	ISA	+13.9°C	for take-off rating	
	ISA	+9°C	for max. continuous rating	up to 25,000 ft (1)
	ISA	+13°C	for max. continuous rating	at higher altitudes
RB211-22B-02 (MOD 72-8700)	ISA	+8.4°C	for take-off rating	up to 5,600 ft (2)
	ISA	+9°C	for max. continuous rating	up to 25,000 ft (1)
	ISA	+13°C	for max. continuous rating	at higher altitudes
RB211-524D4-19, RB211-524D4-39, RB211-524D4-B-19, RB211-524D4-B-39	ISA	+15°C	for take-off rating	at 51,980 lbsf equivalent sea level thrust
	ISA	+10°C	for max. continuous rating	at 47,230 lbsf equivalent sea level thrust
RB211-524B4-D-02	ISA	+17.8°C	for take-off rating	up to 5,000 ft
	ISA	+9°C	for max. continuous rating	up to 25,000 ft (1)
	ISA	+10°C	for max. continuous rating	at higher altitudes
RB211-524B-02, RB211-524B3-02, RB211-524B4-02, RB211-524B2-19, RB211-524B-B-02, RB211-524B2-B-19, RB211-524C2-19, RB211-524C2-B-19	ISA	+13.9°C	for take-off rating	
	ISA	+9°C	for max. continuous rating	up to 25,000 ft
	ISA	+10°C	for max. continuous rating	at higher altitudes
RB211-524D4X-19, RB211-524D4X-B-19	ISA	+15°C	for take-off rating	at 52,810 lbsf equivalent sea level thrust
	ISA	+10°C	for max. continuous rating	at 47,230 lbsf equivalent sea level thrust
alternative rating for RB211-524D4-19, RB211-524D4-B-19, RB211-524D4X-19, RB211-524D4X-B-19	ISA	+11.2°C	for take-off rating	up to 2,000 ft at 53,460 lbsf equivalent sea level thrust
RB211-524G2-19, RB211-524G3-19, RB211-524G2-T-19, RB211-524G3-T-19 (3)	ISA	+15°C	up to sea level	
	varies linearly between ISA +15°C and ISA +10° between sea-level and 5,000 ft			
	ISA	+10°C	at and above 5,000 ft	
RB211-524H-36, RB211-524H-T-36, RB211-524H2-19, RB211-524H2-T-19	ISA	+15°C	up to 1,400 ft	
	varies linearly between ISA +15°C and ISA +8° between 1,400 ft and 3,300 ft			
	ISA	+8°C	between 3,300 ft and 5,700 ft	
	ISA	+11.7°C	above 5,700 ft	

(1) or up to 26,000 ft at Mach numbers between 0.5 and 0.6

(2) after 5,600 ft, thrust reduces linearly to be the same as the -22B at ISA +13.9°C and 10,000 ft. The Maximum Continuous rating is unchanged from the 22B

(3) the RB211-524G3-19 and RB211-524G3-T-19 have an increased +2.9% thrust at ISA +21.2°C between 0.1 and 0.4 Mach number at 600'

1. Temperature Limits

1.1 Turbine Gas Temperature Limits

	Turbine Gas Temperature (°C, trimmed)						
	momentary maximum				without time restriction		
engine model	during starts on the ground	during re-lights in flights	maximum over temperature (20 sec. limit)	maximum for acceleration (2 min. limit)	maximum for take-off (1)	maximum continuous	maximum for ground idling
RB211-22B-02	550	550	750	738	728	700	460
RB211-22B-02 post MOD 5089	550	550	750	738	728	710	460
RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19, RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524C2-19, RB211-524C2-B-19	600	550	800	N/A	785	732	N/A
RB211-524D4-19, RB211-524D4-39, RB211-524D4-B-19, RB211-524D4-B-39, RB211-524D4X-19, RB211-524D4X-B-19	600	550	800	N/A	785	722	N/A

(1) These operating limitations may be used for up to 10 minutes in the event of engine failure (BCAR Section C Issue 13)

	Turbine Gas Temperature (°C, trimmed)					
	below 50% speed	above 50% speed				
		momentary maximum		without time restriction		
engine model		maximum over temperature (20 sec. limit)	maximum for acceleration (2 min. limit)	maximum for take-off (1)	maximum continuous	maximum for ground idling
RB211-524G2-19, RB211-524G3-19, RB211-524G2-T-19, RB211-524G3-T-19	600	805	N/A	785	733	N/A
RB211-524H-36, RB211-524H-T-36, RB211-524H2-19, RB211-524H2-T-19	600	805	N/A	785	733	N/A

(1) These operating limitations may be used for up to 10 minutes in the event of engine failure (BCAR Section C Issue 13)

1.2 Oil temperature limits

	Combined Scavenge Temperature (°C)			
	minimum		maximum	
engine model	for starting	for opening up	unrestricted	transient (15 min. limit) (1)
RB211-22B-02	-40 (2)	-10 (2)	100 (2)	135 (2)
RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19, RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524C2-19, RB211-524C2-B-19	-50	-10	170	N/A
RB211-524B4-02, RB211-524B4-D-02	-50	-10	160	N/A
RB211-524D4-19, RB211-524D4-39, RB211-524D4-B-19, RB211-524D4-B-39, RB211-524D4X-19, RB211-524D4X-B-19	-40	-10	167	N/A
RB211-524G2-19, RB211-524G3-19, RB211-524G2-T-19, RB211-524G3-T-19	-30	-10	171	N/A
RB211-524H-36, RB211-524H-T-36, RB211-524H2-19, RB211-524H2-T-19	-30	-10	171	N/A

(1) transient overshoots on reducing rpm

(2) Temperature at outlet from oil pressure pump (°C)

1.3 Fuel temperature limits

Maximum temperature:

RB211-22B-02:

at inlet to LP fuel pump 57 °C

at inlet to HP fuel pump (measured at fuel filter outlet)

unrestricted 95 °C

maximum during transient overshoots on reducing rpm (15 min limit) 115 °C

RB211-22B-02, RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19, RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524C2-19, RB211-524C2-B-19, RB211-524D4-19, RB211-524D4-B-19, RB211-524D4X-19, RB211-524D4X-B-19, RB211-524D4-39, RB211-524D4-B-39:

at inlet to LP fuel pump 57 °C

at inlet to HP fuel pump (measured at fuel filter outlet)

unrestricted 95 °C

maximum during transient overshoots on reducing rpm (15 min limit) 115 °C

RB211-524B4-02, RB211-524B4-D-02:

at inlet to LP fuel pump 47 °C

at inlet to HP fuel pump (measured at fuel filter outlet)

unrestricted 95 °C

maximum during transient overshoots on reducing rpm (15 min limit) 115 °C

2. Speed Limits

2.1 Maximum speeds

	RPM maximum (%)									
	Maximum take-off (5 min. limit) (1)			Maximum continuous			Maximum overspeed (20 sec. limit)			maximum for reverse thrust
	HP	IP	LP	HP	IP	LP	HP	IP	LP	LP
RB211-22B-02	95.0	102.5	99.5	93.7	101.5	101.0	96.2	106.0	103.0	101.3 (2)
RB211-22B-02 (post MOD 5089)	95.0	102.5	99.5	94.2	101.5	101.0	96.2	106.0	103.0	101.3 (2)
RB211-524B-02	97.0	106.0	103.0	94.5	102.0	103.0	98.3	107.0	104.0	90.0 (3)
RB211-524B3-02	97.0	106.0	103.0	94.5	102.0	103.0	98.3	107.0	104.0	90.0 (3)
RB211-524B4-02	97.5	107.0	103.0	95.3	103.5	103.0	98.5	108.0	104.0	90.0 (3)
RB211-524B4-D-02	97.5	107.0	103.0	95.3	103.5	103.0	98.5	108.0	104.0	90.0 (3)
RB211-524B2-19	96.5	106.0	103.0	93.7	102.0	103.0	98.3	107.0	104.0	90.0 (3)
RB211-524B-B-02	98.3	106.0	103.0	96.3	104.0	103.0	99.6	107.0	104.0	90.0 (3)
RB211-524B2-B-19	98.4	106.0	103.0	96.3	104.0	103.0	99.6	107.0	104.0	90.0 (3)
RB211-524C2-19	97.1	106.0	104.0	94.4	102.5	103.0	98.3	107.0	105.0	90.0 (3)
RB211-524C2-B-19	98.6	106.0	104.0	96.3	104.0	103.0	99.6	107.0	105.0	90.0 (3)
RB211-524D4-19	97.5	106.0	104.4	95.2	103.0	103.7	98.9	107.0	106.0	90.0 (3)
RB211-524D4-39	97.5	106.0	104.4	95.2	103.0	103.7	98.9	107.0	106.0	90.0 (3)
RB211-524D4-B-19	98.6	106.0	104.4	96.5	103.0	103.7	99.6	107.0	106.0	90.0 (3)
RB211-524D4-B-39	98.6	106.0	104.4	96.5	103.0	103.7	99.6	107.0	106.0	90.0 (3)
RB211-524D4X-19	97.5	106.0	104.4	95.2	103.0	103.7	98.9	107.0	106.0	90.0 (3)
RB211-524D4X-B-19	98.6	106.0	104.4	96.5	103.0	103.7	99.6	107.0	106.0	90.0 (3)
RB211-524G2-19	99.2	107.7	110.5	97.1	105.0	109.8	101.5	109.5	111.5	91.0 (4)
RB211-524G2-T-19	99.2	107.7	110.5	97.1	105.0	109.8	101.5	109.5	111.5	91.0 (4)
RB211-524G3-19	99.2	107.7	110.5	97.1	105.0	109.8	101.5	109.5	111.5	91.0 (4)
RB211-524G3-T-19	99.2	107.7	110.5	97.1	105.0	109.8	101.5	109.5	111.5	91.0 (4)
RB211-524H-36	99.2	107.7	110.5	97.1	105.0	109.8	101.5	109.5	111.5	91.0 (4)
RB211-524H-T-36	99.2	107.7	110.5	97.1	105.0	109.8	101.5	109.5	111.5	91.0 (4)
RB211-524H2-19	99.2	107.7	110.5	97.1	105.0	109.8	101.5	109.5	111.5	91.0 (4)
RB211-524H2-T-19	99.2	107.7	110.5	97.1	105.0	109.8	101.5	109.5	111.5	91.0 (4)
RB211-524H2-T-19 (Post SB73-J127)	99.2	108.8 (5)	110.5	97.1	106.1 (5)	109.8	101.5	110.6 (5)	111.5	91.0 (4)

(1) These operating limitations may be used for up to 10 minutes in the event of engine failure

RPM maximum (%)									
Maximum take-off (5 min. limit) (1)			Maximum continuous			Maximum overspeed (20 sec. limit)			maximum for reverse thrust
HP	IP	LP	HP	IP	LP	HP	IP	LP	LP

(2) 30 sec. limit

(3) 60 sec. limit

(4) 40 sec. limit

(5) In addition to raising the mechanical IP speed limit by a factor of 1.01, SB73-J127 introduces a scaling factor on the FAFC ARINC output reducing the cockpit indicated IP speed output by a factor of 1.01. This therefore keeps the cockpit indicated limits common for both pre and post SB-J127 engines as 107.7 for max take-off, 105.0 for max continuous, and 109.5 for maximum overspeed.

2.2 Ground idle

Engine model	Ground idling LP speed (%)
RB211-22B-02	21.0 +2.3
RB211-524B-02	22.5 +1/-0
RB211-524B3-02	22.5 +1/-0
RB211-524B4-02	22.5 +1/-0
RB211-524B4-D-02	22.5 +1/-0
RB211-524B2-19	22.0 +1.5/-0
RB211-524B-B-02	22.5 +1/-0
RB211-524B2-B-19	22.0 +1.5/-0
RB211-524C2-19	22.0 +1.5/-0
RB211-524C2-B-19	22.0 +1.5/-0
RB211-524D4-19	22.6 +1.5/-0
RB211-524D4-39	22.6 +1.5/-0
RB211-524D4-B-19	22.6 +1.5/-0
RB211-524D4-B-39	22.6 +1.5/-0
RB211-524D4X-19	22.6 +1.5/-0
RB211-524D4X-B-19	22.6 +1.5/-0

Note: limit applies to 15°C ambient temperature conditions and varies linearly by 0.5% per 15°C change in air temperature

3. Pressure Limits

3.1 Fuel Pressure

All engine models:

Minimum pressure at engine inlet (measured at inlet to engine LP fuel pump)	not less than 5 lbf/in^2 abs plus true fuel vapour pressure with zero vapour/liquid ration between sea-level and 45,000 ft altitude

3.2 Oil Pressure

RB211-22B-02:

Minimum acceptance for flight	
Ground idle to 70% HP rpm	35 lbf/in^2
Above 70% HP rpm	70 lbf/in^2
Minimum to complete flight	35 lbf/in^2

Note: large reductions in engine rpm to below 70% HP rpm may result in transient reductions in oil pressure below 35 lbf/in^2. This is acceptable provided the oil pressure does not fall below 18 lbf/in^2 and recovers to at least 35 lbf/in^2 within 5 minutes of throttling back.

RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19, RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524C2-19, RB211-524C2-B-19, RB211-524D4-19, RB211-524D4-B-19, RB211-524D4X-19, RB211-524D4X-B-19, RB211-524D4-39, RB211-524D4-B-39:

Minimum acceptance for flight	
Ground idle to 70% HP rpm	35 lbf/in^2
Above 70% HP rpm	40 lbf/in^2
Minimum to complete flight	
Ground idle to 70% HP rpm	25 lbf/in^2
Above 70% HP rpm	35 lbf/in^2

Note: large reductions in engine rpm to below 70% HP rpm may result in transient reductions in oil pressure below 25 lbf/in^2. This is acceptable provided the oil pressure does not fall below 18 lbf/in^2 and recovers to at least 25 lbf/in^2 within 5 minutes of throttling back.

RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19, RB211-524G3-T-19, RB211-524H2-19, RB211-524H2-T-19, RB211-524H-36, RB211-524H-T-36:

Minimum	
Ground idle to 70% HP rpm	25 lbf/in^2
Above 70% HP rpm	35 lbf/in^2

Note: large reductions in engine rpm to below 70% HP rpm may result in transient reductions in oil pressure below 25 lbf/in^2. This is acceptable provided the oil pressure does not fall below 18 lbf/in^2 and recovers to at least 25 lbf/in^2 within 5 minutes of throttling back.

4. Oil capacity, consumption limit

RB211-22B-02:

Consumption

Overall inflight, maximum for unrestricted operation	2.0 Imp pt/hr

Capacity

Nominal total oil system capacity	72.6 Imp pt
Nominal oil tank capacity	47.4 Imp pt
Usable oil (including effect of attitude) minimum	39.6 Imp pt

RB211-524B-02, RB211-524B3-03, RB211-524B4-02, RB211-524B4-D-02, RB211-524B-B-02:

Consumption

Overall inflight, maximum for unrestricted operation	1.6 Imp pt/hr

Capacity

Nominal total oil system capacity	62.5 Imp pt
Nominal oil tank capacity	38.0 Imp pt
Usable oil (including effect of attitude) minimum	27.5 Imp pt

RB211-524B2-19, RB211-524-C2-19, RB211-524D4-19, RB211-524D4-39, RB211-524B2-B-19, RB211-524C2-B-19, RB211-524D4-B-19, RB211-524D4-B-39, RB211-524D4X-19, RB211-524D4X-B-19:

Consumption

Overall inflight, maximum for unrestricted operation	2.0 Imp pt/hr

Capacity

Nominal total oil system capacity	73.0 Imp pt
Nominal oil tank capacity	47.8 Imp pt
Usable oil (including effect of attitude) minimum	39.6 Imp pt

RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19, RB211-524G3-T-19, RB211-524H2-19, RB211-524H2-T-19, RB211-524H-36, RB211-524H-T-36:

Consumption

Overall inflight, maximum for unrestricted operation	2.0 Imp pt/hr

Capacity

Nominal total oil system capacity	72.6 Imp pt
Nominal oil tank capacity	47.4 Imp pt
Usable oil (including effect of attitude) minimum	39.6 Imp pt

V. Operating and Service Instructions

RB211-22B-02:

Operating Instructions	F-RB211-T
Maintenance	M-211-TRR
Overhaul	0-211 En-TRR

RB211-524B-02, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524B-B-02:

Operating Instructions	F-211 (524B)-T
Maintenance Manual	M-211 (524)-T
Engine Manual	E-211 (524)-3RR

RB211-524B2-19, RB211-524D4-19, RB211-524D4-39, RB211-524B2-B-19, RB211-524D4-B-19, RB211-524D4-B-39, RB211-524C2-19, RB211-524C2-B-19:

Operating Instructions	F-211 (524)-BSP
Maintenance Manual	M-211 (524)-B
Engine Manual	E-211 (524)-2RR

RB211-524B2-19, RB211-524C2-19, RB211-524D4-19, RB211-524B2-B-19, RB211-524C2-B-19, RB211-524D4-B-19, RB211-524D4X-19, RB211-524D4-X-B-19:

Operating Instructions	F-211 (524)-B
Maintenance Manual	M-211 (524)-B
Engine Manual	E-211 (524)-2RR

RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19, RB211-524G3-T-19:

Operating Instructions	F-211 (524G/H)-747
Maintenance Manual	Aircraft Maintenance Manual Boeing 747-400 D633U101-RR
Engine Manual	E-211 (524)-2RR
Time Limits Manual	T-211 (524)-7RR
Installation Brochure	EL2806 A

RB211-524H2-19, RB211-524H2-T-19

Operating Instructions	F-211 (524G/H)-747
Maintenance Manual	Aircraft Maintenance Manual Boeing 747-400 D633U101-RR
Engine Manual	E-211 (524)-7RR
Time Limits Manual	T-211 (524)-7RR
Installation Brochure	EL2806 A issue 8

RB211-524H-36, RB211-524H-T-36

Operating Instructions	F-211 (524) -767
Maintenance Manual	Aircraft Maintenance Manual Boeing 767 D633T193
Engine Manual	E-211 (524)-7RR
Time Limits Manual	T-211 (524)-7RR
Installation Brochure	EL2812 A issue 3

VI. Notes

1. Model RB211-22B-02 was previously covered under CAA UK Engine Type Certificate No. 043/1 and CAA UK Type Certificate Data Sheet No. 1039 prior to being superseded by the EASA Type Certificate and Type Certificate Data Sheet.
2. Models RB211-524-02, RB211-524B-02, RB211-524B-B-02, RB211-524B2-19, RB211-524B2-B-19, RB211-524B2-39, RB211-524B3-02, RB211-524B4-02, RB211-524B4-D-02, RB211-524C2-19, RB211-524C2-B-19, RB211-524D4-19, RB211-524D4-B-19, RB211-524D4X-19, RB211-524D4X-B-19, RB211-524D4-39 and RB211-524D4-B-39 were previously covered under CAA UK Engine Type Certificates No. 053, 055/1, 056, 057/1, 058, 059/1, 062/1, 066/2, 078/1 and CAA UK Type Certificate Data Sheet No. 1043 prior to being superseded by the EASA Type Certificate and Type Certificate Data Sheet.
3. Models RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19, RB211-524G3-T-19 were previously covered under CAA UK Engine Type Certificate No. 087/4 and CAA UK Type Certificate Data Sheet No. 1046 prior to being superseded by the EASA Type Certificate and Type Certificate Data Sheet.
4. Models RB211-524H2-19, RB211-524H2-T-19, RB211-524H-36, RB211-524H-T-36 were previously covered under CAA UK Engine Type Certificate No. 089/2 and CAA UK Type Certificate Data Sheet No. 1048 prior to being superseded by the EASA Type Certificate and Type Certificate Data Sheet.
5. Models RB211-22-02, RB211-22C-02 and RB211-22CA-02, which were approved on 22 February 1972, 18 May 1972 and 2 April 1973 respectively, are no longer in service and have been deleted from this TCDS as from December 1974.
6. The RB211-22B-02 (Mod 72-8700) was originally approved on 25 March 1988. It is a re-rate of the existing RB211-22B-02 model, defined to give increased take-off thrust at lower altitudes/ambient temperatures.
7. The RB211-524G-19 was first approved for installation in the B747-400 aircraft on 25 March 1988. This variant is no longer in service and was deleted from the CAA UK TCDS No. 1046 at Issue 4 on 9 May 1990.
8. Rolls-Royce adds suffixes to an Engine Type Designation to identify approved specific configuration variations within the Type. This suffix, which is of the form /00 is used when necessary to provide traceability of customer option equipment selections and is included on the engine nameplate and in engine documentation.
9. The RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19, RB211-524G3-T-19, RB211-524H2-19, RB211-524H2-T-19, RB211-524H-36 and RB211-524H-T-36 engines are fitted with an independent HP spool governor, despatch with this item unserviceable is not permitted.
10. The RB211-524G2-19, RB211-524G2-T-19, RB211-524G3-19, RB211-524G3-T-19, RB211-524H2-19, RB211-524H2-T-19, RB211-524H-36 and RB211-524H-T-36 engines satisfy the certification basis in section II of this TCDS when operating with the FAFC in reversionary control mode.

11. In respect of Extended Range Operations, the qualifying standard and approved maximum rule time for the RB211-524H series engins, eligible for use in the Boeing 767 aircraft, are defined in CAA approved document ANR 125.

12. The acceptance limitations for Production Pass-off and Repair/Overhaul are defined in the latest edition of Rolls-Royce manual E211(524)-7RR. The Engine Manual states the Trimmer values which establish the constant Turbine Gas Temperature operating limits for varying Turbine Entry Temperatures which is a function of engine model and modification standard.

SECTION: ADMINISTRATIVE

I. Acronyms and Abbreviations

BCAR	British Civil Airworthiness Requirements
CAA UK	Civil Aviation Authority of the United Kingdom
DIS	Drawing Introduction Sheet
EASA	European Union Aviation Agency
ETCDS	Engine Type Certificate Data Sheet
FAFC	Full Authority Fuel Control
HP	High Pressure
ICAO	International Civil Aviation Organization
INA	Integrated Nozzle Assembly
ISA	International Standard Atmosphere
IP	Intermediate Pressure
JAR	Joint Aviation Regulations
LP	Low Pressure
NGV	Nozzle Guide Vane
PINT	Integrated fan and turbine exhaust total pressure
PTO	Ambient Pressure
RPM	Revolutions per minute
RR	Rolls-Royce plc
TC	Type Certification
TCDS	Type Certificate Data Sheet

II. Type Certificate Holder Record

Rolls-Royce Deutschland Ltd & Co KG

formerly (until 20 February 2019): Rolls-Royce plc

III. Change Record

Issue	Date	Changes	TC issue
Issue 01	19 May 2017	Initial Issue of EASA TCDS due to: 1. Change to the IP speed limits for model RB211-524H2-T-19 2. Removal of approved oils (replaced with reference to operating instructions)	Initial Issue, 19 May 2017
Issue 02	23 March 2018	Change of TC Holder's address	23 March 2018
Issue 03	21 February 2019	Transfer of TC from Rolls-Royce plc to Rolls-Royce Deutschland Ltd & Co KG	21 February 2019

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